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Heat transfer—a review of 2001 literature

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1. Introduction

Heat transfer continues to be a major field of interest to engineering and scientific researchers, as well as designers, developers, and manufacturers. Considerable effort has been devoted to research in traditional applications such as chemical processing, general manufacturing, energy devices, including general power systems, heat exchangers, and high performance gas turbines. In addition, a significant number of papers address topics that are at the frontiers of both fundamental research and important emerging applications, such as microchannel flows, bioheat transfer, electronics cooling, semiconductors and a number of natural phenomena ranging from upwelling currents in the oceans to heat transport in stellar atmospheres.

The present review is intended to encompass the English language heat transfer papers published in 2001. While being exhaustive, some selection is necessary. We restrict ourselves to papers published in reviewed archival journals. Many papers reviewed herein relate to the science of heat transfer, including numerical, analytical and experimental works. Others relate to applications where heat transfer plays a major role in not only virtually all man made devices, but natural systems as well. The papers are grouped into categories and then into subfields within these categories.

Besides reviewing the journal articles in the body of this paper, we also mention important conferences and meetings on heat transfer and related fields, major awards presented in 2001, and books on heat transfer published during the year.

The 6th ASME Thermal Anemometry Symposium was held in Melbourne, Australia on 1 January. The First International Conference on Computational Methods in Multiphase Flow was held on 14–16 March in Orlando, USA. The 3rd United Engineering Foundation Conference on Turbulent Heat Transfer was held in Alyeska, Alaska, USA on 18–22 March. Sessions were held on direct numerical simulation (DNS)/LES, experimental techniques, and gas turbines. A meeting on Advances in Computational Heat Transfer was held in Palm Cove, Australia, on 20–25 May. Topics discussed included natural convection, solidification, turbulence, porous media and grid generation. The 35th National Heat Transfer Conference was held in Anaheim, USA on 10–12 June. The focus was on emerging applications of heat transfer, including bioengineering, electronic cooling, and microchannels and microscale transport. The Third International Symposium on Radiative Heat Transfer in Antalya, Turkey on 17–22 June had sessions on transient problems, the method of discrete ordinates, inverse problems, and radiative transfer in foams, and particulate and porous media. The International Intersociety Electronic and Photonic Packaging Conference and Exposition (InterPACK'01) in Kola, Hawaii on 8–13 July included sessions on thermal management and microelectronic cooling. The 5th International Symposium on Experimental and Computational Aerothermodynamics of Internal Flows was held in Gdansk, Poland on 4–7 September. The 5th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics on 24–28 September in Thessaloniki, Greece covered instrumentation, vortex flows, thermal-hydraulics, combustion, and boiling. A meeting on Microgravity Transport Processes in Fluid, Thermal, Biological and Materials Sciences held on 30 September–5 October in Banff, Canada discussed electrostatic and electromagnetic phenomena, crystal growth, interfacial phenomena and two-phase flows. The 2001 ASME International Mechanical Engineering Congress and Exposition (IMECE) was held in New York on 11–16 November. Topics covered included heat pipes and multiphase heat transfer, microscale thermal phenomena, heat and mass transfer in biotechnology, and transport phenomena in fuel cell systems. The 2001 ASME Turbo Expo organized by the ASME in New Orleans on 4–7 June held sessions on combustor heat transfer, film cooling, internal cooling, and endwall flow and heat transfer.

The 2000 Max Jakob Award was presented at the 2001 National Heat Transfer Conference to Vedat Arpaci for his discoveries on the optical dependence of radiating gas instability, photon-vibration interaction in radiating plasma kinetics, microscale of complex turbulent flows, and natural convection. The Donald Q. Kern Award instituted by the ASME/AIChE was bestowed on Hamid Arastoopour for his many contributions to industrial design and energy conversion. The Nusselt–Reynolds prizes for outstanding contributions in the area of heat transfer were awarded to Ronald Adrian for his development of new experimental techniques and to Arthur Bergles for his seminal work in the area of heat transfer enhancement. At IMECE-2001, the Heat Transfer Memorial Awards were given to G.P. Peterson (Art) for his contributions in the area of phase-change heat transfer and microscale heat pipes, and Portonovo S. Ayyaswamy (Science) for his work in phase-change, plasma, bioheat transfer, droplet flows, and natural convection.

Books published on heat transfer during the year include the following:

Fundamentals of heat Transfer (5th edn.)
F. Incropera and D.P. DeWitt
John Wiley and Sons

Fundamentals of Momentum, Heat and Mass Transfer (4th edn.)
J. Welty
John Wiley and Sons

Heat Transfer (9th edn.)
J.P. Holman
McGraw-Hill

Heat Transfer in Gas Turbines
B. Sunden, M. Faghri (eds.)
WIT Press

Heat Transfer in Gas Turbine Systems
R.J. Goldstein (ed.)
Annals of the New York Academy of Sciences

Advances in Heat Transfer, Vol. 35
J.P. Hartnett, T.F. Irvine, Y.I. Cho, G.A. Greene (eds.)
Academic Press

Principles of Heat Transfer
M. Kaviany
Wiley-Interscience

Extended Surface Heat Transfer
A.D. Kraus, A. Azziz, J.R. Welty
Wiley-Interscience

Principles of Convective Heat Transfer
M. Kaviany
Springer-Verlag

Convective Heat Transfer
I.I. Pop, D.B. Ingham
Pergamon Press

Optical Measurements: Techniques and Applications
O. Feldmann, F. Mayinger
Springer-Verlag

Thermal Radiation Heat Transfer (4th edn.)
R. Siegel, J.R. Howell
Taylor & Francis

Computational Fluid Dynamics
T.J. Chung
Cambridge University Press

Interfacial Phenomena and Convection
A.A. Nepomniaschii, M.G. Velarde, P. Colinet
CRC Press

Dynamics of Regenerative Heat Transfer
J. Wilmott
Taylor & Francis

Fundamentals of Heat Exchanger Design
R.K. Shah, D.P. Sekulic
John Wiley and Sons

Heating and Cooling of Buildings
J.F. Kreider, P. Curtiss, A. Rabi
McGraw-Hill

Handbook of Flow Visualization
W.-J. Yang
Routledge

The Boundary Element Method: Applications in Thermofluids and Acoustics. Vol. 1.
L.C. Wrobel, M. Aliabadi
John Wiley and Sons

Advances in Numerical Heat Transfer, Vol. 2
W.J. Minkowycz, E.M. Sparrow (eds.)
Taylor & Francis

Gas Turbine Heat Transfer and Cooling Technology
J.-C. Han, S. Dutta, S. Ekkad
Taylor & Francis

2. Conduction

For the year 2002, numerous papers appeared in this category and the various subcategories included; Contact conduction and contact resistance; micro/nanoscale thermal effects, laser pulse heating and hyperbolic heat conduction; composites and heterogeneous media and complex geometries; conduction with convection; analytical, numerical and experimental studies; thermomechanical problems; and special applications of heat conduction. All of the papers that appeared this year are briefly detailed and follow next.

2.1. Contact conduction and contact resistance

The papers that appeared in this subcategory included analytical, modeling and numerical aspects, and experimental studies of heat conduction effects due to contact conduction and contact resistance. Some analytic aspects appear in Ref. [2] dealing with metal/polymer joints and in [5] which deals with non-flat rough surfaces with non-metallic coatings. The modeling aspects, and also the numerical aspects appear in Refs. [1–4,8–14]. An experimental investigation for gold coatings and ceramic substrates appears in [4] and other experimental studies for contact conduction/resistance are present to an extent in some of the previous references. Temperature effects in compound annular sections [6] and for non-circular heat sources [7] fundamentally address thermal resistance models.

2.2. Micro/nanoscale thermal effects, laser pulse heating, and hyperbolic heat transport

There is evidence of increased research activity in this subcategory which includes a wide variety of topical subjects to probe the fundamental aspects of heat transport. Again, analytic, numerical and experimental studies have been extensively carried out including comparative studies in some of the studies. The topical subject matter encompasses solid state physics, molecular dynamics, constitutive models, mathematical theories, modeling, numerical simulations, and a wide variety of experimental studies. Thermal effects due to laser pulse heating also appear in this subcategory. In a majority of the studies, a principal focus is on estimation of thermal properties such as thermal conductivity in very thin films [17,23,27,29,36], subcontinuum length scale [30] and time scale [22]. Other aspects focus on the appropriateness of constitutive models for heat conduction and studies of validity for assessing small scale effects [15,16,20,21,25,26,31,32], while a wide variety of other studies have dealt with providing an understanding of thermal heat transport and temperature profiles in materials under various conditions to include those due to laser effects [19,28,33–35]. Related study of ballistic energy heat transport [18] and vibrational energy transfer in glass [24] also appear in the literature.

2.3. Composites, heterogeneous media and complex geometries

The study of thermal interface materials appears in [37]. The studies dealing with arbitrary geometries, fins and layered media include those that have appeared in [38–40,43]. The computation of effective thermal conductivity of unidirectional composites [41], and heat conduction in granular materials [42] also relate to this subcategory.

2.4. Conduction with convection, phase change

The numerical analysis involving natural convection and entropy generation from a cylinder with high conductivity fins [44], simulation of conduction advection problems with phase change [45], mechanism and control of heat transfer influenced by convection [46], phase-change heat transport in laser transformation [47], and weld metal composition change in during conduction mode laser welding of an aluminum alloy [48] appeared in this subcategory.

2.5. Analytical, numerical and experimental studies

A wide range of applications and a wide variety of analytical and numerical methods have been used to study various mechanisms of heat transport. Likewise, numerous experimental studies also appeared in the literature. The numerical techniques encompass finite differences, finite elements, and the like to include developments of solution methods and transient algorithms to address a variety of situations. Shape design, optimization and sensitivity analysis related issues for thermal conduction have also been addressed. Inverse problems and related applications continue to be challenging and have been studied. The relevant literature in this subcategory appears in [49–69]. Comparisons with experimental studies appear in some of the research in heat conduction.

2.6. Thermomechanical problems

The effects of temperature in materials and structures is an important coupled problem and relates to thermomechanical or thermal stress studies. The analysis of thermal stresses due to pulsating flow in circular pipes [70], effects due to shrinking and cracking in drying [71], gap formation and interfacial heat transfer between imperfect thermoelastic bodies [72], thermal stresses due to the two step heat conduction equation in a rapidly heated plate [73], and a coupled heat conduction equation for linear thermoelasticity [74] appeared in this subcategory.

2.7. Miscellaneous and special applications

A wide variety of specialized applications and various miscellaneous studies involving heat conduction have been studied. The range of applications include moisture effects, thermal studies in buildings and foundations, solar effects, electron devices and capacitors, automotive components and the like. These and related specialized applications appear in [75–97].

3. Boundary layers and external flows

Papers on boundary layers and external flows for 2001 have been categorized as follows: flows influenced externally, flows with special geometric effects, compressible and high-speed flows, analysis and modeling techniques, unsteady flow effects, flows with film and interfacial effects, flows with special fluid types or property effects and flows with reactions.

3.1. External effects

Papers that focus on external effects document the influence of thermal boundary conditions [100,101], suction through the wall [99] and freestream turbulence [98,102].

Two papers include studies of thermal boundary conditions. In one, wall temperature fluctuations were experimentally documented for different thermal wall boundary conditions [100]. Also, the effects of a thermal entrance region on wall temperature distributions were given. Results of DNS on temperature fields in flumes were presented [101]. When $Pr = 1$, the buffer layer part of the boundary layer significantly influences the heat transfer in the conduction sublayer, whereas at $Pr = 5.4$, the near-wall temperature field may be associated with predominant motion in the viscous sublayer. The effect of concentrated wall suction was computed [99]. It was noted that the severity of the response to a disturbance is reduced at higher Reynolds numbers. Turbulence intensity levels and length scales were shown to affect low-pressure turbine boundary layer transition and separation when the turbulence level is high [98]. The effect of turbulence intensity was computed for heat transfer from the stagnation region of a flat plate with a circular leading edge [102]. Augmentation over laminar levels was around 77%.

3.2. Geometric effects

Papers in this category addressed heat transfer in several geometries; a parabolic cylinder [105], a cube [116], a viscous sphere [110], a baffled cylinder [104], fibers in the flow [113], a cavity on a wall, [124], a sphere attached to a wall [111], a dimple on the wall [120], roughness, including ice [107,112,119], a wavy wall [121,109] stretching sheets [103,114,115,118,122,123], a stagnation region [117], a short heated strip [106] and opposing flows [108].

One paper numerically investigated laminar flow past parabolic bodies in a uniform stream [105]. The effects of both Reynolds number and Prandtl number on the local and average Nusselt numbers were presented. Another presented experimental results for a cube mounted on a wall [116]. An equation was given for the Nusselt number in terms of the Reynolds number. Flow around, and heat and mass transfer from, a viscous sphere were computed [110]. Nusselt numbers for various values of *Re*, *Pe* and viscosity ratio were presented. The effect of the internal fluid density on the heat or mass transfer was shown to be negligible. The effects of baffles on a cylinder in cross-flow were computed [104]. Optimum conditions were found. Heat transfer from surfaces on which fibers had been flocked was evaluated [113]. The friction factor and Nusselt number multipliers varied strongly with length of the fibers relative to the duct half width or radius. Convective heat transfer from the wall of a cavity to an external stream was evaluated [124]. Detailed measurements allowed discussing the regions of strongest augmentation. DNS was used to describe heat transfer from a sphere on the wall of a channel [111]. The effect of the sphere on the structure of near-wall turbulence were used to discuss the heat transfer results. Heat transfer from dimples on a concave or convex surface was experimentally described [120]. The tornado-like oscillating vortex bursting from the dimple was related to observations of the effects of curvature. Three papers dealt with roughness. In one [107], the roughness length for melting snow and ice was experimentally described. The roughness length of temperature was about 10–100 times that of the hydrodynamic roughness length. In another, some rules for estimating effects of roughness were presented [119]. For gases, the enhancement is reached by creating many reattachment zones after obstacles. For liquids, the effect is mostly the disturbance of the viscous sublayer. The final roughness paper discusses roughness due to ice formation [112]. Frost layers which form on the front and rear surfaces of a horizontal cylinder were found to be thicker than those on the top and bottom surfaces. Important are the Reynolds number, temperature, humidity, dew point and the thermal conductivity of the frost layer. Two papers dealt with wavy surfaces. The first gives heat transfer rates described as functions of Reynolds number, Prandtl number, wavelength and amplitude [121]. The results are limited to mild amplitudes. Another is a model for heat transfer during wave breaking, as observed on the ocean surface [109]. The breaking wave surface conditions are incorporated into the model by the different transport properties at the near-interface layers. Stretching sheets were discussed in several papers. In the first, the sheet was non-linearly stretched [123]. In the second, the effects of Hall and ion-slip currents on magnetomicropolar fluids were computed [118]. Important effects are the magnetic parameter, Hall parameter, ion-slip parameter, mass transfer parameter and power-law exponent. In a third, the stretch is with a rapidly decreasing velocity [114]. Another focuses on non-Newtonian fluids, variable wall temperature and injection or suction [122]. The various ways of enhancing heat transfer coefficients with these effects were quantified. Another paper studied the problem of free convection with buoyancy, radiation and transverse magnetic fields [103]. The effects on both heat transfer and velocity distributions were quantified. The final stretching surface paper gave an exact analytical solution for heat transfer from a permeable, continuous surface with a variable stretching rate [115]. Two papers investigated the effects of flow turbulence. In the first, the different vortical structures that can be generated in the flow were studied with regard to stagnation region heat transfer [117]. In a second, a discrete Green's function approach was considered in discussing the effect of freestream turbulence [106]. Liquid crystal imaging was used for temperature measurement. In the final paper of this category, mass transfer rates were determined in a region of opposing-current flow [108]. The ratio between the mass transfer rate and the energy dissipation rate was determined.

3.3. Compressibility and high-speed flow effects

Papers in this category include several with different body shapes [126,128,129,131,132], a supersonic nozzle [125], wall temperature jumps [133], stagnation flow [136], the effects of radiation [130], transition and turbulence modeling [127,137,138] and flows with reactions [134,135].

One paper presented measurements of temperature distributions on an elliptic cone lifting body in a hypersonic flow [132]. Temperature sensitive paints were used for the measurements. The effects of boundary layer transition location were documented. Aerodynamic heating of the X-33 was experimentally evaluated in support of advanced metallic thermal protection system design [131]. The value of pressure and temperature sensitive paints for these experiments was extolled. Hypersonic flow heat transfer predictions based on single-equation turbulence models were presented [129]. One model was preferred over the other two tested for this case and was recommended for hypersonic flow heat transfer. Experimental results were given for the heat transfer of shock/shock-interferences in high Mach number flows. The geometry was a cylindrical-blunted plate and a wedge serving as an oblique shock generator [128]. Boundary layer transition and aeroheating characteristics of several X-33 configurations were experimentally examined [126]. The effects of discrete and distributed roughness on boundary layer transition were documented. A transition correlation was proposed. Discharge coefficients and heat transfer for axisymmetric supersonic nozzles were computed [125]. Reynolds' analogy and the Dittus–Boelter equation were applied to compute heat transfer. Wall temperature jumps on a flat plate in a supersonic flow were studied numerically and analytically [133]. Treatment of rapid heat transfer changes, both upstream and downstream of the jump, was included. Methods for preliminary design of thermal protection systems were proposed. Hypersonic drag and heat transfer reduction using a forward-facing jet were studied numerically [136]. Upstream injection can significantly modify the flowfield. A large reduction in drag and heat transfer can be obtained. The influence of radiative heat transfer upon the collapse of a cylindrical shock wave was evaluated using a self-similar solution technique [130]. The influence of radiation was described through the variation of the mean free path of radiation. A transition model and a turbulence model were applied to transitional flow over an elliptic cone at Mach 8 [138]. The instability mechanisms responsible for transition could not be determined. A form of bypass transition resulting from large-amplitude disturbances was shown to compare well with the experimentally measured heat transfer data, however. A hypersonic boundary layer trip was developed for the Hyper-X flight vehicle [126]. Turbulence modeling was assessed for simulation of cross-shock-wave/boundary-layer interactions at Mach 4 on double-sharp finned plates [137]. Heat transfer was over-predicted on places as a result of 3-D features in the flows. The streamlines that were most poorly predicted originated from very narrow regions close to the fin leading edges. Two papers dealt with dissociation of the fluid. In one, numerical simulations were made of airflow over a hemispherical cylinder with vibrational relaxation being the dominant mechanism and dissociation of oxygen being small [134]. The computed shock-standoff distance was the parameter compared to experiments. In a similar paper, vibrational dissociation, coupled with the equations, was used to determine the effect of dissociation on population depletion in the vibrational states of the nitrogen molecule [135]. The results helped to explain the restricted success of a familiar model for dissociation.

3.4. Analysis and modeling

Papers in this category include some on modeling of transition to turbulence [151–153], modeling turbulence [139–141,144–146,148,150], the application of JAVA [143], modeling mixed convection [147], modeling stagnation point flows [154], modeling laminar flows with superposition [155] and modeling discrete particles in homogeneous flows [149].

Heat transfer measurements were made in a transitional boundary layer and used to discuss the effectiveness of different intermittency distributions [152]. A model that was based upon a finite spot size showed good agreement with the measurements when the turbulence level was low. For high turbulence levels, an exponentially growing intermittency was derived after the other models were found to be insufficient. Modeling of transition for high-pressure turbine blades was discussed [151]. The effects of free stream turbulence on laminar boundary layer development were computed. Comparisons of computed static pressures and heat transfer rates with experimental values were made. The effects of wakes on transition were experimentally assessed in a Ludwieg tube [153]. The intermittency distribution in this wake-disturbed flow on mean heat flux could not be determined unequivocally. There was no unique turbulent heat flux, due to the dependence on the origin of transition. Predictions of heat transfer rate were made by using a dual-dissipation, RANS turbulence model [146]. This model was shown to represent an improvement over standard k–ϵ models in strongly out-of-equilibrium flows. The use of two versions of the k–ω model and a shear stress transport model was documented for a transonic turbine blade flow [145]. The SST model resolved the passage vortex better on the suction side of the blade than did the k–ϵ models. A fix to the SST model for improved suction side performance was proposed. A wall function was proposed for high-speed separated flow computation [148]. High Schmidt number mass transfer calculations were made using a near-wall, coherent-structure model [141]. The effects of turbulence intensity on eddy viscosity and eddy diffusivity were also determined. Experimental results in support of subgrid-scale heat flux and dissipation calculations in atmospheric surface layers were presented [150]. The model reproduced experimental observations better than did the eddy diffusion model. A near-wall, two-equation heat transfer model was proposed for wall turbulent flows [142]. The predicted results were compared with DNS predictions. A study of the breakdown of Reynolds analogy in the stagnation region flow was analyzed [139]. The profiles of $s'v'$ and $v'T'$ are changed significantly at a location where the evolution of the streamwise vortex is strong. The heat/mass transfer analogy was assessed for turbine blade flows [144]. Suggestions on how to use mass transfer data for heat transfer design were made. Length scale calculations for heat transfer evaluations were discussed [140]. Momentum thickness Reynolds numbers ranged from 400 to 2100 and turbulent Reynolds numbers were as low as 90.

JAVA computer codes, freely available on the internet, were used to solve boundary layer heat transfer problems by integral techniques [143]. The marching breakdown of a boundary layer equation for mixed convection was removed by reinterpretation of the structures that emerge [147]. A numerical simulation was shown to compute the proper separation point in this flow. A shear-free boundary layer on a flat plate and flow and heat transfer near the forward stagnation line of a circular cylinder were computed [154]. A one-equation, eddy-viscosity model, modified from one in the literature by the addition of a turbulence length scale, was shown to compute with better accuracy than the conventional turbulence models. A composite model was presented for evaluating the Nusselt number for forced, laminar flow parallel to a finite, isothermal, rectangular plate [155]. This correlation equation was based on superposition of dimensionless shape factors and a modified laminar flow boundary layer asymptote. Temperature fluctuations of discrete particles in a homogeneous turbulent flow were computed with a Lagrangian model [149]. Anisotropy of the flow and turbulent heat flux were accounted.

3.5. Unsteady effects

Flows in this category include some with a step change in heating [157,162,165], breaking waves [164] and droplet heating [156,158–161,163].

One paper showed the transient heating of a thick plate after impulsive acceleration and associated beginning of viscous heating [162]. The effects of important physical parameters on the temperature behavior at the solid fluid interface were discussed. Transient boundary layer heat transfer from a flat plate subjected to a sudden change in heat flux was solved numerically [157]. The technique extended a series solution that is valid for small times to describe the full transient. Unsteady Stokes flow near an oscillatory, heated contact line was solved [165]. The technique is to couple the heat equation in the frame of reference of the moving contact line with the unsteady Stokes equation. Measurements of microscale breaking waves were presented [164]. Previous experiments had shown a cool skin layer behind the leading edge of a microscale breaker which when distrupted, creates a thermal signature, as seen by an IR image. The evidence presented indicates that the wakes produced by microscale breaking waves were regions of high near-surface vorticity that enhance the air–water heat transfer rates. The transient heatup of a droplet suddenly immersed in a gas was presented [163]. It was shown that Newton's law of cooling underestimates the heat flux, a problem that is rectified by introducing an effective thermal conductivity for the beginning of the process to account for transient effects. Numerical simulation of steady and transient mass transfer to a single drop dominated by external resistance was presented [160]. The analysis shed light on the respective contributions of molecular diffusion, convection and recirculating wake flow. The results also were considered valuable for analyzing and optimizing the solvent extraction operation. The cooling effectiveness of a water drop impinging on a hot surface was studied both experimentally and numerically, including the impact of the water droplet on a hot stainless steel surface [161]. As part of the analysis, the droplet shape and substrate temperature were computed during the impact. These results agree with experiments. The adiabatic spreading assumption in the droplet-impact cooling problem was addressed [158]. It was concluded that, while the amount of heat transfer during impact is small, the effects of heat transfer on the liquid coverage area and subsequent heat transfer to the liquid film might be substantial. In another paper, the effects of surface wetting on the spreading of liquid droplets impacting on a solid surface at low Weber numbers were discussed [159]. A modification of a standard equation for the maximum spreading ratio was proposed. A collision of a droplet with a hemispherical static droplet on a solid surface was analyzed experimentally and numerically [156]. The effects of viscosity, surface tension and gravity were taken into account.

3.6. Films and interfacial effects

Papers in this category address falling film heat and mass transfer [166–170] and microbubble dynamics [171].

A correlation of simultaneous heat and mass transfer experimental data for aqueous lithium bromide absorption in a falling film was presented [167]. The purpose was to better understand the governing mechanisms. With the correlations, the absorber load can be evaluated. Coupled heat and mass transfer in a falling film on a wavy wall column was numerically [169] and experimentally [170] evaluated. The same authors reported enhancement of this flow by hydrodynamic conditions generated by a new type of column wall that generates a vortex in the furrows [168]. Exact solutions for heat and mass transfer in a falling laminar film were presented [166]. Heat or mass transfer with the wall and mass transfer with the gas were discussed in some detail. A molecular dynamics study on surface tension of microbubbles was presented [171]. Simulation was with the Lennard–Jones model for molecules and local densities and normal and tangential pressure components were calculated and used for estimation of bubble surface tension.

3.7. Effects of fluid type or fluid properties

This category includes papers with high or low-Prandtl-number fluids [174,179], micropolar fluids [182,184], fluids with surfactants [172], non-Newtonian fluids [173,180,181], heated or cooled fluids [177,183], flows with internal turbulence [176], low Knudsen number flows [178] and a two-phase flows [175].

DNS was used to compute turbulent, free-surface, high-Prandtl-number-fluid flows in fusion reactors [179]. High Prandtl numbers lead to very thin thermal boundary layers and difficulties in measuring important turbulence quantities. DNS was used to provide such information. An asymptotic solution of heat transfer between a plate and an unbounded uniform fluid flow was presented for low-Peclet-number flow of a low-Prandtl-number fluid [174]. Heat transfer in a micropolar fluid over a stretching sheet with viscous dissipation and internal generation was presented [182]. Solutions were presented for various values of material parameters of the micropolar fluid. Transient forced and free convection along a vertical wavy surface in a micropolar fluid were analyzed [184]. It was found that forced convection dominated the first harmonic while free convection dominated the second. As the vortex viscosity increased, the Nusselt number decreased; thus, the micropolar fluids were shown to have reduced heat transfer rates. Solutions with drag-reducing surfactants were analyzed for maximum friction and heat transfer reduction [172]. Using the analysis, one can identify asymptotic solution behavior. Local non-similarity solutions were presented for flows of a non-Newtonian fluid over a porous wedge [180]. Atherosclerotic fibrous plaque manifestation and fluid mechanics of branches and expansions in large elastic arteries were related [173]. Heat transfer to the arterial walls and conduction through the tissues were accounted. The heat transfer speeds up the chemical reaction and contributes to plaque localization. This is due to the viscosity-linked thixotropic property of blood. Fully developed flow down an inclined plane of a modified, second-grade fluid with temperature-dependent viscosity was investigated numerically [181]. Velocity and temperature profiles were presented for various cases. Drag reduction due to heat transfer in the presence of pressure gradients was numerically simulated [177]. Optimized distributions of surface heating and cooling were presented. The effects of cooling a cylinder on the Karman vortex street behind it under low Reynolds number flow were numerically evaluated [183]. The main effect of cooling is the generation of a wavy wake, rather than a Karman street. The main cause is the generation of wake vorticity in the case of the cooled cylinder. This effect is Prandtl number dependent. The influence of internal turbulence structure on temperature fluctuations of particles in dispersed phase flows [176] was assessed. The importance of dynamic and thermal relaxation times of the particles was reported. The association between Lagrangian and Eulerian turbulent time macroscales of various types of flows was estimated. Diffusive mass transfer with superimposed frictional flow was analyzed [178] by modeling ordinary diffusion and molecular motion with friction. Results are different in the transitional region where the Knudsen number is between unity and one-tenth. In this region, pressure diffusion, slip flow and diffusion slip must be accounted. Diffusion processes in a two-phase, random, non-homogeneous, stratified semi-space were discussed [175]. Admixture diffusion in a body with a random, non-homogeneous, two-phase, laminar structure was modeled. Jump discontinuities of diffusion coefficient were taken into account.

3.8. Flows with reactions

Papers in this category are on combustion and other reactions.

Temperature-dependent reactions in droplet-laden, homogeneous turbulence were numerically simulated [188]. Comparisons were provided between constant- and variable-rate reactions. Non-isothermal, gas–liquid absorption with chemical reactions was studied via temperature measurements within a thin, spherical, liquid film surface made during absorption [189]. These measurements were compared with modeling results. Turbulent heat transport in non-premixed jet flames was characterized to improve the knowledge on counter-gradient diffusion [185]. It was concluded that mixture fraction calculations within the region must be computed with second-moment closure models, rather than with effective viscosity models. Unsteady flow interactions with acoustic waves were theoretically investigated in a premixed, planar flame [187]. Energy addition by unsteady heat release was discussed. The heat release is due to an unsteady flux of unburned reactants through the flame by fluctuations in flame speed or density. Excitation of vorticity and fluctuation in the flame speed produce significant effects on interactions between flames and acoustic waves. Experiments with flame/solid interactions in turbulent premixed combustion were discussed [186]. Highly resolved temporal and spatial data for changes in flame shape, speed and length of the flame front were presented.

4. Channel flows

4.1. Straight-walled ducts

The review of channel flows begins with a collection of papers that encompass the general area of straight-walled ducts. This relatively simply geometry provides an attractive test bed for both experimental and numerical studies. The assumption of thermal equilibrium was examined under transient conjugated forced convection [190]. Conjugate laminar forced convection in the entry region of eccentric annuli was investigated numerically [193]. A vertical annular channel was studied experimentally under isothermal and heated upward flow conditions [196]. Mass transfer and heat transfer were correlated in a smooth pipe using the electrochemical technique [199]. Conditional sampling was used to examine the coherent structures in a turbulent channel flow and their impact on heat transfer rates [200]. The flow and heat transfer in a tube is modeled to fourth-order [202]. Turbulent flow and forced heat transfer is predicted using an explicit algebraic stress model [205]. A commercial code (CFX 4.2) is used to examine the stability of plane Poiseuille flow [206]; the same flow was computed using DNS [207]. The inverse heat transfer problem was computed to estimate the inlet temperature in a thermally developing flow [210]. Exact solutions of the Graetz problem were presented for the three main types of boundary conditions [211]. Unsteady conduction in the walls of a fully developed velocity and temperature field was computed using DNS [213]. DNS was also used to study a 2D fully developed open channel flow [216]. Numerical simulation of the isothermal and heated upward flow in an annular channel was performed [220]. A theoretical analysis of the three-dimensional flow between parallel porous plates was undertaken for incompressible flow [208]. A combined experimental and numerical study of conjugate heat transfer was conducted in a horizontal channel heated from below [192]. Correlations for the heat transfer from liquid metals were provided in single-phase flow [191]. The extended Graetz problem was examined taking into account the axial conduction in the fluid [215]. A new exact differential model was employed to study the fully developed turbulent convection in a round tube [217]. The thermal performance of an earth–air-pipe system was studied experimentally [212]. Frictional effects were considered on the steady flow of a dense gas [209]. The heat transfer of a viscous liquid and the associated bistability of the flow in a channel were modeled [201]. The temperature dependence of viscosity and the dissipation of mechanical energy were treated in the steady flow of a liquid in a flat channel [198]. Pressure drop and heat transfer from HeII flow at high Reynolds number was studied experimentally [195]. Energy transfer due to mass diffusion was investigated for flow in an elliptic channel [194]. The cooling of supercritical carbon dioxide was studied numerically and experimentally [203,204]. Fuel cell ducts were examined with different cross-sections [219] and for buoyancy effects [218]. The stationary velocity and pressure field in a thermoacoustic stack were computed [214]. The forced convection in a asymmetrically heated channel was considered from aluminum foam materials [197].

4.2. Microchannel heat transfer

Microscale heat transfer phenomena were examined in a number of channel flow geometries. The single-phase heat transfer was computed for microfin tubes using Fluent [223]; parametric effects of geometry were also considered [224]. The role of constant wall temperature on the laminar flow of an incompressible gas was studied theoretically [221]. Comparisons of microscale and macroscale results for turbulent microchannel flow were made [225]. A microfin array was vibrated to determine the heat transfer enhancement [226]. The efficiency of fins in microchannel design was investigated analytically [230]. The effect of viscous dissipation on the heat transfer in microtubes was considered [232]. The laminar slip-flow in rectangular microchannels was studied analytically using a modified generalized integral transform technique to solve the energy equation for hydrodynamically fully developed flow [236]. The applied electrostatic potential field and its impact on the microchannel flow between parallel plates and 90° bends were examined [235]. The Burnett equations were used to study microcouette flow [234]. Supersonic flow in microchannels was studied using a Monte Carlo method [227]. Rarified gas flow in corrugated microchannels was investigated theoretically [233]. The heat transfer and fluid flow in microchannels was reviewed; the study emphasized quantitative experimental results and theoretical predictions [231]. An analytical model of steady gaseous flow through rectangular microchannels was undertaken; high-order boundary conditions were considered [222]. Monte Carlo simulations of the flow through microfilters were performed to evaluate the validity of existing scaling laws [228]. A finite-volume code was developed to investigate the conjugate parallel liquid flow through microchannels with electric double-layer effects [229].

4.3. Irregular geometries

The forced laminar convection in a two-dimensional horizontal channel was studied with a built in triangular prism [237]. The laminar convection in ducts having slowly varying cross-sections were also investigated using similarity assumptions [239]. The laminar diverging flow between two parallel fixed discs was reexamined to evaluate new analytical relationships [241]. A mesh-screen insert was used in a channel for the purpose of heat transfer enhancement when a drag-reducing surfactant was used [242]. The surface was also studied through a contracted channel [243]. The heat transfer in a trapezoidal channel was compared to existing correlations valid in circular pipes; correlations underpredicted heat transfer rates by 11–28% [245]. Series solutions were presented for the flow in helically coiled rectangular ducts at low Dean and Germano numbers [250]. Flow and heat transfer in a slowly diverging conical annular channel was studied using an eigenfunction series expansion [251]. The heat transfer of a viscous liquid squeezed between two parallel discs was studied analytically and numerically [248]. A combined numerical and experimental study of the turbulent flow in a square duct using twisted tapes was undertaken [252]. The local heat and mass transfer characteristics in a serpentine rectangular channel were studied using the naphltalene sublimation technique [247]. A perforated plate device was used to achieve mixing in a pipe; a model was proposed describing the axial temperature profiles [244]. The conjugate gradient method was used to estimate the two boundary heat fluxes in irregularly shaped channels [240]. Heat transfer and discharge measurements were obtained in a stepped labyrinth seal [253]. The flow liquid in a trapezoidal cross-sectioned groove was studied under fully developed laminar flow conditions [249]. Local heat transfer rates were obtained in a three-pass industrial heat exchanger [246]. The convective heat currents through two identical tree networks was studied; it was shown that the total heat current convected by the double tree was proportional to the total volume raised to the 3/4 power [238].

4.4. Finned and profiled ducts

Extended surfaces, protrusions, fins, twisted elements and other surface or flow enhancements in channels are considered in this section. An experimental study of a dimpled channel surface was conducted at Reynolds numbers up to 61,500 [272]; a channel was also studied having dimples and protrusions, with the same shapes as the dimples [273,270]. The heat transfer and pressure drop were studied in a rectangular channel with diamond-shaped elements [286]. The complicated turbine blade passage was approximated as a serpentine channel with ribs and bleed [287]. A two-dimensional rib-roughened passage was examined using a low-*Re* model [265]. Uniformly spaced square ribs placed on inner surfaces were investigated experimentally for fully developed turbulent flow [268]. Cylindrical fins were placed in a rectangular channel through which air passed [255]. A developing turbulent flow was studied in a ribbed convergent/divergent square duct [288]. The characteristics of square cylinders placed inline and offset were investigated numerically [278]. The heat transfer in a rib-roughened duct was numerically simulated for laminar and turbulent flow conditions [276]. Sand-grain roughness and two-dimensional ribs were computed using DNS in a turbulent channel flow [275]. Fin profile types of rectangles, triangles and round crests were studied in internally finned tubes [271]. A pin-fin trapezoidal duct was studied experimentally; parametric effects of lateral-flow ejection, pin shape, and Reynolds number were considered [264]. The heat transfer effects of an insulated block placed on the wall of a laminar channel flow was investigated numerically [259]. A parametric study was undertaken to determine the effects of rectangular block placement on a flat channel surface [282,283]. The endwall region with a single row of oblique pin fins was investigated experimentally [274]. The application of gas turbine blade cooling was approximated using a rectangular rib-roughened channel [267]. Three different rib-roughened ducts were considered in one study; parallel ribs with V-shaped ribs pointing upstream and downstream were treated [261]. The flow and heat transfer in a two-pass channel with 60° ribs was computed [266]. Experiments were conducted to evaluate the heat transfer in equilateral triangular ducts with surface roughness [254]. Helical turbulence promoters were used in pipes to enhance the heat transfer rate; the naphthalene sublimation technique was used to evaluate local heat transfer coefficients [284]. A helical tube fitted with circumferential ribs was examined experimentally using a test matrix involving Reynolds number, Dean number, pulsating and buoyancy numbers [258]. Two different three-start spirally corrugated tubes were studied with five twisted tape inserts [291]. Turbulent flow in a spirally corrugated tube was studied experimentally; four different tubes were considered using water and oil as the working fluids [290]. Laminar swirling flow was investigated experimentally through a circular tube with regularly spaced twisted-tape elements [279,280]. Numerical predictions were made of the laminar flow and heat transfer through a square duct with twisted tape inserts [277]. The application of piston cooling was considered by examining the heat transfer of a parallel-mode reciprocating tube fitted with a twisted tape [257]. Chaotic advection was studied experimentally in a twisted duct flow [256]. A filament insert was used to increase the uniformity of the radial temperature profile in a square channel [289]. Heat transfer distributions were obtained for a rectangular duct with V-shaped ribs pointing upstream and downstream relative to the main flow [260]. Square sectioned cooling ducts were computed using two low-*Re* k–ϵ models; thermal–hydraulic characteristics were evaluated for a ribbed duct [281]. Turbulent mixed convection was computed in a circular duct with inserted longitudinal strips [263]. Equilateral triangular ducts having mill-roughened walls were studied experimentally for fully developed turbulent flow [269]. The effect of inclined vortex generators on heat transfer enhancement in a three-dimensional channel was handled numerically [285]. The heat transfer enhancement due to the placement of heated blocks in a channel was compared in grooved channels [262].

4.5. Ducts with periodic and unsteady motion

The unsteady laminar flow and heat transfer in a channel was studied numerically; square bars were mounted periodically and arranged side by side to the approaching flow [298]. An unstructured covolume method was used to compute the heat transfer in a periodic wavy channel [296]. The impact of bifurcation on heat transfer enhancement in periodically grooved channels was studied and correlated to pressure drop predictions [292]. The heat transfer in a corrugated sinusoidal duct was computed for fully developed laminar flow [299]. Isothermal and adiabatic wall conditions were examined using a two-dimensional computation of resonant oscillations in a gas-filled tube [297]. A pulsatile reversing channel flow was explored experimentally; the work focused on the developing laminar regime [294]. The moderate Reynolds number flow of air over heated blocks in a horizontal channel was studied experimentally; holographic interferometry was used with high-speed cinematography to visualize the unsteady temperature field in this self-sustained oscillatory flow [293]. The unsteady flow of a liquid metal was analyzed in a vapor-filled capillary [295].

4.6. Multiphase and non-Newtonian flows in channels

An experimental study was undertaken to measure the fluctuating temperatures associated with saturated boiling of water in a narrow vertical channel [302]. The impact of aspect ratio on the heat transfer of paraffin slurry flow was investigated in a rectangular channel [300]. A full factorial design was used to study fluid-to-particle heat transfer coefficients [309]. The heat transfer characteristics of cocurrent upflow of dilute gas–coal particle suspensions was studied in a circular tube [307]. Heat transfer correlations were developed for the two-phase flow of air–water in a horizontal pipe [303]. Viscous dissipation effects of a power-law fluid were considered in an oscillatory pipe flow [301]. Modified power-law fluids were studied in ducts of arbitrary cross-section; the fluid's viscosity are neither Newtonian nor power law [306,304]. A Herschel–Bulkley fluid was studied in flow within a concentric annular duct [308]. The laminar convection of non-Newtonian fluids in the thermal entrance region of a coiled circular tube was solved numerically [305].

5. Separated flows

The separated cross-flow past the cylinder dominated the literature in 2001. A heated cylinder in laminar cross-flow was examined using a new reference temperature concept [340]. A heated turbulent flow over a circular cylinder was studied in the presence of blowing [327]. The relationship between vortex shedding the heat transfer enhancement was investigated over a heated cylinder with small amplitude oscillations [319]. Local heat transfer characteristics were studied for flow past a circular cylinder with and without vortex-generating winglets [329]. The effects of free stream turbulence were investigated experimentally for the flow over a circular cylinder [335]. The heat transfer from an oscillating cylinder in cross-flow was computed using an arbitrary Lagrangian–Eulerian kinematic description [342]. The compressible flow past a yawed cylinder was studied for non-uniform mass transfer or wall enthalpy [334]. Pulsating approach flow to a heated cylinder was simulated numerically at a Reynolds number of 100 [330]. The flow and heat transfer characteristics around a rectangular cylinder with small inclination was treated experimentally [322]. Energy separation occurring in flow past a circular cylinder was examined using surface mounted thermocouples [320]. Experiments were carried out to determine the heat convection from stationary and oscillating cylinders in cross-flow [331]. A rod bundle geometry was studied numerically for turbulent flow using an isotropic k–ϵ method [333]. Three cylinders placed as an equilateral triangle were positioned between parallel plates [323]. The mixed convection from an elliptic tube was studied numerically by varying the fluctuation level of the free stream [311]. Heat transfer and flow characteristics past a prism were studied; a rod was set upstream of the prism for flow control [336]. A numerical simulation was employed to evaluate the role of local heat flux on the separation of an unsteady boundary layer [314]. The wall heat transfer is obtained for the separating wall jet; analytical and numerical solutions are presented [316]. The moving boundary problem of a body traveling opposed to a flowing fluid in a channel was investigated numerically [318]. Experiments were conducted to evaluate the heat transfer from two cubes arranged in tandem in a flat-plate turbulent boundary layer [328]. A combined experimental and numerical study of the heat transfer to an inclined wall at the trailing edge of a cavity was studied [332]. The heat transfer on the surface of blunt bodies experiencing hypersonic flow was studied; particular focus was place on the characteristics near the stagnation point [337]. Relationships between friction and heat transfer is discussed for two- and three-dimensional electron systems [338]. A Fourier–Chebyshev spectral collocation method is used for the DNS of the uniform cross-flow past a sphere [312]. The heat transfer from a sphere moving under creep conditions was studied; internal circulation of the sphere was taken into the analysis [324]. Measurements of the turbulent mixed convection over a vertical backward-facing step were made using LDV and cold wires [310]. The natural convection in an enclosure with a heated backward-facing step was studied; numerical analysis was used to evaluate effects of Rayleigh number and Prandtl number [315]. Transient cooling by the injection of cold fluid downstream of a step in a heat flow was studied [341]. The limiting value of the Nusselt number was determined for particles of different shapes; substantial errors were found for non-spherical particles [339]. The fluid motion past a bubble on a heated wall is studied under microgravity conditions [313]. The compression ramp heating of hypersonic vehicles at high angles of attack was investigated [321]; the heat transfer from aerodynamic control surfaces under hypersonic conditions was also studied [317]. The thermocapillary interaction of two bubbles was studied; the effect of weak convective heat transfer was addressed [325,326].

6. Porous media heat transfer

The literature on heat transfer, mass transfer and flow in porous media continues its steady expansion that has been seen over the past five years. A goodly number of fundamental studies continue to focus on development of a multifield model of transport and on the description of the fluid and thermal boundary conditions between a porous medium and either a solid wall or a fluid layer. Quite a bit of experimental and analytical/numerical work was reported on prediction of permeability in fiber systems, and on the effective thermal conductivity in stagnant systems. Research on permeability effects on transport has lead to broadly based test of the validity of the Darcy, Ergun, Forcheimer and Brinkman models for a saturated porous medium. Heat and mass transfer in enclosures was investigated largely via numerical solutions, with a focus being the effects non-uniform thermophysical properties and coupling of the porous medium to finite thickness boundaries (i.e., the conjugate problem). Several articles were published on flow and heat/mass transfer in packed beds and channels that were aimed at testing formulation of the basic transport equations and interfacial boundary conditions. Numerous measurements were reported on heat and mass transfer in two- and three-phase fluidized beds aimed at developing accurate heat transfer correlations to immersed heaters at confining walls. Heat and mass transfer in metal foams, in deforming porous media, and in geological media (e.g., fractured rock) have emerged as areas where more research may appear in the future.

6.1. Fundamental studies

Turbulent flow and transport in porous media has begun to receive attention via both model studies using rod arrays [362,363,366] and a review of time and volume averaging schemes [345,361].

A number of papers addressed modeling schemes for transport in random and structured porous media. A mathematical focus was given to boundary integral methods [349], various types of exact or closed form solutions [355], and time-stepping methods for transient problems [360]. Thermal non-equilibrium models were applied to forced and free convection [344,350], convective phase-change [347], one-dimensional conduction with heat generation, and one-dimensional thermally developing flow [358]. Spectral and bifurcation methods were used to determine conditions for the onset of the first few modes of oscillatory convection [348]. Developing flow with a piecewise continuous density gradient was analyzed with an extended Darcy–Lapwood formulation [364]. Deformable porous systems also received attention to determine their thermo-hydro-mechanical behavior [351,346,368].

The effective permeability of layered porous cavities was approximated by a lumped parameter approach and was tested by numerical integration of the governing equations [354], and a similar study developed overall heat transfer rates via finite-element methods [357]. A model for non-Newtonian flow was developed based on viscometric flow in capillary tubes [356]. A form of Darcy's Law was analytically derived for flow in spatially varying porous media that exhibits a locally periodic structure [359], and flow in randomly fractured porous media was analyzed based on Brinkman's equation for the medium [365]. Closure relations derived for slow viscous flow in spatially non-uniform suspensions show that Brinkman's viscosity term is the limit of two different viscosities when the particles are stationery [367].

Numerical work on the thermal boundary condition between a saturated porous medium and a solid wall showed that non-uniform heat flux always exists and that thermal equilibrium assumptions are needed [352]. Another study employed a two-equation model for convective heat transfer at a boundary [353]. The interface conditions between a fluid and porous layer were critically reviewed and it was shown that while solutions for the velocity field are sensitive to modeling and assumptions, the temperature field and heat transfer are less so [343].

6.2. Property determination

Porous foams were subject to transient heat fluxes to show that heat propagation is controlled at the microstructural level [369]. For cellular sandwich panels, heat transfer depends on cell morphology and cell arrangement [372]. Porous glass saturated with water was shown experimentally to exhibit heat transfer rates related to pore size distribution and the fractal dimension of the pore network [378].

Graphite made from exfoliated powder was characterized experimentally for gas permeability and thermal diffusivity, and correlations for heat and mass transfer were developed in terms of solid conductivity, bulk density and porosity [370]. Gas permeability in expanded graphite–salt composites was characterized in terms of bulk density and the type of chemically active gas forced through the material [373]. The permeability of woven fiber preforms was determined via a geometric model that included fabric structure and a flow model that employed the Brinkman and Stokes flow models [379]. A related study presented a correlation for flow across unidirectional arrays of fiber bundles in an effort to determine overall permeability [380], and another considered permeability predictions using the Ergun and Forchheimer equations [381].

Effective thermal conductivity of foams filled with high-pressure gas was determined experimentally and results were used to update an previously developed model based on Darcy flow [384]. The capillary pressure-saturation relation was used as the basis for predicting the thermal conductivity of unconsolidated porous media [374]. A semi-empirical method employing a unit cell and a special wall-region analysis was reported for a packed bed with no flow [375]. Grain size and the fraction of amorphous constituent were shown to have a dominant effect on thermal conductivity of ocean basalts [382]. Measurements of thermal diffusion and electrical conductivity in sandstone were used to determine tortuosity [371].

The importance of thermal radiation and radiative properties in porous media combustion were numerically assessed for two-dimensional systems [377]. A model based on the discrete ordinate method (DOM) and geometric optics laws was able to predict spectral emittance in a bed of packed spheres [376].

New measurements of the thermal conductivity of Topopah Spring Tuff at Yucca Mountain, Nevada, were presented, and enhancement of vapor diffusion was not observed over the tested ranges of water content, temperature and pressure [383].

6.3. External flows and heat transfer

Unsteady flow of a micropolar fluid past a vertical porous plate imbedded in a porous medium was investigated for the case of small suction velocity at the surface [402], and Falkner–Skan flow of a power-law fluid past a wedge was solved via the local similarity method [401]. Free convection from a surface embedded in a porous medium was analyzed numerically via a non-equilibrium approach [406] and for variable porosity [389].

Conjugate film condensation in natural convection on a vertical plate treated via the non-similarity method reveal the roles of the primary thermal resistances and the Jakob number [1078,1079]. Convection from a vertical plate imbedded in a porous medium filled with a non-Newtonian fluid was analyzed for the effects of suction and injection [391], for the effects of oscillating wall temperature [398], and for non-uniform heat flux [392,400].

Mixed convection from horizontal and vertical surfaces embedded in non-Darcy porous media was computed to determine effects of viscous dissipation [394,399,407]. Mixed convection from a wedge in porous medium of very high porosity was investigated numerically for the effects of viscous dissipation and an applied magnetic field [404].

Convection in a semi-infinite space in the presence of thermal radiation was analyzed for a high porosity porous medium [397,411]. Non-Darcy flow over a vertical plate was similarly treated under the Forcheimer flow and Rosseland radiative approximations [393].

Moving boundary problems for porous systems were analyzed for both deformable and non-deformable boundaries. Convective heat transfer from a continuously stretching sheet embedded in a non-Darcy medium with a magnetic field was analyzed via boundary layer integral methods [386]. Free and forced convection driven by heat and buoyancy for similar system was analyzed for the case of a viscoelastic fluid [385]. Forced flow in a fibrous belt due to contact with a moving surface, such as is found in automobile braking systems, was approximated as a porous medium with heat transfer and time-varying loading pressure [395,396].

The effects of external flow on the boundary of a porous region were determined for impinging flows at the high porosity limit via analysis and flow visualization studies [409,410]. A conjugate model of heat and mass transfer for a thick porous wall exposed to boundary layer flow was analyzed numerically [408], and the effects of gravity jitter on flow near stagnation in a porous medium were determined analytically [412]. Natural and forced convection from the exterior of a porous cylinder were shown to be sensitive to the radial and tangential permeability [387,388]. For cylinders imbedded in an infinite medium analyses were reported on the effects of forced flow and wall blowing on the buoyant flow [390,405]. When porous fins are fixed to a surface, heat transfer enhancement may exceed that of a solid fin depending several governing parameters [403].

6.4. Packed beds and channel flows

Theoretical research on unsteady non-Darcy flow in wire mesh systems and flow in layered channels tested assumptions on thermal non-equilibrium conditions [441,445,452]. A two-equation analysis of forced convection in a channel that tested the Carbonell–Whittaker formulation was developed for Darcy flow and heating at one wall [463]. This study was extended via experiments to the special case of porous heat sinks in circular ducts [462]. For the unique matrix structure represented by a layered hydrothermal system with vertical permeable cracks, analytical solutions were developed for the axial temperature distribution in the crack for vertical through flow and used to validate numerical predictions [464]. Experiments on impregnation of glass fiber mats with a thermoplastic resin tested modeling assumptions, provided optimization data, and suggested that modeling be done on the basis of a dual scale porous medium [433,443]. A variable area channel with porous inserts was shown to be an effective technology for regulating surface temperature under high heat flux [435]. Fingering patterns resulting from miscible displacement in a finite layer were predicted numerically and revealed two states of finger orientation [421].

Channel flow with heat or mass transfer in either fully or partially filled porous media was analyzed to determine the role of inertia [413], structured changes in porosity [414,461], variable viscosity [447–451], and unsteady flow [415,454] on transport coefficients. Heat transfer enhancement with porous wall inserts in channel flows demonstrated that the highest developing Nusselt numbers are obtained for a filled porous channel [417]. For very high viscosity fluids in channel flow, a fully packed channel was found to enhance laminar flow Nusselt numbers up to a certain mass flow rate [423]. With transverse variations of permeability and thermal conductivity and symmetric or asymmetric heating, reductions of the Nusselt number occur, but the relations to parameter variations turn out be quite complex [461].

Experiments on forced convection heat transfer in porous channels with discrete heat sources on one wall demonstrated the variation of heat transfer rates that could be obtained across the heaters [425]. Thermal infrared visualization techniques were able to obtain information on the random variation of wall temperatures and flow patterns near the wall under a constant heat flux boundary condition [427]. Nusselt number variations were measured under oscillating flow conditions [429] and for random porosity distributions [430,438].

Analysis and experiments were reported on combined mode heat transfer in aluminum oxide foams to characterize their heat transfer behavior [455]. The possibility of using metal foams inserted between components to enhance cooling of electronic equipment was investigated numerically with a one-equation model [456]. A similar application of deposited foams to increase the heat removal capability of heat exchange tubes demonstrated a threefold improvement of heat load capability [458]. Aluminum foam heat sinks were modeled as anisotropic porous media, and their thermal characteristics were determined based on the Forchheimer extended Darcy flow model [436].

Heat transfer from a packed bed with cocurrent gas–liquid flow revealed a limit for tube-to-particle diameter where effective property models are not longer valid [442]. Effective property models were the focus of another study in which the extended Brinkman model, effective viscosity correlations, and measurements were combined to determine flow profiles and radial heat transfer for a range or particle packing [418]. For a fixed bed with a tube-to-particle diameter of two, it was found that corrections are required in numerical analysis to compensate for the non-ideal experimental conditions [426,453]. In a bed heated with a permeable wall inserted normal to the direction of mean flow, the Nusselt number was found to be proportional to the first power of the Peclet number [465]. When the fluid is a power-law fluid, a new correlation for Nusselt number is needed over a fairly wide range of key parameters [457]. Measurements of particle–liquid heat transfer rates in a trickle-bed reactor via invasive probes showed that transfer rates are strongly dependent on the structure of the packed bed [419]. A similar result was observed via experiment and analysis for a cylindrical bed with a high versus a low permeability packing [444]. Packing and particle geometry were also suggested as critical to partial catalytic oxidation at high space velocities [432]. Propagation of heat transfer-limited reaction fronts driven by Arrhenius temperature kinetics in packed beds was found to be controlled by a diffusion-controlled and convective zone [431].

Agglomeration of zeolites in a fluidized bed was measured in a semi-scale apparatus to determine heat and mass transfer effects on the production of larger diameter particles than can be realized from processes that use molecular sieves and ion exchangers [437]. Constitutive parameters for liquid–fluid beds were developed from measurements as function of void fraction and slip velocity [434].

A heat transfer correlation averaged over the wall of a circulating fluidized bed boiler was developed from measurements on full-scale boilers rated from 12 to 300 MWth [420]. Heat transfer to a sphere immersed in a magnetically stabilized fluid bed was used to develop data on the local heat transfer coefficients, temperature distribution, fluidization velocity and stabilization parameters [416]. Correlations for heat transfer to immersed heaters in two- and three-phase circulating beds were developed and related to temperature fluctuations on the heaters [424,459], to a modified j-factor [446], and to time averaged temperature measurements [440]. Radiation effects on heat transfer to immersed heaters were quantified by measurements and thus permitted a model for separating convective and radiative transport [460]. Measurements in a bubbling fluidized bed comprised of porous particles produced lower heat transfer rates and lower devolitization rates of plastic wastes [428]. Microwave heating on fluid bed drying was numerically analyzed, and criteria were developed on drying time as a function of input wave pattern [422].

Modeling of a dense gas–solid reactive mixture utilizing separate transport equations for all particle classes and based on the kinetic theory of granular flow was applied to biomass pyrolysis in a fluid bed to determine controlling factors on tar yield [439].

6.5. Porous layers and enclosures

Convective instability in saturated layers heated form below was investigated to determine effects of anisotropy, inclination, and a variable gravity field [477,483]. The stability of base flow and weak laminar convection in cavities and layers with a horizontal temperature gradient was studied via numerical methods using the standard Darcy–Bousinesq approximation [466,472], and the Darcy–Lapwood Brinkman formulation with dissipation was used to predict laminar convection via a perturbation method [479]. For convection in a confined fluid overlying a porous sublayer, alternative models of the interfacial boundary condition were found to lead to significant differences in overall transport at large Rayleigh and Darcy numbers [485].

Buoyancy-driven convection in square and rectangular cavities with thermally coupled horizontal walls was found to be influenced by the solid–fluid conductivity ratio, and Nusselt numbers were not too different when the wall thickness is neglected [467]. Effects of anisotropy, density maximum, cavity aspect ratio, and energy generation on buoyant convection were developed via numerical studies [475,478,488]. For the case of energy generation, an asymptotic convection regime as identified. Nusselt numbers for Benard-type convection in a truncated trapezoid were shown to be in good agreement with those of a vertical cylinder for a wide range of Rayleigh numbers and aspect ratios [468].

Buoyant convection in differentially heated tall cavities was investigated numerically allowing for an exponential variation of porosity near the wall to improve agreement with experiments [480]. For a tall cavity where buoyancy forces induced by thermal and solutal forces are opposite and of equal intensity, it was found that a base flow corresponding to a rest state is possible [474].

Thermosolutal convection coupled to a horizontal temperature gradient exhibited roll patterns that can mimic solute dispersion in thermogravitational convection and in fuel cells [469,476,481,482]. In the regime of flow and transport where solutal and thermal buoyancy are of equal magnitude, a hysteresis was observed that permits two solutions depending on initial conditions [470]. In tilted and multilayer enclosures, thermosolutal convection exhibits oscillatory behavior that can be modulated by the properties of the porous matrix [473,486]. Variable permeability however can significantly change heat and mass transfer rates [471]. When compressibility was taken into account, thermosolutal instability is delayed [484]. A stability analysis via a one-equation model for superposed fluid and porous layers was developed and compared to an earlier two-equation model with no conclusive result as to the superiority one over the other [487].

6.6. Coupled heat and mass transfer

Coupled heat and mass transfer in natural convection from a vertical surface in a porous medium was found to be highly sensitive to variable porosity and thermal dispersion [500]. A related analysis for transient for free convection from an impulsively started flat plate presented parameterized results for skin friction and transfer coefficients [1822]. In a volatile porous medium, heat and mass transfer rates were shown to be predicted via a model that combines a macroscopic heat transfer analysis with kinetic solutions for the gas flow [528].

Ground water flow with pollutant transport was modeled via a two-dimensional formulation within a larger study posed by the optimization problem posed by groundwater management on multiple scales, and in such a case, different management scenarios require a conceptualization of different porous media environments and operating situations for an acquifer [499].

Two-phase flow in anisotropic systems was modeled numerically, and a sensitivity of flow to the gas and liquid permeability was observed [489]. A model based on thermodynamic potentials was to predict transport of the liquid and gas phases and to estimate their diffusivity [519]. An algebraic technique was developed to estimate transport of either a volatile or soluble component by oscillatory flow, such as can occur in vadoze zone and in an acquifer [516]. Binary two-phase flow with phase change was modeled by combining the thermodynamics of real fluids with constructs of the porous matrix [490]. Interfacial transport in porous wicking systems was analyzed both theoretically and experimentally to obtain effects of wall heat transfer and thermofluid properties on the liquid–vapor interface and overall heat–mass transfer performance [514,523]. Boiling in a particle bed with internal energy sources was characterized via local temperature and void-fraction measurements so as to assess coolability of the bed [536]. Gas formation from methane hydrates via depressurization of porous layers was shown to follow a square root dependence on time when conduction behind the phase front was neglected [524].

An exergy analysis of the freezing stage demonstrated that large reduction in the magnitudes of total exergy loss and input due to heat transfer could be managed via control of the temperature of the cooling source [492]. An analysis of energy transport in surface soils established the importance of including gradients of temperature, concentration, and vapor pressure to accurately set the boundary conditions that determine the deep thermal state [498]. A related study derived the equations for an interface between a porous layer and a freezant and compared computed results for immersion freezing with experiments [510]. Freezing in an unsaturated porous medium was analyzed numerically to include the movement of the air phase and its effect on ice segregation and moisture transport [509].

Phase change during solidification and casting was addressed as a problem involving coupled heat and mass transfer in the mushy zone which was modeled as a porous medium. Models of continuous casting processes during ladle change and grade transition were analyzed using a Darcy-law flow model in low Reynolds number turbulent flow [503,504].

Coupled transport with reaction was solved for the water–gas shift reaction both within and on a porous catalyst using well established kinetics [507]. Isothermal catalytic reforming of methanol was analyzed for an open matrix, high thermal conductivity porous catalyst that resulted high reaction rates, good reaction control, and optimal temperature distributions [526]. A reactor comprising a porous tube containing a packed catalyst with an outer vacant annulus enabled control of radial air permeation to the reaction zone with overall conversion higher than that for a traditional packed catalytic bed [534].

For char particle gasification, the time-dependent morphology and fragmentation of the particle was seen as necessary to predict heat and mass transfer [533]. Hydrogen production by coal gasification with steam in a gas–solid moving bed was analyzed to determine the dependence of performance on gas flow rate, inlet temperature, particle diameter and inlet concentration of water [491]. A two-temperature porous medium model was also applied to the deflagration of a confined energetic material and was shown to sharpen the transition from conductive to convective burning [511]. When electromagnetic radiation results in the volumetric heating of a porous catalyst, such as by laser or microwave heating, it was found that reaction could occur more uniformly throughout the volume [506].

Experimental work on combustion with cyclic flow reversal in a porous medium was carried out to determine the effects of flow velocity, cycle frequency, and equivalence ratio on temperature distribution and heat transfer [497]. Knitted fiber mats modeled as a porous medium were tested as type of catalytic burner and demonstrated good performance with respect to carbon monoxide emissions [493], and a related experiment in which both foams and dense fabrics were used produced reduced pollutant emissions [522]. A one-dimensional traveling wave model was developed for low velocity catalytic combustion in porous solid [502], and for steep moving gradients a wavelet-based collocation method was found successful for calculating non-catalytic reactions [508].

Bulk evaporative drying was approached as a two-dimensional conjugate problem to show that an analogy between heat and mass transfer does not exist until the entire domain reaches the wet bulb temperature and that buoyancy at the surface can effect the overall drying rate [515,529]. Experiments on drying of a moist paper sheet via infrared heat provided new data on IR penetration and moisture content [527]. A numerical model of low-temperature drying of wood included cross-diffusion, a two-temperature heat transfer model, temperature-dependent kinetics, and gas flow through a porous medium [496]. Prediction of material properties of softwood was based on density variations and a novel numerical technique to limit the mobility of the liquid and gas [521,532]. A general mechanistic theory of thermo-mechanical effects during drying was developed based on the conservation equations for energy and mass and irreversible thermodynamics to predict shrinking and fracturing [501,520]. A finite-element solution for heat and pollutant transport was developed to handle deforming geomaterials and subsidence [525].

Drying conditions and system properties on the catalyst profile in supported impregnation catalysts were modeled to show that for weak adsorption, drying strongly impacts catalyst distribution [505]. Experiments on dehydration kinetics of lithium sulfate monohydrate crystals revealed uncommonly high isothermal dehydration rates and a linear dependence of the rate under non-isothermal conditions [512]. Gas phase transport and adsorption kinetics in porous catalysts were modeled assuming bulk and Knudsen diffusion in the pores, viscous flow and surface diffusion, and all mechanisms were seen as important to overall kinetics [513].

Exact solutions for shrinking during desiccation were developed from a linear model of the hygro-mechanical coupling that develops during drying of an unsaturated double-layer porous material wherein one of the sublayers is thin [531]. Drying of diced apples in a spouted bed with microwave heating was modeled via finite differences and successfully compared with measurements that showed a temperature leveling effect [494]. Coupled heat and mass transfer and internal moisture transfer coefficient were predicted via a general model for food farm-produced foodstuff and validated with experiments on potato drying under forced convection [535]. Heat and moisture transfer in concrete subjected to heating was analyzed using water vapor and liquid water separately to compute vapor pressure and temperature distributions [530], and a related study reported similar results but with mechanical loading [518]. Fluid–rock interactions were modeled taking into account solid–mineral concentrations, transport in pore fluids, and pore evolution over time [537].

Resistance to moisture transport of membrane barriers used in air-to-air heat exchangers was shown to be determined by the slope of sorption curve, with linear sorption curves giving better performance that others under similar operating conditions [517]. For a membrane with adaptive conductive and diffusive characteristics, effective medium theory has been developed for coupled heat and mass diffusion effects on solute transport [495].

7. Experimental methods

Even as the use of numerical techniques for studying heat transfer expands, so does the need for detailed experimental measurements. For many systems, numerical results do not give reliable predictions of heat transfer because of uncertainty in turbulence models or flow conditions, or other difficulties in modeling complex systems. Experimental measurements are needed to determine performance of thermal systems including many related to energy conversion and transport. Measurements are also required to verify numerical methods and turbulence models. Accurate and reliable data are required, which gives rise to a greater need for improved experimental techniques.

7.1. Heat flux measurements

A black body facility is undergoing a validation test at NIST for calibrating heat flux sensors [544]. A micro sensor, utilizing a thermopile has been developed and calibrated to measure heat flux in the range 0–180 mW/cm^2 [545]. A fast response heat flux sensor has been developed for use in hypersonic wind tunnels [543]. Infrared cameras have mapped the heat transfer coefficient over a circular cylinder [542] and on rough surface turbine vanes [539]. Simple models provide a fast method [540] for evaluating heat flows in a building wall. A special technique was developed [538] to measure heat loss from skin exposed to cryogenic spray cooling devices in laser dermotologic surgery. Experiments [541] indicate the value of an on-line calibration system for heat transfer in calorimeters.

7.2. Temperature measurement

Problems inherent in measuring surface temperatures from embedded thermocouples are studied [555] through developed analytic expressions. A number of studies [548,550,557] report on use of liquid crystal thermography and potential errors that can occur, from off-normal viewing and different lighting arrangements. Transient liquid crystal thermography has been developed to study film cooling [549], while the influence of viewing angle in the determination of local heat transfer coefficients on curved surfaces has been shown to strongly influence the accuracy of measurements [547].

The temperature of a surface of a melting solid has been measured with a digital photocalorimeter [552]. Temperatures are measured with a special fluorescent dye in a microfluidic system [554] and with fluorescent additives in glass [556]. Different parameters were compared for surface temperature measurement on materials exposed to concentrated solar radiation [558]. Internal temperatures in a solid material were determined [551] using ultrasonic computed tomography, based on the effect of the temperature on sound propagation velocity. Liquid crystal scanning thermography was used to determine the temperature distribution in a differentially heated vertical cavity [553]. A new sensor [546] uses gas injection through a pinhole and control pad to measure wafer temperatures in semiconductor processing applications.

7.3. Velocity measurement and flow visualization

The importance of free convection in hot-wire measurement of low velocity flows has been examined [563]. A two-sensor hot-wire probe has been used [565] for simultaneous measurement of concentration and velocity in a jet.

Optical techniques for velocity measurement including particle image velocimetry (PIV) are being extensively used and studied. The use of Chebyshev spectral analysis has been proposed for calculating vorticity from PIV experimental data [560]. PIV has been used in conjunction with a liquid crystal system [564] for combined measurement of heat transfer and flow. Particle tracking velocimetry was used to study flow in coarse solid–liquid mixtures [570] while measurements of instantaneous velocity and velocity difference have been taken using fiber-optic couplers [568]. Positron emission particle tracking has been used [561] to measure the flow of tracer particles in opaque fluids.

Various pressure-tube probes for flow measurement have been studied, including application and measurements in droplet-laden flows [559] and instantaneous velocity and pressure measurements in turbulent mixing layers [562]. The importance of tube diameter on Preston tube (used to measure wall shear stress) performance has been demonstrated [566]. A MEMS sensor has been developed to measure liquid flow rates in the nl/min range [567]. Thermal streaks provide flow visualization to characterize a turbulent flow [569].

7.4. Property measurements

Use of a laser flash technique has proven to be very convenient in measurement of thermal diffusivity [571]. Another laser-based device [573] uses a thermal pulse to measure thermal conductivity and diffusivity in liquids. Other systems for measuring thermal conductivity include a photoacoustic method [574] and the application of spectrum analysis of a transient surface heat-flux input [572].

7.5. Miscellaneous measurement methods

Laser holography has been used to study heat transfer phenomena near the critical point of nitrogen [584] and to simultaneously map temperature and heat transfer coefficient distribution [576] while transient double-diffusive convection phenomena has been studied using a real-time phase-shifting interferometer [583]. Issues related to the accuracy of differential scanning calorimeters have been described in several studies [577,587]. A study on solar radiation measurement compares different flux gauges [579] while a spectrophotometer has been developed for measurements in the wave length range from 0.30–11 μm [586]. A bolometer with a high temperature superconductor is used [578] for measurement in the far infrared.

Other studies report on heat transfer in the sensor tube of a mass flow controller [580], on applications for active heat transfer control [582] and on measurement techniques for studying directional solidification [585]. Laser radiation has been used to study high temperature energy accommodation coefficients [575]. A simple void-fraction measurement system was developed using a γ-transmission technique and tomographic reconstruction [581].

8. Natural convection

8.1. Internal flows

8.1.1. Highlights

Flow conditions and associated heat transfer in Rayleigh–Benard layers continues to attract attention, primarily in the extremely large Rayleigh number regime. Vertical and inclined rectangular cavities remain a popular subject with several papers on the effects of partial or complete baffles. Smoke and fire propagation in vented cavities that simulate rooms in a building remains a topic of concern.

8.1.2. Fundamental studies

Experimental and theoretical studies of classic Rayleigh–Benard layers continue to receive interest. Flow visualization using air resulted in a description of the vortex flow patterns as a function of Rayleigh number [596]. A study using HeIII above its critical temperature [595] indicated when the flow is dominated by the Rayleigh criterion and when it is controlled by the adiabatic temperature gradient. Gaseous and liquid helium enabled Rayleigh numbers above 10^{14} to be achieved [591] and a new regime above $Ra = 10^{11}$ was found where the heat transfer rate is enhanced. An experimental study using a sodium potassium alloy in a vertical magnetic field showed that the fluctuations in the temperature field are damped significantly by the magnetic field [590]. A time-dependent Reynolds-averaged Navier–Stokes numerical approach was used to investigate the effect of a magnetic field and bottom wall configuration on the flow structure and transport process [593]. The marginal stability curve with radiative transfer and uniform surface heat flux was determined [588]. Numerical solutions were presented for unsteady convection of a non-linear fluid represented by the Criminale–Erickson–Filbey model for the Rayleigh–Benard case [592]. Salt finger phenomena were studied for a hot solution above cold water [594] where cylindrical Rayleigh–Benard-type roll cell convection occurred near the surface. Plumes detaching from the cooled surface above a volumetrically heated pool [589] were visualized using a laser induced fluorescence technique to gain a better understanding of the effect of Rayleigh and Prandtl numbers on the heat transfer.

8.1.3. Thermocapillary flows

The instability in Marangoni flows was the emphasis of work conducted in this area. A three-dimensional numerical simulation of liquid bridges in low-Prandtl-number fluids was performed [598]. Another numerical simulation showed that the volume of a liquid bridge is not the only sensitive critical parameter for the onset of oscillation in a floating half zone [599]. Marangoni instability in a container consists of short wavelength modes governed by the advection of heat and longer wavelength modes governed by the interface deformation [597].

8.1.4. Enclosure heat transfer

Rectangular cavities heated and cooled on the sides continues to be the geometry of most interest. An experimental study using air and a differential interferometer was reported [616]. Several numerical simulations have been reported for various aspect ratios and boundary conditions [605,614,620]. Additional numerical studies considered the inverse problem of measuring internal temperatures to determine surface heating conditions [615] and double-diffusive convection in a microgravity environment [617]. Solutions for volumetrically heated enclosures at $Pr = 0.0321$ were given for square [601] and shallow rectangular cavities [600]. The effect of conducting walls was investigated for a square enclosure with uniform volumetric heating [611]. Several numerical studies were performed to determine the stability of flows in vertical rectangular cavities [607, 610,619,621]. The effects of a heated patch on one wall of a cubic enclosure [606] and a thick wall with an external oscillating temperature [603] were determined numerically. Flow blockage by a variety of objects included six square-shaped solid objects in the cavity [613], a single horizontal baffle at midheight [602], and several partition geometries [609,622]. A comprehensive analytical and experimental study was conducted to determine flow regimes versus tilt angle [604].

Heat transfer from a body protruding into a square cavity was studied numerically [618]. A new potential benchmark problem for incompressible buoyant flows was defined [608] that consists of a rectangular plume in a rectangular cavity. Transient natural convective heating of rectangular and vertical cylindrical containers was simulated numerically [612].

8.1.5. Vertical ducts and annuli

An experimental study was performed [624] to investigate the effect of an adiabatic extension above a vertical channel with constant heat flux walls. The results showed that the heat transfer rate could be enhanced by up to 20% but that the extension should be about 3 times the height of the heated channel. Numerical solutions were given that showed the effect of plate thermal conductivity on heat transfer in a vertical channel with constant heat flux boundary conditions [626]. The effect of a third plate in a vertical channel was studied numerically [623]. Linear stability of two immiscible fluids driven through a long vertical annulus was investigated [625]. When viscosity depends on temperature, thermal conductivity stratification was found to induce interfacial instability.

8.1.6. Horizontal cylinders and annuli

A numerical study was presented on natural convection between a heated inner cylinder and an eccentrically located square outer enclosure [628]. Laminar two-dimensional unsteady flow was modeled in an annular sector [627]. The results were obtained at high values of Grashof number to investigate the development of preturbulent flows.

8.1.7. Mixed convection

The difference between turbulent diffusion heat and mass transfer in a thermally stratified flow was investigated both experimentally and numerically [635]. The buffer flow in continuous electrophoresis was modeled numerically to study the coupling between the transfer phenomena and their role on inducing thermal convection that disturbs the desired forced convection flow [630]. Numerical solutions were presented for entrance region effects [634] and the results of non-uniform circumferential heating [633] for mixed convection in a horizontal annulus. An analysis of flow reversal in a vertical rectangular duct was given [632]. Numerical solutions were presented for mixed convection in inclined tubes that simulate a liquid heating solar collector [636]. The flow within horizontal mantle heat exchangers used in solar water heaters was investigated by approximating a narrow horizontal annulus to an equivalent rectangular cavity [637]. The superposition of Von Karman street and convective cells in a horizontal plane channel containing a triangular prism and heated from below was simulated with a finite-element method [629]. A pseudo-compressibility algorithm for mixed convection was used to study the buoyancy and inertia effects inside a driven cavity [631].

8.1.8. Complex geometries

A trapezoidal enclosure with offset baffles representing an attic space was investigated numerically [639]. Heating from above and from below were considered to simulate summer and winter conditions respectively. The natural convection in a partially melted region heated from below in a cylinder was simulated [638]. Bifurcation changed considerably as the interface between the melt and solid layer continued to deform.

8.1.9. Fires

Several investigations were reported on heat transfer and flow in vented cavities that are important in fire and smoke control [641,647,648,650]. Numerical simulations were presented that investigated the effects of wall construction [646] and window design [640] on fire spread. Comparisons between predicted and experimental plume characteristics were presented [643]. Fire flashover was modeled including the effects of water sprinklers and water mist systems [645]. A mathematical model developed to predict the propagation of smoldering fires in dust accumulations [644] showed the effects of initial dust accumulation, moisture content and temperature. An interesting theoretical and experimental study was performed to investigate fires in rack storage systems in warehouses [642]. A discussion of fire modeling [649] presented the background in various approaches to provide a basis for selecting and interpreting fire simulation tools.

8.2. External flows

8.2.1. Vertical plate

The vertical plate continues to be the geometry that receives the most attention in studies of natural convection in external flow fields. Heat transfer correlations were discussed for isothermal [651] and uniformly heated [652] vertical flat plates. A means of determining the local heat transfer using an inverse method was described [654]. Geometry variations include a vertical round plate [659] and a plate with a sinusoidal wavy surface with varying wave amplitude and length [663]. A study of surface temperature oscillation [660] showed that long-term average results approach those at steady state. Fluid property variations include a stably stratified salt solution [664], cold water near its density maximum [661,662] and a power-law fluid [656] where the plate also has a power-law variation of surface temperature. Studies of combined heat and mass transfer include an analysis of free convection in a micropolar fluid with constant suction at the plate [655]. Linearized theory was used to obtain solutions for double-diffusive convection where both temperature and species concentration varied with time [657]. Laminar free convection in air in the presence of chemical species concentration and thermal radiation was studied [653]. Holographic interferometry was used to investigate the effects of thermal radiation on natural convection from a plate to nitrogen or carbon dioxide [658]. The effects of a transverse magnetic field taking frictional heating into account were determined numerically [665]. A simple method to determine the rate of particle deposition onto vertical flat surfaces in laminar natural convective flow was described [666] that can be used to estimate particle deposition in room environments.

8.2.2. Horizontal and inclined plates

Fundamental work on vortex structures found in natural convection from horizontal and inclined plates added to the knowledge of flow stability and transitions [668,669,671]. Experiments in air and water and corresponding numerical solutions were obtained for heat transfer from a downward facing heated circular disk [672]. Experiments in air using horizontal circular plates of various thickness to diameter ratios showed that the rate of heat transfer agreed with the existing archival results for a horizontal disk [670]. Similarity solutions have been obtained for combined heat and mass transfer from an inclined flat plate in the presence of an external magnetic field with internal heat generation or absorption [667]. Geometry variations that were studied include an inclined flat plate with an irregular leading edge [674] and horizontal and vertical disks with additional material added [673].

8.2.3. Cylinders, cones and blunt bodies

A theoretical and experimental study of heat transfer from a horizontal circular cylinder confined by two vertical walls [682] showed that there is an optimum spacing of the walls to promote heat transfer. An analysis was performed to study the flow and heat transfer near the forward stagnation point of a two-dimensional body following a step change in surface temperature [681]. A series of papers presented results of theoretical studies on heat transfer from a circular cone in which the cone was permeable with a non-uniform surface temperature [680], the fluid had temperature-dependent viscosity and thermal conductivity [679], the cone had a wavy surface in a variable viscosity fluid [677] and the wavy cone was immersed in a fluid of variable viscosity and thermal conductivity [678]. A similarity solution was obtained for Marangoni convection near vapor bubbles [675,676] by assuming the boundary layer thickness is small compared to the bubble diameter and thus the curvature can be neglected.

8.2.4. Thermal plumes

The effect of buoyancy on the production and dissipation of turbulent kinetic energy in a plume has been investigated using variants of the k–ϵ turbulence model [691]. Round and plane turbulent heated water jets discharged into stagnant water were modeled using a differential turbulence model and boundary layer equations [689]. Initial modeling of lava–SO_2 interactions on Prometheus, Io may explain the light colored streaks that have been observed [686]. Experimental investigations of plumes in stratified flows include a study of the turbulence enhancement, reverse transition and relaminarization in air [688] and tests conducted in liquids that simulate air flow in displacement ventilation systems in buildings [683]. Experiments using a circular water plume in brine were conducted to simulate the behavior of light fuel gas released into a region of quiescent, heavier air [684]. Two-dimensional bubble plumes in water were observed to determine plume oscillations and local void fraction [690]. Spatial DNS was employed to study the near field dynamics of a rectangular turbulent diffusion flame [685]. A finite-volume procedure was utilized to simulate methane/air flames with a cross-wind velocity ranging from 0.5 to 2 m/s [687].

8.2.5. Mixed convection

An experimental study was performed for aiding mixed convection on a vertical heated plate [695]. The authors found the wall shear stress to increase monotonically as the free stream velocity increased but the heat transfer rate suddenly decreased as the turbulent natural convection boundary layer went through a transition to laminar flow. Numerical solutions were presented for a continuously moving heated plate immersed into a thermally stratified medium [699] in which the stratification significantly affected both the surface shear stress and the heat transfer rate. A series of theoretical solutions were presented for suddenly started vertical flat plates [697,698] and semi-infinite vertical cylinders [692–694] with various thermal and mass concentration boundary conditions. Local similarity solutions were obtained for mixed convection from a horizontal flat plate in a micropolar fluid where the plate temperature varied as a power of distance from the leading edge [696]. Experimental data for mixed convection from a small sphere in cross-flow were obtained for Grashof numbers less than 0.01 and Reynolds numbers smaller than 0.5 [700].

8.2.6. Applications and miscellaneous

An inverse method was used to determine the local convective heat transfer coefficient from a vertical plate fin subject to an oscillating base temperature [701]. Variation in fin spacing and height were investigated experimentally for arrays of fins mounted on a horizontal base [702]. Results showed that optimum spacings exist for maximum heat transfer rate and that vertical base orientations are superior to horizontal ones. A study to implement modern control techniques to flow systems such as natural convection was reported [704]. The stability of flowing glass cooled by radiation from its surface was studied using a finite difference approach [703].

9. Heat transfer in rotating systems

Moderate activity on rotating flows continued in 2001 with a heavy emphasis on numerical studies. Key technologies included turbomachinery (i.e., gas turbine cooling), rotating drums, materials processing (i.e., crystal growing techniques), and extrusion machinery. Crystal growth processes with various rotational effects received good attention with experimental studies of and industrial scale Czochralski melt being a highlight. An extensive study of heat transfer and flow in rotating drums was published that has begun to establish universal scaling laws and a sorting out of parameters needed for practical design and scale up of pilot plant and laboratory equipment.

9.1. Rotating disks

Heat and mass transfer to a rotating disk in axial flow were measured under transient [705] and steady [709] conditions. Surface roughness was found to significantly affect the transition to turbulent flow and overall heat transfer coefficients. Analytical and numerical solutions for film flow were also developed [714,713], and effects of a temperature-dependent viscosity and transverse magnetic field on heat transfer were also calculated [708].

The stability of transient three-dimensional flow with heat transfer on a rotating disk reactor was reduced to an eigenvalue program by linearizing the transient around a steady-state solution [710]. For a rotating disk reactor of the type employed in chemical vapor deposition of thin films, a fully numerical analysis yielded the global stability limit for multiple solutions [711]. Mass transfer between two rotating disks was computed via the parabolized Navier–Stokes equations [712]. Heat transfer between two disks, one of which is rotating, was computed for the effect of gap ratio for steady, laminar, axisymmetric flow via integral relations; good agreement was found with measurements [706]. A comprehensive review of the state of predictions of three-dimensional heat transfer to rotating discs was also presented [707].

9.2. Rotating channels

Experimental results were reported for a four pass, rotating serpentine channel [717], and for a narrow cross-section cavity that models a trailing edge cavity in a gas turbine [726]. Both studies sought to elucidate effects of key design parameters on heat transfer coefficients. Ribbed channels with vortex generators were investigated experimentally to determine the degree of heat transfer enhancement [716]. Experimental correlations for heat transfer in a rotating circular straight pipe for several flow regimes [720].

Turbulent flow and heat transfer were computed for a variety of smooth and ribbed ducts. Turbulence models were a focus of several theoretical papers focused on rectangular ducts [719,723–725]. One study reported results of related experiments [715]. A three-dimensional calculation was reported for a ribbed U-duct [721], and a related work reported measurements of velocity and heat transfer in a square-ended U-bend [718]. More general results on were obtained numerically for smooth ducts [722,727].

9.3. Enclosures

Fundamental aspects of heat transfer in rotating enclosures addressed transport in rarefied gases [751], sealed rectangular cavities [730,752], cavities with swirl flow [739], Couette flow with solidification and viscous dissipation [745], and natural convection in a vertical annulus of moderate aspect ratio [756,759]. An annulus with a smooth rotating inner cylinder and a stationary grooved outer cylinder was investigated numerically to determine the limitations on two-dimensionality for heat transfer [753].

The instability of the Ekman layer in a rotating annulus with radial through flow was computed via DNS [750]. Gravitational–centrifugal separation in an axisymmetric source-sink flow with a free surface was analyzed for small Ekman, Taylor and Reynolds numbers [746]. Extensive experiments on Rayleigh–Benard convection, magnetoconvection and rotating magnetoconvection in liquid gallium were reported [729]. A numerical study of the base flow near its density maximum in a differentially rotating vertical cylinder for large rotational Reynolds and Rayleigh numbers [743]. A new DNS algorithm for rotating homogeneous decaying turbulence was introduced, and results show that rotation inhibits the decay of kinetic energy and alters the structure of vorticity [747].

Numerical models and experiments for various aspects of crystal growing techniques received a good deal of attention. One study of the industrial Czochralski process sought to predict oscillatory three-dimensional convection states [757], and another investigated contact-free control of the process via a rotating heat field [740]. Experiments and numerical analysis were carried out to determine the effects of a non-rotating crystal in the Czochralski process [738], and measurements of the convection state in an industrial scale melt were compared with numerical predictions [734]. Growth parameters and convection in the RF-floating-zone technique were investigated numerically and with experiments for an intermetallic compound [737]. Three-dimensional heat transfer, segregation, and interface shape of gradient-freeze crystal growth in a centrifuge was analyzed to determine effects of Coriolis forces [742]. Effects of vibration, acceleration, and buoyancy in microgravity in the floating-zone method were investigated numerically [735]. The effects of crystal rotation on the growth process in the floating-zone method were studied numerically, and conditions for approximating steady-state growth were determined [748]. The Stockbarger technique was analyzed to determine the effect of accelerated crucible rotation [733]. Effects of steady centrifugal acceleration due to ample rotation on flow and segregation in vertical Bridgman crystal growth were shown to be vary greatly when macrogravity conditions or high rotational speed existed [741].

Thermal and fluid models of screw extrusion processes were analyzed for several internal designs and operating condition. Modular, self-wiping corotating machines were considered numerically [758]. For polymer, twin-screw extruders, the effects of non-Newtonian fluid properties on feasible operating ranges [761] and chemically reactive materials [760] were considered. A somewhat related study considered condensation heat transfer and internal flow characteristics on a coil inserted in a rotating pipe via visualization experiments and measurements of overall heat transfer rates [744].

An extensive, systematic study of the scaling relationships for rotating drums was published with the goal reducing the number of controlling parameters for design [732]. More focused studies were reported on rotary desiccant dehumidification [731], rotating bioreactors with through flow [736], and heat and mass transfer in a rotating monolith reactors [754]. Focused studies were reported for heat transfer to a dilute dispersed solid with axial rotation [755], heat and mass transfer rotary grinding and drying [728], and the effects of agitation and deposits in mechanical solids mixers [749].

9.4. Cylinders, spheres, and bodies of revolution

An analysis of heat transfer from the surface of a rotating cylinder in a particle bed was undertaken to determine controlling parameters [764]. Another analysis considered closed form solutions for heat transfer between two circular rods, one of which experiences rotation and oscillatory axial sliding motion [765].

The hydrodynamics of a liquid flow on a rotating cone were investigated analytically and experimentally [763]. For flow over a rotating sphere, a numerical technique involving operator splitting was developed to improve computational accuracy [762].

10. Combined heat and mass transfer

10.1. Film cooling

Film cooling is an effective method of heat transfer. The effect of film cooling on thermal stress is a property that has been specifically investigated. Both numerical and experimental treatment of film cooling has been performed. Numerically, investigations into different situations have used various finite-volume methods (FVMs), such as flow field around a turbine blade at the leading edge [777,793], and a turbine guide vane [787], have been performed. A numerical model of blowing to cool surfaces proved effective as well [782]. The effects of injection through compound-angle holes were investigated numerically [768,779] and experimentally [772,774,783]. The use of chemical reactions to heat and cool different surfaces was investigated experimentally [788]. One such investigation looked at the influence of nozzle-to-skin distance in cryogen spray cooling during dermatologic laser surgery [766]. Experimental evaluation of impingement cooling were performed [775, 789,790]. Evaluation of local heat and mass transfer characteristics were performed for film cooling of different holes [769,770,786] and for the effusion plate in impingement/effusion cooling systems [771]. A two part study was done for film cooled turbine end walls in transonic flow fields to attain aerodynamic measurements [776], and heat transfer and film-cooling effectiveness [784]. Other experiments involved the consideration of convex surfaces, one consider it subject to favorable pressure gradients [780], another considered pressure gradients as well as Mach number [781] in film-cooling effectiveness. The effect of film-hole shape on turbine blade film-cooling performance [791] and heat transfer coefficient distribution [792]. One study considered the scaling of performance for varying density ratio coolants on an airfoil with strong curvature and pressure gradient effects [773]. Another considered the film-cooling subject to bulk flow pulsations: effects of density ratio, hole length-to-diameter ratio, and pulsation frequency [778]. A common techniques for extracting data from experiments are liquid crystal thermography [767,785]

10.2. Jet impingement heat transfer—submerged jets

The interactions of longitudinal vortices made by two inclined impinging jets in in-line and staggered arrangements are studied by using thermochromic liquid crystal, fluorescence dyes and PIV [823]. The transient heat transfer during cooling of a high temperature cylindrical block with an impinging water jet is experimentally studied [822]. The effects of jet-to-jet spacing on the local Nusselt number for confined circular air jets vertically impinging on a flat plate is experimentally investigated [825]. A local entropy generation rate is computed for fluid jet impinging on a heated wall. The standard k–ϵ, low-Reynolds-number k–ϵ and two Reynolds stress models are introduced to account for the turbulence [827]. A laminar swirling jet impinging on to an adiabatic solid wall is computationally studied. The effect of the nozzle exit velocity profile and the swirling velocity on the flow field and entropy generation rate is also studied [826]. Verification and validation of an adaptive finite-element method for laminar and turbulent jet impingement heat transfer is performed. Turbulence is modeled using the standard k–ϵ model for high Reynolds number, coupled with wall functions [830]. Freezing of biomaterials using impingement jets is experimentally studied. Because of their high turbulence characteristics, impingement jet systems have been introduced as an alternative to conventional freezing methods [828]. Turbulent plane jets impinging nearby and far from a flat plate are experimentally investigated using laser Doppler velocimetry and PIV methods are used [820]. Numerical simulation of the impingement of a turbulent jet on a plane surface is performed. The performance of the three turbulence models is studied under isothermal conditions. The computational results are compared with the experimental ones [818]. Heat transfer in a mist/steam impinging jet is modeled [817]. Turbulent flow field and heat transfer from an array of impinging horizontal knife jets on a moving surface is studied using large eddy simulation with a dynamic subgrid stress model [799]. Numerical simulation of mass transfer from soluble plate to an impinging liquid jet confined by a conical wall is performed using a finite difference scheme [821]. The velocity field in the vicinity of a target surface with a turbulent slot jet impinging normally on it is experimentally examined [833]. Heat transfer rate of a heat plate under a slot jet is numerically studied [805]. Heat transfer rate of a heat plate under a slot jet is numerically studied [804]. High Schmidt number mass transfer to a line electrode in turbulent impinging slot-jet flows is investigated [797]. Numerical simulation of turbulent jet diffusion flames by means of two-equation heat transfer model is performed [829]. Transitional jet diffusion flame with/without a duct is numerically investigated in two-dimensional case [814]. A numerical model for the simulation of industrial flames impinging on to material surfaces is presented. The modeling is used to account for heat release calculated by mixing and kinetically controlled mechanisms, as well as for turbulent closure and heat transfer by convection and radiation [819]. Velocity and heat transfer characteristics of multiple impinging slot jets in rib-roughened channels in the presence of cross-flow is numerically investigated [813]. Mixing of circumferentially placed round jets with a cross-flow in a circular duct is numerically modeled [831]. A new model and heat transfer analysis of impinging diesel sprays on a wall is developed. The model is based on the energy conservation law and experimental results, and developed by proposition of several mathematical formulas to determine the post impingement characteristics of droplets [815]. Surface temperature distribution on effusion-cooled plates is experimentally studied [807]. Fluid flow and heat transfer in gas jet quenching of a cylinder is studied by numerical simulation for surface treatment of a cylindrical sample geometry [808]. The effects of high relative curvature on surface heat transfer for a round air jet impinging perpendicularly on a semi-cylindrical convex surface is examined using liquid crystals [800]. Acoustic effects on the temperature spectra, spreading rate of heat, and flow structures of a two-dimensional hot-air jet are studied experimentally [832]. The density field of coaxial jets with large density differences are investigated experimentally [802]. The flow assimilation of a preheated jet into non-uniform external streams has been examined [796]. The behavior of a round jet issuing from a straight tube and impinging on a convex surface is investigated by smoke-wire flow visualization [803]. Large eddy simulation of the flow field due to an impinging jet at a moderately high Reynolds number, emanating from a rectangular slot nozzle has been performed [801]. Numerical simulation of heat transfer in confined laminar axisymmetric impinging jets at small nozzle-plate distances is presented, to show the role of upstream vorticity diffusion [798]. The flow distribution and kinetics of particle deposition in the radial impinging-jet cell was studied numerically [795]. Numerical investigation of impingement heat transfer using linear and non-linear two-equation turbulence model was performed [794]. A k–ϵ–$f(\mu)$ model was modified and a near-wall turbulence model developed for predictions in strongly strained turbulent flows and was applied to an impinging-jet flow [824]. Heat transfer from a discrete heat source to multiple, normally impinging, confined air jets is experimentally investigated [806]. Experiments for heat transfer characteristics of confined circular single jet impingement are conducted. The effect of jet Reynolds number, jet hole-to-plate spacing and heat flux levels on heat transfer characteristics of the heated target surface was also considered [809]. Impingement heat transfer and flow in the radial and circumferential directions by a single circular laminar jet in a flow passage with a confined insulated wall were estimated numerically in a three-dimensional system [812]. An experimental study of the row and heat transfer characteristics of an impinging jet controlled by vortex pairing was performed [811]. Local heat transfer coefficients and static wall pressure drops in leading-edge triangular ducts cooled by wall/impinged jets is measured experimentally [810]. The influence of fluid thermophysical properties on the heat transfer from confined and submerged impinging jets is experimentally investigated [816].

10.3. Jet impingement heat transfer—liquid jets

A jet in which the issuing stream has a density significantly higher than that of the ambient fluid is said to be a liquid jet. Liquid jets are often used for jet impingement heat transfer because of their relatively high thermal conductivity. A study of heat transfer enhancement with impinging free-surface liquid jets was performed [836]. The detailed heat transfer distributions of an atomized air–water mist jet impinging orthogonally onto a confined tal-gst plate with various water-to-air mass flow ratios were studied and a transient technique was used to measure the full field heat transfer coefficients of the impinging surface [834]. Mist/steam heat transfer were also studied in confined slot-jet impingement [839]. Besides the studies of heat transfer in liquid jets, the energy-transformation efficiency [841], dynamics of pinch-off in liquid/liquid jets with surface tension [840] were investigated. A new method was constructed to define the turbulent flow structures effective for heat transfer augmentation [838] and a non-spherical model for bubble formation coupled with phase change at a submerged nozzle in a flowing subcooled liquid [835] was built. A numerical simulation of the deformation behavior of two liquid drops one by one impinging coaxially onto a solid was performed [837].

10.4. Transpiration

Transpiration involves passage of a fluid through a porous surface. Transpiration cooling is a process by which a body having a porous surface is cooled by forced flow of coolant through the surface from the interior. Numerical [844] and experimental [846] studies investigated the effect of velocity, temperature, injection and suction angle on characteristics, such as heat transfer coefficient and skin friction, of a turbulent boundary layer. A numerical study of free and mixed convective heat transfer from small leaf shaped model structures showed that neglecting heat transfer by transpiration results in higher temperatures than would be observed in real leaves [847]. Wall transpiration and suction were shown to greatly impact the mixed convective heat transfer performance in inclined ducts [848]. Other studies investigated transpiration and evaporation of water from plants and soils. In one study [845], the relationship between increase in atmospheric carbon dioxide and decrease in plant transpiration rates was demonstrated. In other studies, the evaporation rates of water from soils under isothermal and non-isothermal conditions were determined [842,843].

11. Bioheat transfer

The present review is only a small portion of the overall literature in this area. This represents work predominantly in engineering journals with occasional basic science and biomedical journals included. This is a very dynamic and cross-disciplinary area of research, and thus, this review should be taken as more of an overview, particularly from an engineering heat transfer point of view, rather than an exhaustive list of all work in this area for this year. Subsections include work in cryobiology, thermal properties, thermal therapy, and thermoregulation.

11.1. Cryobiology

There is broad literature in this area to be found in the Journal of Cryobiology which is not referenced in this review. The engineering journals contributions to this subtopic included a number of studies on thermodynamic and mechanical effects on cellular cryobiology [853]; improvement in the viability of cryopreserved cells by microencapsulation [852]; analyses of thermal stress and fracture during cryopreservation of blood vessel [851]; interaction of biological cells with an ice front [850]; and a model for the heat transfer process during freezing [849].

11.2. Thermal properties

The thermal resistance of chicken plumage [859] as well as nucleotide induced changes in skeletal muscle myosin and muscle fibers were studied by DSC and temperature-modulated differential scanning calorimeter (TMDSC) [856,857]. The thermal properties of handwear at varying altitudes [858] as well as infrared sensitivity of thermoreceptors [855] and improved continuous calibration in biochemical reaction calorimetry [854] were presented.

11.3. Thermal therapy

In this subsection, the use of heat and cold to treat diseased tissues in the body were investigated.

Many of these studies evaluate experimentally and theoretically the effects of tissue perfusion on the deposition of energy within tissues. Studies included evaluation of 3D temperature distribution in perfused tissues during hyperthermic treatments [860,861] and assessment of the temperature distribution during hyperthermia treatment by isolated extremity perfusion [865]. The bioheat equation was used to evaluate perfusion induced instability [871] and solved by use of neural network analysis [872] while a hybrid equation for simulation of perfused tissue during thermal treatment [879] and development of a perfusion based model for characterizing the temperature fluctuation in living tissues [862] were presented. Whole-body hyperthermia with water-filtered radiation was presented by Wehner et al. [878] while evaluation of heart temperature during topical cooling was simulated [876].

Characterization of SAR patterns and freezing distributions for various thermal therapy devices and tissues were also presented including: a dynamic two-dimensional phantom for ultrasound hyperthermia testing [873]; helical antenna arrays for interstitial microwave thermal therapy for prostate cancer [875]; optimization in RF-capacitive hyperthermia [877]; 3D thermal response in interstitial hyperthermia of prostate carcinoma [874]; optimization of external ultrasound thermal therapy [869]; non-invasive vasectomy using a focused ultrasound [864]; X-ray thermal interactions with biomaterials [868]; thermal response of porcine cartilage to laser irradiation [863]; and an experimental attempt to detect the vulnerability of atherosclerosis plaques to pulsed laser irradiation [870] were presented. Lastly, studies involving cold therapy such as rapid minimally invasive induction of hypothermia using cold perfluorochemical lung lavage in dogs [866] and the effects of cryosurgery on the microvasculature of normal and tumor tissue within a perfused intravital chamber [867] were also reported.

11.4. Thermoregulation

Studies in this subsection investigated thermoregulation in beef heifers after heat challenge [880]; human thermoregulatory and temperature responses to a wide range of environmental conditions [886]; and exertion induced fatigue and thermoregulation in the cold [905]. Related studies included simulation of a flow field around a cow using 3D body-fitted coordinate system [904]; thermal time constant estimation for ectotherms [885]; and heat loss from giant extinct reptiles [899]. Radiative studies of heat loss related to thermoregulation included: heat radiation during caloric vestibular test [897] and several models of radiant losses from the human body [890,894] and evaporative cooling of wet skin and fur [887] were presented. Thermal comfort due to sweating [884] heat loss and gain [889] and the warm–cool feeling relative to tribological properties of fabrics [896] as well as thermal stability of the human body under hyperbaric environmental conditions [892] were presented. Critical thermal maxima and acclimation rate of the tropical guppy *Poecilla reticulata* [882] was also presented. Finally, an inline sample thermoregulation unit for flow cytometry [888] was described.

At the level of the skin and circulation, other thermoregulatory studies included investigation of decreased cutaneous vasodilation in aged skin [893]; hypethermia by drug induced (Ecstasy) cutaneous vasoconstriction in conscious rabbits [898]; chronic heating responses in muscle and lung tissue in vivo [900]; and body morphology and the speed of cutaneous rewarming [902]. Related studies included Pulsatile blood flow effects on temperature distribution and heat transfer in rigid vessels [883] and simulation of perfused tissue temperature during thermal treatment [879]. A compact data logger for ambulatory skin temperature measurement was also introduced [881]. Investigation of a temperature control system was also modeled [895].

Other thermoregulation work included heart rate effects on thermoregulation in the varanid lizard [901] as well as simulated heart temperature during topical cooling [876]. Theoretical simulation of temperature distribution in the brain during mild hypothermia treatment for brain injury [906]; brain temperature monitoring using microwave brightness temperatures [903]; as well as heat and water transfer rates in the human respiratory system [891] were presented.

12. Change of phase

12.1. Boiling

Papers on boiling change of phase for 2001 have been categorized as follows: droplet and film evaporation, bubble characteristics and boiling incipience, pool boiling, film boiling, flow or forced convection boiling and two-phase thermohydrodynamic phenomena. These topics are discussed in their respective subsections below.

12.1.1. Droplet and film evaporation

Papers in this category discuss droplet heat transfer [907–910,913,914,917–919,921–925,928–930,934,937,939], film heat transfer [911,912,915,916,926,927,932,933,935, 936,938,941] and spray heat transfer [920,931,940].

An analysis was presented of heat transfer to emulsions in which the internal phase is a low-boiling point liquid compared with the dispersion medium [907]. The heat flux magnitude depends both on the mean size of droplets and on their distribution over the volume in which they reside. Evaporation of volatile liquid droplets on a surface was experimentally studied [908]. Drop spreading was discussed and it was noted that the rate of evaporation strongly affects the contact angle of the evaporating drops. Interfacial velocity slip effects on transpiration heating of droplets were discussed [909]. Transpiration sustains velocity slip only where droplets typically have become too small for much convective enhancement of the heat transfer. Droplet impaction on a hot surface was addressed theoretically [913] and experimentally [914]. A kinetic theory treatment was used to calculate conditions existing at the non-equilibrium interfaces of the vapor layer. The effect of surface tension on fuel vapor pressure was incorporated into droplet evaporation modeling [917]. Some differences were noted with results in the literature. The contact angles of droplets impinging on a heater surface were measured [918]. The dynamic advancing contact angle extends beyond the equilibrium advancing and receding contact angles during the motion of the interface. Measurements were made of droplet size distributions in propane sprays rapidly evaporating within an air flow within a channel [919]. It was concluded that to obtain a homogeneous spray pulse, injection should take place in a converging channel. Detailed measurements were made of cooling of a surface with a single droplet [921]. The process was recorded and it was shown that the unsteady conduction process is affected by drop deformation dynamics and the nature of the external diffusive vapor region near the impact site. With numerical simulations, modification of the rate of evaporation as a result of surface deformation was formulated [922]. The model expressed the mass flux as a function of the surface curvature. Oscillations in evaporating drops were documented [923]. The rate of evaporation decreases for an oscillating droplet, as compared to a deformed, but non-oscillating, droplet. A spherical cell model was proposed for droplet combustion [924]. Droplet life increases with a decrease in droplet spacing, ambient temperature and ambient oxidizer concentration. A droplet growth model was compared with experimental measurements [925]. New experimental diffusion coefficients were obtained. The stability of rapidly evaporating droplets in an explosive boiling situation was discussed [928]. The process was shown to be unstable, as was found in experiments. Evaporation of ventilated water droplets was experimentally documented [930]. The results were a validation of mass and heat flux expressions commonly used in condensation and evaporation studies. Molecular dynamic calculations were used to simulate nanodroplet evaporation [934]. A study of convergence of the method was presented. The effects of turbulence on single droplet evaporation rate were experimentally documented [937]. Higher evaporation rates compared with those in quasilaminar cases were quantified. The differences between theory and experimental documentation of droplet evaporation in microgravity were discussed [939]. The main discrepancies were the additional fiber conduction (used to support the droplet in the experiment) and, at high temperatures, the liquid phase radiative adsorption. Soot evaporation modeling was reviewed [929] and errors in modeling were discussed. Of significance were the molecular weight effects associated with the heat of evaporation and the thermal velocity of carbon vapor. Finally, the effects of dissolving gases or solids into the droplets for boiling on hot surfaces were experimentally documented [910]. The addition of sodium bicarbonate produced a large enhancement of heat transfer.

Evaporation of a film on a vertical channel was numerically investigated [911]. Spatial profiles of velocity, temperature and moisture were presented. A numerical study of evaporative cooling of a liquid film in a tube flow was presented [912]. Convection of heat by the flowing water film becomes the main mechanism for heat removal from the interface. A simulation of superheated steam drying was presented [915]. The influence of the initial thickness of the film on the heat transfer coefficient was investigated. An experimental evaluation of critical heat flux in films of dielectric liquids was presented [916]. At low Reynolds numbers of the film, a specific form of critical heat transfer was observed which is characterized by disintegration of the jet into droplets and their separation from the heater. Heat transfer coefficients in films flowing down smooth and longitudinally profiled tubes were experimentally documented [926]. Recommendations for geometrical parameters of profiling were made. Rewetting of an infinite tube heated internally was computed [927]. A critical heat flux was obtained by setting the Peclet number equal to zero, which gives the minimum heat flux required to prevent the hot surface from rewetting. Propane evaporation from a porous wick of a heat pipe was experimentally documented [932]. Heat transfer intensification of up to 3–5 times was obtained with the wick. The effects of vapor–liquid equilibrium and mass transfer on evaporative heat transfer of solutions containing dissolved solids were experimentally quantified [933]. The importance of interfacial mass transfer on boiling heat transfer was addressed. A similar paper addressed interfacial evaporation in a falling liquid film [935]. Evaporation in triangular grooves was shown to be 3–6 times higher when a porous layer was added [936]. The effects of evaporation and mass transfer were numerically evaluated for film evaporation in a vertical annulus [938]. Finally, interfacial evaporation in a falling liquid film is modeled [941]. They showed that inclusion of interfacial evaporation heat transfer in the turbulent model would lower the predicted convective heat transfer coefficient.

Simulations of the behavior of multicomponent fuel sprays impinging on a hot surface were presented [920]. New models are proposed for implementation into the KIVA code. Measurements were given of spray cooling of a finned, horizontal tube bundle [931]. A distributor plate below the bundle enhanced the heat transfer by providing a level of liquid hold-up just below the bottom tube row. Spray cooling in reduced gravity was experimentally addressed [940]. The effects of heater orientation and of rebounding droplets were studied in detail.

12.1.2. Bubble characteristics and boiling incipience

Nucleation of bubbles in microchannels was modeled [955]. It was demonstrated that bubble nucleation temperatures markedly increased as the size of microchannel decreased. Nucleation in vapor explosions or liquid nitrogen in water was experimentally investigated [946]. Potential critical issues involving such a process in fusion systems were identified. Incipience of boiling within tube bundles, with application to desalination plants, was experimentally studied [951]. The influence of tube spacing and concentration of salt water in the evaporators were discussed.

Bubble dynamics from a single artificial site were observed [957]. Artificial sites were of the conical, cylindrical and reentrant geometries. Nucleation sites activated by laser heating were studied in a pool-boiling setting [947]. Experiments involved three and four active sites. In some cases, one nucleation site was observed to deactivate another. Bubble growth and departure from artificial nucleation sides were experimentally investigated [952]. A numerical study showed that the bubble grows very rapidly after it begins to form a neck. The results are also useful for predicting the volume of a bubble that resides inside a cavity after a previous bubble has departed. The convection around a gas bubble was numerically and experimentally studied [943]. The effect of thermocapillary or Marangoni convection was discussed. The results were described in terms of the relevant dimensionless numbers. Bubble dynamics during boiling in a microgravity atmosphere were discussed [959]. Bubble dynamics and regeneration of boiling were documented [960]. The regeneration is with the disappearance of the low efficiency, subprocess of evacuation of bubbles. Experiments were performed on transport near attached bubbles on a downward-facing surface [954]. A jet was observed to emerge from the bubble top, induced by interfacial evaporation and condensation rather than by natural convection due to buoyancy or by Marangoni flow. The shift of concave liquid–vapor interfacial phase equilibrium temperature and its effect on bubble formation were discussed [961]. It was noted that interfacial evaporation might even occur at a temperature lower than the nominal saturation temperature. A numerical study was conducted of heat transfer to a sliding bubble under nucleate boiling [958]. The study is proposed to aid in understanding the physics of partial nucleate boiling. High heat flux pool boiling was modeled to determine the boiling curve [948]. It was found that evaporation due to the growth of the vapor stem provides the main contribution to the total heat flux. A method is presented for predicting the boiling curve for saturated nucleate boiling [956]. The correlation is based on a model in which heat transfer is primarily by heat conduction through the conduction layers formed under the primary bubbles. Nucleate boiling in binary mixtures was experimentally and theoretically addressed [945]. The binary mixture vapor–liquid interface greatly influences boiling dynamics. Boiling near the crisis point was modeled to predict the growth of a dry spot [953]. The spot begins to grow rapidly under the action of the vapor recoil. A model was given to predict pool-boiling CHF [950]. It includes the surface–liquid interaction effects through the dynamic, receding contact angle.

Bubble cavitation created by a laser pulse is mathematically modeled [942]. It accounts for the occurrence of supercritical conditions during bubble collapse. The mechanics of bubble collapse in binary mixtures were investigated [944]. The moving boundary feature was an integral part of the solution of the governing equations.

Microstructure boiling within a porous surface was described analytically and with experiments [949]. The experimental data were used to verify the optimization.

12.1.3. Pool boiling

Bubble dynamics in pool boiling were experimentally revealed [962]. At high heat flux, bubbles mainly remain close and form large coalesced bubbles. At low or moderate heat flux, they are propelled into the fluid core prior to rise in a bubble column. A numerical method was presented for the analysis of bubbles during nucleate pool boiling [985]. The results yield the bubble growth rate, departure radius and heat transfer rate. A fractal description of the active nucleation site density was proposed for the study of boiling fundamentals [983]. The origin of thermocapillary convection in subcooled nucleate pool boiling was presented [976]. The effects of non-condensable gases were discussed. Thermosyphon boiling in a vertical tube and vertical channel was experimentally described [969]. The effect of the size of the gap between plates on the boiling curve was discussed.

Pooling boiling in both microgravity and in high gravity was discussed [972].

Critical heat flux was experimentally documented for boiling in confined spaces [987]. Boiling is off a heated plate over which is held a mesh screen. CHF is reduced with a decrease of the space between the plate and the screen if it is below a critical value. Means were presented for enhancing nucleate boiling and CHF under microgravity conditions [986]. One was a microconfigured metal–graphite composite and the other was to use a dilute aqueous solution of a long-chain alcohol. With the later, Marangoni flow direction is reversed, which aids the bubble departure. The effects or heater size and orientation for pool boiling off plain or microporous surfaces were experimentally shown to be significant [979]. The effect of a modulated porous layer coating on pool-boiling CHF was experimentally evaluated [974]. The surface optimization was discussed in terms of hydrodynamic stability issues. The optimized system had separated liquid and vapor flow paths. Mechanisms of boiling dryout and rewet with porous coating were presented [963] in the region of critical heat transfer. The performance of enhanced tubes with pores having connecting gaps was documented [973]. The connecting gaps are believed to serve an additional route for the liquid supply and delay the dryout of the tunnel. The performance of spirally wrapped tubes of pool nucleate boiling enhancement was experimentally evaluated [968].

Experimental results and numerical analysis of heat losses in a liquid nitrogen cryostat were presented [964]. Results were for the heat loss between the vapor and the cryostat neck. The relative performance of FC-72 and HFE-7100 fluids was evaluated [975].

The effect of lubricant concentration, miscibility and viscosity in R134a pool boiling was experimentally evaluated [971]. Large improvements over pure R134a heat transfer can be obtained for mixtures with small lubricant mass fraction, high lubricant viscosity and large critical solution temperature. Boiling of ammonia with miscible oil on the outside of a horizontal plain tube was evaluated [988]. The heat transfer coefficient first decreased with an increase in oil concentration, then significantly increased with a further increase in oil concentration. Pool boiling with a mixture of R507 and oil was evaluated [977]. The effect of increasing saturation temperature of the mixture was presented. The effect on nucleate pool boiling of adding a surfactant to water was presented [984]. For a highly soluble surfactant, boiling heat transfer is enhanced by its addition due to the depression of the equilibrium surface tension, but is suppressed by the depression of the equilibrium contact angle. These two effects counter-balance. The effects of surfactants on bubble growth and wall thermal patterns in pool boiling were recorded by high-speed video [966].

Controlled wall temperature transients were imposed on pool boiling to investigate their effects on heat transfer coefficients [967]. Boiling heat flux increases when transient heating rates are increased. The effect of plate length on CHF was evaluated for the boiling of HeII [982]. The measured CHF values were higher for a shorter length of the test plate. The effect of diameter of a vertical tube on the boiling curve was experimentally documented [970]. The heat transfer coefficient decreased as the tube diameter increased.

The effect of dielectrophoresis (DEP) on pool-boiling heat transfer under microgravity conditions was documented [980,981]. Maintaining boiling in space with DEP forces required striking a balance between the short-distance vapor bubble detachment needs and the long-distance bubble transport requirements. Boiling enhancement with EHD was evaluated with HCFC-123 fluid in a wire geometry [978]. Application of an electric field increases the natural convection contribution to the total heat flux, while the latent heat and forced convection contributions are reduced, due to the reductions in the number of active nucleation sites and the average bubble departure diameter.

Numerical simulation of pool-boiling heat transfer was discussed [965]. Pool nucleate and film boiling at standard gravity and microgravity conditions were considered.

12.1.4. Film boiling

Turbulent film boiling on a horizontal cylinder was formulated [994]. The importance of thermal radiation was discussed. Film boiling on a downward-facing surface was discussed [995]. Subcooled film boiling on a horizontal disc was analyzed [990] and experimentally studied [989]. Measurements were made using particle tracking velocimetry. Film boiling on a flat plate upon which impinges a water jet was theoretically and experimentally documented [993]. A semi-empirical correlation was proposed. Dry patch interaction caused by lateral conduction in transition boiling was analyzed [992]. The mechanism for non-hydrodynamic transition was revealed. Quench velocity and rewetting temperature on hot surfaces were analyzed with a hydrodynamic macroscale model [991]. An advanced tool for further studies of the mechanisms that govern the motion of thin liquid films on hot solid surfaces was presented.

12.1.5. Flow boiling

A comparison of CHF measurements for R-134a in tubes and correlations of water data were presented [1023]. The look-up water table provided an excellent CHF prediction for the R134a. An approach was presented for correcting DNB-type CHF correlations for non-uniform axial power shapes [1017]. The key parameters representing the influence of the upstream heat flux profile are revealed as the bubble layer thickness, the mixture velocity of the bubble layer directed parallel to the heated wall and the lateral mass velocity from the core to the bubble layer caused by turbulence. CHF correlations were presented for flow in vertical, steam generating channels [996] and vertical tubes [1003]. CHF performance with microporous surface coatings was evaluated experimentally [997]. The coating provides increases in both heat transfer coefficient and critical heat flux. A comparison was made of boiling heat transfer coefficients with plain and microporous coated surfaces [1024]. The conductive resistance of the microporous surfaces was shown to have an effect on the boiling curve. The effect of surface roughness on CHF in tubes was documented [1008]. A correlation was found between CHF and the fractal surface roughness of the tubes. The effect of obstacles in a tube on CHF was documented [1012]. The CHF for flow boiling off a wire in microgravity was experimentally documented [1020]. Compared to pool boiling, forced convection tends to offset the microgravity effect on CHF. Experiments were reported with a single vapor bubble grown in a flow field of FC-72 on a flat surface with standard and microgravity [1021]. At high flow rates, the bubble generation frequency, Weber number and bubble shape tend to be similar to those in normal gravity.

The fundamentals of flow boiling were discussed in terms of 'catastrophe theory' [1004]. Interfacial area measurements in subcooled flow boiling were presented [1000]. Parameters include void-fraction distribution, interfacial area concentration distribution, Sauter mean diameter and the interfacial velocity. Phase change near an isothermal wall was discussed and compared with mono-phase fluid flow [1018]. Two-phase flow with phase change in a helically coiled tube was discussed [1011]. Methods were proposed for elimination of pressure drop oscillations. Flow boiling in small, low-aspect-ratio, horizontal channels was experimentally characterized [1019]. Correlations from the literature were recommended. Heat and mass transfer during water evaporation in a two-dimensional, steady, laminar flow of an air–vapor mixture were studied [1001]. The effect of thermal radiation on the ratio between Sherwood and Nusselt numbers was indicated. Highly subcooled boiling in flow over a horizontal cylinder was experimentally studied [1016]. A new nucleate boiling suppression factor for cross-flow was developed. Evaporation and condensation heat transfer inside of an internally grooved horizontal tube were measured [1010]. Local heat transfer coefficients of the herringbone-grooved tube were about twice as large as those of the spiral-ribbed tube for condensation and only slightly larger for evaporation. A smooth tube and an internally ribbed tube were compared for flow boiling heat transfer performance [1006]. The spirally, internally ribbed tube gave 1.4–2 times the heat transfer coefficient and about the same increase in two-phase pressure drop. A horizontal, microfinned tube was evaluated for evaporation performance [1030]. There was a noted improvement with microfinning over the performance of the smooth tube. Evaporation of R-134a in a heated capillary tube was experimentally documented [1005]. A correlation predicting the under-pressure of vaporization for capillary tube was developed. Survival of a vapor bubble within a macrochannel was described [1022]. The hydrodynamic forces acting on the bubble generated in a microchannel may cause its premature detachment thereby shifting the formation of visible bubbles toward higher heat fluxes, compared to observation in a macrochannel. The effects of non-uniform temperature distributions in electronic devices were discussed in terms of boiling flow stability [1015]. Hydraulic instabilities lead to irregularity of temperature distribution on a heated chip. Internal forced convective flow with boiling through a duct filled with a heat generating porous medium was numerically investigated [1009]. The influences of wall channeling and capillary effects were discussed. Tunnel and pore enhanced surfaces are evaluated with two refrigerants [1007]. The data show that greater tunnel height and smaller tunnel pitch are preferred. Evaporation in a vertical tube was measured [1026]. The results supported a forced convection mechanism of the conventional type rather than the alternative thin film boiling mechanism proposed by others. Special features of a high power beam dump cooling flow were discussed [1028]. Empirical correlations were recommended. Boiling in flow impinging on a disc was experimentally documented [1013]. A variation on this was to make the jet two-phase, with injection of a gas [1014]. Adding the gas increased the convective heat transfer by up to a factor of 2 in the stagnation region. The maximum heat flux was unaffected by changes in the jet void fraction, while the minimum film boiling temperatures increased and film boiling heat transfer coefficients decreased, with increasing jet void fraction. Heat transfer characteristics were studied for gas carrying evaporation with fluidized solid particles [1031]. The heat transfer was enhanced and introducing solid particles lowered the superheat of the liquid in contact with the heated surface. The heat transfer performance for annular flow of liquid nitrogen in a vertical annular channel was computed [1027]. The measured heat transfer coefficient increased as the mass flux increased and the gap of the annular channel decreased. Boiling of binary mixtures in an annular flow was modeled [998]. A model for droplet interchange in the annular flow regime in vertical pipes was presented. In a second paper, a model for phase-change heat transfer to binary mixtures at high qualities is proposed [999]. Evaporation heat transfer coefficients for smooth and microfinned tubes with R-22 and R-410A fluids were measured [1025]. Generally, R-410A showed the higher heat transfer coefficients. A visualization study was performed for boiling in a heat exchanger under microgravity conditions [1029]. It was shown that an earth-based correlation for the flow regime did not correlate well. EHD enhancement of convective boiling was studied to document the influence on flow regime, heat flux and mass flux [1002]. EHD forces can drastically reduce the rates of heat transfer under certain conditions.

12.1.6. Two-phase thermohydraulic phenomena

An analysis of density-wave instabilities in boiling channels was presented [1033]. A two-dimensional map of the results of the stability analysis was presented. Dynamic behavior of boiling in a horizontal channel with wall thermal capacity was analyzed [1042]. Under certain conditions, the model exhibited self-excited periodic oscillations. Slug-to-annular regime transition in a vertical duct was measured [1049]. Heating induced a more dramatic effect on the frictional pressure gradient near the slug-to-annual transition than seen in an adiabatic tube flow. Dryout was theoretically and experimentally evaluated in an inclined pipe [1036]. Thermal patterns on the heated wall and the local heat transfer coefficients were obtained during the experiments. Boiling heat transfer in a matrix-type channel consisting of perforated plates was experimentally studied [1043]. The results were generalized by correlation. Two-phase bubbly flow was modeled with emphasis on inclusion of the interfacial pressure jump term [1032]. The numerical stability is improved significantly if the interfacial pressure jump terms are used in lieu of the virtual mass terms. Boiling of methanol on a surface covered with a layer of mesh was studied experimentally [1040]. The mesh enhanced the heat transfer efficiency of nucleate boiling at low wall superheats. Boiling on coated surfaces and in porous structures was modeled [1047]. The results described different kinds of liquid–vapor structures inside the porous coating. A numerical analysis of strong evaporation through porous matter was presented [1039]. Direct numerical solution of the Boltzmann kinetic equation was employed. Boiling on surfaces coated with a porous wick was modeled [1051]. The wick can enhance boiling heat transfer and increase critical heat flux. Evaporation in thin biporous media were discussed [1050]. Biporous media can increase the number of small evaporating menisci, with increased heat transfer performance. Evaporating flow in heated capillary macrochannels was analyzed and measured [1045]. The flow in macrochannels appears to have two distinct phase domains, one for the liquid and another for the vapor, with a very short section of two-phase mixture between them. Pressure drop of steam-water, two-phase flow in helical coils was measured [1035]. Because it was found that there was a great deviation among the correlations in the literature and that they were difficult to implement, a new correlation was formulated and presented. Critical flow through a safety valve was measured for various subcooling levels and pressures [1038]. A non-equilibrium critical mass flow correlation was developed. Explosive vaporization within superheated liquids by a boiling front was measured [1046]. Above a certain superheat threshold, vaporization occurred only in a thin surface zone of intense boiling and liquid fragmentation. Explosive flow of boiling and degassing liquids was investigated to assess the influence of wall friction [1044]. Changes of boiling modes by rewetting and by autowaves were measured in support of reactor safety analyses [1034].

The influence of additives on the enhancement of boiling was modeled [1041]. Enhancement with the addition of sodium oleate or polyethylene glycol was described. Thermal-fluid phenomena induced by nanosecond-pulse heating of material in water was tested and visualized [1048]. Finally, high-density laser-material interaction was modeled with a mathematical scheme that captured the transient liquid–vapor interface [1037]. A homogeneous boiling phenomenon near the critical point was implemented.

12.2. Condensation

12.2.1. Surface geometry and material effects

Observation of film condensation on copper plates with triangular microgrooves machined in them showed an improved removal of the condensate resulting in an enhancement of the Nusselt number by a factor of up to 2.22 [1053]. A three-dimensional heat and mass transfer model for condensing/evaporating films on a vertical grooved tube has been developed, and the results show the enhancement of the heat transfer by the grooves due to the remaining bare surface area [1060]. Another experiment showed that when an electric field was applied to a finned tube in the direction of the flow, the film split into liquid columns as soon as the field reached a certain critical value, resulting in an enhancement of the heat transfer [1055]. The experimental results were supported by theoretical calculations. The same authors repeated the experiments with partially coated finned tubes, finding almost the same enhancement of the heat transfer with a considerable reduction in power [1056]. Condensation on a thin wire has been investigated theoretically and experimentally, and a comparison of the predicted film temperature with one derived from measurements of the wire resistance showed good agreement [1061].

Coating surfaces with a thin polymer film was found to increase the heat transfer coefficient by factors of 3 for polytrimethylvinylsilane and of 5–7 for polytetrafluoroethylene [1059]. Condensation of steam through a non-condensable gas on polymer coated surfaces of a compact heat exchanger has been investigated and good overall heat transfer coefficients have been obtained [1054]. A couple papers consider the condensation on subcooled liquid surfaces. Experimental measurements of the condensation heat transfer to the thick film of a moving subcooled liquid over a wide range of Reynolds numbers, Prandtl numbers and degree of subcooling has shown that the latter parameter has the strongest effect [1062]. In the other study, the condensation of saturated steam on a conical spray of subcooled water was investigated experimentally and analytically, and it was found that the condensation heat transfer lead to a break-up of the water sheet into droplets [1063]. A model of the condensation heat transfer of R22 in horizontal smooth tubes with turbulent annular film flow shows the importance of the entrainment effect on the heat transfer coefficient [1058]. Another model calculation considers the configuration of a fluid evaporating at the heated bottom of a tube and condensing at the cooled top, and criteria are given for having either dry or liquid covered side walls between the two regions [1052]. A new technique based on a modified Wilson plot technique has been used to predict the condensing side heat transfer coefficient of flow over horizontal tubes, and comparison with experimental data shows that the predictions underestimate the heat transfer by 7.5–15% for steam, and by 15–25% for R134a [1057]. To study condensation on a microscale, an optical technique has been used for determining the movement of a single condensed ethanol drop into a concave liquid film. It has been found that the intermolecular forces are more important than the gravitational forces for the removal of the condensate at the microscale [1064].

12.2.2. Global geometry and thermal boundary effects

Several studies concerned themselves with the effects of shear between the vapor and the liquid. A comprehensive model has been formulated for the condensation heat and mass transfer in a vertical tube, considering the forming film section and the formed film section separately. The importance of the relative velocity ratio of vapor and liquid and of the momentum transfer due to mass transfer is described [1073]. The model results showing these effects and the influence of the fluid thermophysical properties are in good agreement with experimental data. For a similar geometry of a vertical tube, the effects of shear between a gas and a liquid film in a counter-flow arrangement have been investigated experimentally, and the stresses are found to have opposite effects depending on the film Reynolds number [1076]. The convection and condensation heat transfer outside an inclined elliptical tube with an isothermal surface has been calculated including the effects of shear, and an enhancement of the heat transfer with ellipticity has been found [1072]. A model is presented for humid air moving due to natural convection between vertical parallel plates, and correlations between latent and sensible Nusselt numbers are presented [1065]. The enhancement of convection heat transfer through condensation from wet flue gas in a vertical channel has been investigated theoretically and experimentally, and the importance of the wall temperature on the fog formation and the heat transfer is described [1067].

Heat transfer and pressure gradient have been measured for multiport flat extruded aluminum tubes with very small hydraulic diameters, and the increases in condensation coefficient and pressure gradient with decreasing hydraulic diameter are presented [1077]. An arrangement of a vertical grid of horizontal copper tubes with integral fins has been used for determining the condensing side heat transfer using a modified Wilson plot technique for steam [1074]. Direct contact condensation has been studied with steam discharging into a quenching tank with subcooled water over a range of design and operating parameters, and empirical correlations of the dimensionless steam jet length and the average heat transfer coefficient as function of steam mass flux and condensation driving potential are presented [1068]. A method for predicting the onset of a self-sustained oscillatory flow instability in a multitube condensing flow system has been developed by extending the equivalent single tube model [1069].

The effect of steam leakage into the cryogenic cooling system of a fusion power plant has been investigated theoretically, and the condensation rate and ice layer growth are presented for different parameter values [1071]. The flow of moist air around thin air foils has been investigated theoretically including the consideration of non-equilibrium and homogeneous condensation for a range of parameters. It has been found that heat addition due to condensation causes significant changes in the compressible flow pattern and affects the aerodynamic performance of the air foils [1070]. A two-dimensional model has been developed to investigate the observed pressure dependence of nucleation rates in thermal diffusion cloud chambers. The significance of buoyant convection and of thermal diffusion on the results is demonstrated, making a case for the need of a 2-D model [1075]. The mixed convection and film condensation heat transfer from superheated vapors flowing onto a sphere with varying wall temperature is described by a model for different conditions [1066].

12.2.3. Modeling and analysis techniques

A random fractal model has been developed to simulate drop size and spatial distribution in dropwise condensation. Results obtained for water condensation on a copper wall show good agreement with the bulk of experimental data and improved precision compared to an existing single drop model [1084]. The same authors studied the effect of the surface thermal conductivity on dropwise condensation, and a decrease in the condensation heat transfer coefficient with surface thermal conductivity has been found [1085]. A non-equilibrium molecular dynamics simulation has been used to calculate the heat and mass transfer across the liquid vapor interface, and the results are compared with values obtained using kinetic theory. Agreement exists between the two approaches from the triple point to about halfway to the critical point [1081]. The condensation on a capillary grooved structure has been simulated using a finite volume of fluid approach, with condensation on the fin top and on the meniscus being modeled by introducing additional source terms in the continuity equation [1086]. The same authors investigated capillary blocking effects in miniature channels using the same approach and describe the effects of total mass flow rate and distance between plates [1087]. A finite difference method has been used to describe the wave evolution and the heat transfer with a wavy condensate film on a vertical wall, introducing the waviness as a random perturbation of the film thickness near the leading edge [1080]. The effect of the presence of non-condensable gases on the condensation of vapors on a vertical fin has been modeled using the heat and mass transfer analogy, and numerical solutions of the results have been transformed into dimensionless equations which can predict the mean condensation heat transfer coefficients [1082].

Two papers by the same authors deal with condensation in porous media. In one, the film condensation and natural convection along a vertical plate is investigated with a saturate vapor porous medium on one side and a fluid saturated porous medium on the other. Temperature distributions on the plate and local as well as global heat transfers are predicted [1078]. The second paper deals with a similar geometry, however, the vertical plate is immersed in a porous medium filled with saturated vapor [1079]. A non-equilibrium three phase model has been developed for the simulation of catalytic distillation, and results obtained for the aldol condensation of acetone to diacetone alcohol show good agreement with experimental data [1088]. A numerical model has been formulated for the absorption of atmospheric pollutants such SO_2 by growing cloud droplets, and the dependence of the acidity on the presence or dissolution of cloud condensation nuclei is demonstrated [1083].

12.2.4. Fluid material effects

Experimentally determined heat transfer coefficients and pressure drop data for condensation inside a smooth tube are presented for several pure HFC refrigerants (R134a, R125, R236ea, R32) and the nearly azeotropic HFC blend R410A. Effects of vapor quality, mass velocity, saturation temperature and temperature difference between saturation and tube wall on the heat transfer coefficient are reported [1090]. In another experimental study, the condensation heat transfer on the outside of a bank of smooth copper tubes was determined for pure HFC134a and different azeotropic mixtures of HFC134a and HFC23, and visualization of the condensate flow has provided explanations for differences between experimental data and theoretical predictions. A decrease in the heat transfer has been found for the mixture [1089]. Another pair of mixtures investigated experimentally consisted of R407C and R22 mixed with polyol–ester and mineral oils and experiments were performed for microfin tubes in straight and U-bend shapes. Straight tubes revealed the strong decrease in the heat transfer enhancement when the oil concentration increased and the mass flux decreased [1091]. Condensation enhancement during the flow of steam over horizontal tubes by using small amounts of additives such as 2-ethyl-1-hexanol has been investigated experimentally, and an augmentation of the heat transfer by as much as 30% has been found. A general criterion for selecting effective additives is proposed [1092].

12.3. Melting and freezing

This is the change of phase (freezing and melting) section of the review. It is broken into several subsections including melting and freezing of spheres, cylinders and slabs; Stefan problems; ice formation/melting; melting and melt flows; powders, films, emulsions and particles in a melt; glass technology; welding; enclosures; energy storage—PCMs; casting, molding, and extrusion; mushy zone—dendritic growth; solidification; crystal growth; droplets, spray and splat cooling; oceanic, geological, and astronomical phase change.

12.3.1. Melting and freezing of sphere, cylinders and slabs

In this subsection, phase change in a cylinder and a cylindrical shell [1094] as well as in spherical containers [1095] and solid spheres [1093] were studied.

12.3.2. Stefan problems, analytical solutions/special solutions

In this subtopic, analytical solutions for freezing planar Couette flow with viscous dissipation [1096] and for freezing induced by evaporative cooling [1097] were presented. In addition, special solutions using the Lattice Boltzmann method were used to solve the heat conduction problem with phase change [1098] and heat-entropy analogy solutions were applied to interface tracking in phase-change heat transfer with [1100] and without fluid flow [1099].

12.3.3. Ice formation/melting

Papers in this section included both ice formation and melting work. Ice formation was studied by use of ultrasound to induce nucleation within supercooled water [1105,1109]. Melting studies included analysis of melting within an ice slurry by warm air bubbling [1101]; as a solid state reaction [1103]; and in a rectangular enclosure [1104]. Experimental and theoretical models of freezing and thawing processes in building materials [1106]; food [1108]; and ice cream [1102] were presented. Finally, a fully coupled thermo-hydro-mechanical model for a frozen medium was reported [1107].

12.3.4. Melting and melt flows

This subtopic included work in molten metals, laser and electron beam melting and general studies in the area.

Molten metal flows were studied for dimensionless correlations during forced convection [1110]; dynamics and control of solidification [1112]; and melt infiltration into a moving bundle of fibers for processing of composite wires [1117]. In addition, thermal stratification in a steel ladle [1125] and transient flow and heat transfer in a steelmaking ladle during the holding period [1126] were studied as well as magnetothermal instabilities in cylindrical melt-textured Y-Ba–Cu–O [1124].

Laser electron beam: In electron beam melting, the role of ingot-crucible thermal contact was studied mathematically by Koleva et al. [1113]. Laser melting work included analysis of the laser surface transformation hardening process [1114]; laser heating and air bubbles on the morphologies of *c*-axis $LiNbO_3$ fibers [1115]; prediction of laser melt depth in selected architectural materials [1116]; laser surface alloying with distributed melting [1121]; and laser surface glazing of inhomogeneous materials [1118]. In addition, features of molten pool in laser processing were studied both numerically and experimentally [1127,1128].

General studies in the melt area included melting effects due to thermal coupling in numerical analysis [1111] initial molten pool and Marangoni flow [1119]; and glass–fiber content and coolant temperature on polypropylene melt during cooling [1122]. In addition, thermocapillary flow at low Prandtl numbers [1123]; close-contact melting [1129]; and heat transfer at solid melting in solutions [1120] were studied.

12.3.5. Powders, films, emulsions, polymers and particles in a melt

Papers in the subtopic included the study of in-flight oxidation of composite powder particles [1130]; solidification of nylon 66 [1131]; laser processing of metal powder mixtures [1132]; melt spinning for flow-induced crystallization [1133]; crystallization in rods and filaments [1135]; and solidification in liquid metal film flow over a moving boundary [1134].

12.3.6. Glass technology

Work on burner systems for glass melting furnaces with recuperative air preheating was presented [1136].

12.3.7. Welding

Arc welding studies of electrode melting rate [1137]; heat transfer and fluid flow in a weld-pool [1138]; transport modeling of the process [1141]; two-way interaction between weld-pool and arc for GTA welding process [1142]; and impingement of filler droplets [1144] were presented.

General welding work included studies on the Marangoni effect in laser deep penetration welding [1139]; nitrogen influence on microstructure and properties of alloyed stainless steel welds [1140]; and the modelling of transport phenomena in laser welding of dissimilar metals [1143].

12.3.8. Enclosures

Phase change in enclosure studies considered buoyancy-driven convection on melting within spherical containers [1095]; natural convection–diffusion in rectangular enclosures [1145]; and melting in a side heated tall enclosure [1146].

12.3.9. Energy storage—PCM

Energy storage developments included the study of solidification of PCM around a cylinder for ice-bank applications [1147]; acceleration of phase-change heat transfer [1148]; relaxation of supercooling of erythritol [1149]; turbulent heat transfer with phase-change material suspensions [1150]; and solid phase-change material melting outside a horizontal tube [1151].

12.3.10. Casting, molding and extrusion

In this subtopic, many casting studies investigated the heat transfer and solidification process in mold filling and solidification [1152,1156,1164,1173] as well as the thermomechanical coupling [1153] and microstructural results [1165,1172]. Additional studies reported on characteristics of the interface heat transfer in investment casting of aluminum alloys [1154] during continuous casting [1157] and during solidification of cast iron in sand moulds [1166]. A series of modelling papers which evaluated the fluid flow, heat transfer and solidification in the strip casting of copper base alloys were presented [1160–1162]. Other aspects of casting including in-mold electromagnetic stirring [1158]; solidification control [1163]; influence of a high frequency electromagnetic field [1167]; fluid flow and disperse phase behavior in tundishes [1168]; estimation of air gap and heat transfer coefficient [1169]; and crystallisation processes during electron beam casting and melting [1170]. In addition, microporosity formation in an alloy cast under standard and microgravity conditions was investigated [1171].

Studies on moulds and molding included modeling natural convection with solidification in mould cavities [1155] in addition to an analysis of filling and solidification in casting with natural convection [1159].

12.3.11. Mushy zone—dendritic growth

In this section, solidification with a quasiequilibrium mushy region [1174] in addition to solute redistribution in Al–Cu alloy [1175] and lateral freezing of an anisotropic porous medium saturated with an aqueous salt solution [1176] were presented.

12.3.12. Solidification

Studies on solidification within metals reported on the effects of substrate surface conditions on shell morphology [1178]; multicomponent alloy solidification [1179]; heat transfer in composite rolls [1180]; martensitic stainless steel [1187]; and $Y_3Al_3O_{12}$ garnet [1188] were also reported.

Additional studies investigated direct contact cooling for melt crystallization and purity [1177]; solidification processing of graded composites by sedimentation [1182]; gap formation due to shrinkage during solidification [1183]; and high-Reynolds-number flow in a narrow gaps during solidification [1184,1185]. Additional papers investigated thermocapillary convection on dopant segregation in microgravity solidification [1186]; solidification of an aluminum-base multicomponent alloy [1189]; and the geometry of solidification and shrinkage criterion [1191]. General models of solidification included a continuous unidirectional solidification process [1192]; FEM modelling of solidification phenomena [1190]; and a unified approach to the heat and mass transfer in melting, solidification, frying and different drying processes [1181].

12.3.13. Crystal growth

This subtopic is dominated by work using the Czochralski and Bridgman crystal growth techniques. In addition, Marangoni and microgravity reports as well as general reports are described.

Conditions during Czochralski crystal growth from the melt were modeled or studied for various conditions including: a transverse and other magnetic field configurations [1193,1200]; with varying oxygen content and thermal fluctuations at the melt–crystal interface [1197] and in the melt [1222]; growth up to 400 mm in diameter [1220]; and silicon melt flow under the influence of steady and dynamic magnetic fields [1221].

Bridgman crystal growth was investigated for the determination of the dopant distribution [1196]; effect of axial magnetic field on three-dimensional instability of natural convection [1199]; thermosolutal convection [1205] and interface shape in vertical Bridgman growth [1207]; CdTe crystal growth [1211]; crystal growth of an alloy with thermosolutal convection under microgravity conditions [1216]; interface deflection [1217] and solute segregation [1218]; heat and momentum transfer analysis [1212].

The influence and effects of Marangoni convection in crystal growth were studied during semiconductor growth in a rectangular open boat [1194]; dopant distribution in Ge space-grown single crystals [1195]; flow of molten silicon [1202]; floating-zone silicon crystal growth [1206]; silicon liquid bridge [1219]; and the floating zone under microgravity [1223].

Microgravity effects on crystals grown onboard spacecraft were assessed by directional crystallization [1198] and on the Mir-station [1204]. In addition, a technique for rapidly deploying a concentration gradient with applications to microgravity was presented [1208].

General work in this subtopic area included: static and dynamic solid layer melt crystallization [1201]; silicon ribbon growth from the melt [1203]; magnetic field design for damping thermocapillary convection in a floating half zone [1209]; sapphire crystal growth [1210]; and coupling microscopic and macroscopic phenomena during the crystallization of semi-crystalline polymers [1213]. In addition, the growth of large diameter silicon tubes [1214]; GaAs crystals [1215]; and general modeling of heat transfer with crystallization in rods and filaments [1134] were presented.

12.3.14. Droplets, spray and splat cooling

Droplet work centered on dispersion of a droplets during its motion through the coolant [1224]; contact resistance and undercooling effects [1227]; drop fragmentation in liquid–liquid media [1229]; non-equilibrium solidification of undercooled droplets during atomization process [1230]; and microstructural evolution during droplet-based deposition [1234]. The spray work focused on modeling of spray formed billets [1226]; microstructural features during spray forming [1231,1233]; and droplet spreading in thermal spray deposition [1232]. In splat cooling work, the melting and resolidification of a substrate caused by molten microdroplet impact was addressed [1225]. In addition, work on freezing dynamics of molten solder droplets impacting onto flat substrates in reduced gravity [1228] as well as splat morphology and rapid solidification during thermal spraying [1235] were presented.

12.3.15. Oceanic, geological, and astronomical phase change

Thermal convection in the outer shell of large icy satellites was presented by Kerr [1236]. Thermal erosion by laminar lava flows were also presented [1237].

13. Radiative heat transfer

The papers below are divided into subcategories that focus on the different impacts of radiation. Most of the papers report the results of modeling studies. Papers describing the development of new numerical methods themselves are reviewed in the numerical methods section under the subcategory radiation.

13.1. Radiative transfer calculations and influence of the geometry

A wide variety of methods has been used to study radiative transfer in one- or multidimensional systems. The DOM is popular among many authors. Balsara [1238] proposes a DOM approach that is both accurate and fast convergent both in the free streaming and high optical depth limit. His approach uses a multigrid method with Newton–Krylov smoothing. Kim and Kim [1247] study radiative transfer in 2D rectangular enclosures. Sakami et al. [1258] use DOM to study radiative transfer in 2D enclosures with obstacles. Thomson et al. [1261] compare DOM calculations with finite volume and finite-element studies of multidimensional radiation transfer problems.

The FVM is the subject of several papers. Chai et al. [1241] compute view factors using FVM. An unstructured FVM for complex 2D structures with obstacles is used by Kim et al. [1248]. Liu et al. [1250] use FVM to model radiative transfer in optical fiber drawing. Lin and Dold [1249] present finite-element calculations of a resistance heated floating-zone furnace.

Another popular method is the ray tracing method. A parallel ray tracing code is presented by Marakis et al. [1254]. Ray tracing was applied to the design of rapid thermal processing systems [1244] and to the modeling of arbitrary three-dimensional bodies [1255]. The influence of the spatial variation of thermooptical properties in absorbing–emitting semi-transparent sphere was studied using ray tracing in [1239]. Integral methods for radiative transfer were developed by Tan and Hsu [1259] and Ben-Abdallah et al. [1240].

Inverse radiation problems were studied in one and three dimensions by Liu and coworkers [1251,1252]. Kauati et al. [1246] use a source-detector methodology to construct and solve a one-dimensional inverse radiation problem. Park and Yoo [1257] study a multidimensional inverse radiation problem to estimate the strength of the radiation source.

Daun and Hollands describe a parametric surface representation through non-uniform rational B-spline functions [1242]. Tang and Buckius [1260] study scattering from rough surfaces. A collapsed dimension method is discussed in [1253].

Radiative transfer in spherical media is discussed by El-Wakil et al. [1243]. Huang et al. [1245] consider the energy transfer via thermal capillaries. These are treated as cylindrical hohlraum accounting for mass and energy conservation for ablated wall material.

New to this section are papers that focus on radiative transfer on the nanoscale. Volotkin and Persson study the importance of retardation effects for the radiative transfer over very short separations [1262,1263]. Mulet et al. [1256] focus on the radiative transfer between nanosize particles and surfaces. They point out that the radiative transfer can be enhanced by orders of magnitude, if the particles or the surface can support resonant surface waves.

13.2. Radiation and combustion

Combustion problems involve radiative heat transfer as well as participating media, and other heat transfer modes. The increase in the number of publications over the last years justifies grouping these papers in a separate section.

A number of papers consider radiation in flames. Wang and Niioka [1269] study the effect of radiation reabsorption on NO formation in CH_4/air counter-flow diffusion flames, Ruan et al. [1267] investigate $CH_4/O_2/CO_2$ flames. The effect of extinction and scattering by soot in turbulent buoyant diffusion flames is discussed in [1266].

Soot is also important in the radiation heat transfer to furnace walls [1264]. Solovjov and Webb propose an efficient method for radiative transfer in multicomponent gas mixtures with soot [1268]. Yu et al. [1272] model radiation in coal combustion.

Radiation in fires is studied by several authors. Different combustion models for enclosure fire simulation are compared by Xue et al. [1271]. Keramida et al. compare the discrete transfer and the six-flux model for fire simulation [1265]. Wen et al. study large compartment fires [1270].

13.3. Radiation and small particles

A number of publications consider radiative heat transfer in systems involving small particles.

The role of asymmetric scattering from particles is studied by Caldas and Semiao [1275] who also examine isolated particles and polydispersions [1276]. Radiation from particles has to be considered in the transient cooling of two-phase media (gas-particles) in rarefied cold environments [1273]. Radiation from hot gases and small metal oxide particles can be important for rocket plumes [1274]. Radiation from fluidizing particles in a fluidized bed is studied by Yamada et al. [1277].

13.4. Participating media

Papers in this category focus on emission and absorption properties, as well as scattering properties of the participating medium.

Several papers deal with the molecular emission and absorption properties. Guo and Maruyama [1281] model the heat flux of a boiler furnace by accounting for the radiative characteristics of H_2O and CO_2. The same gases are considered in the combustion study of Hur et al. [1282] and by Kim et al. [1283] in their study of radiation in cubical enclosures. Okamoto et al. [1290] propose an approach to incorporate narrow band nonuniformity into non-gray analysis of non-isothermal and non-homogeneous gases. Funatsu et al. [1279] investigate the radiative characteristics of a carbonaceous ablation layer.

Semi-transparent media with diffusive reflection, emission and transmission are studied in [1278,1289].

Scattering of radiation is also important in transient heat transfer problems. Lazard et al. [1285,1286] study flash experiments with high forward scattering, linear anisotropic scattering, and Rayleigh scattering. Scattered radiation in two-dimensional cylindrical media in the large scattering mean free path limit is investigated in [1291]. Guo and Kumar [1280] present a radiation element study for transient transfer in scattering, absorbing and emitting media. Liu and Tan [1287] consider transient radiation and conduction in a participating cylinder subjected to pulse irradiation.

Mathur and Murthy [1288] discuss the acceleration of anisotropic scattering computations, and Koo et al. [1284] focus on the convergence of temperature in radiation problems in participating media.

13.5. Combined heat transfer

Papers in this subcategory consider the combined effect of radiation with conduction and/or convection. This year only few papers focus on combinations of conduction and radiation. Laitinen and Tiihonen study conduction and radiation in gray materials [1297]. The interaction of radiation and conduction in a crystal growth furnace is considered in [1301]. Miliauskas [1299] discusses combined radiation and convection in evaporating semi-transparent liquid droplets. The collapsible dimensions method is applied to the treatment of radiation and conduction in participating media with heat generation [1304]. Lee and Viskanta [1298] compare DOM and diffusion approximation methods for two-dimensional systems, while Asllanaj et al. [1292] study radiation and non-linear conduction. Non-linear diffusion models are also studied in [1295]. Bergheau and Potier [1293] use a finite-element approach to study radiative and diffusive transfer.

Radiation mixed with convection in square ducts is studied by Yan and Li [1306]. Turbulent convection and radiation in square and rectangular enclosures is discussed in [1305]. Sakai and coworkers investigate radiation and convection in hypersonic flowfields over blunt bodies [1302,1303]. Radiation and convection also play a role in the sublimation growth of silicon carbide single crystals [1296]. Monnier and Vila study convection and radiation with multiple reflections [1300]. An inverse boundary design for radiation and convection is proposed in [1294].

13.6. Experimental methods and systems

Only few studies of experimental methods and systems are reported this year. Zhao et al. [1308] study surface temperatures using infrared multiwavelength methods. Shi et al. [1307] report the analysis of a single-layer photovoltaic system.

14. Numerical methods

Computation of heat transfer and fluid flow is now routinely used in both basic research and practical applications. Numerical techniques are developed and applied in heat conduction, convection and diffusion, phase change, fluid flow, turbulence, and multiphase systems. In this review, the papers that are primarily focused on the *application* of numerical techniques to particular problems are included in the relevant application category. The papers that mainly describe the development of numerical methods are referenced in this section.

14.1. Heat conduction

An effective finite-element algorithm is described for heat conduction problems with an irregular domain [1309]. The Kirchhoff transformation is used for the numerical treatment of rapidly changing and discontinuous conductivities [1311]. Different gradient approximations for the calculation of the flux term are compared in a FVM for the solution of the two-dimensional diffusion equation [1310].

14.2. Inverse problems

For the multidimensional inverse heat conduction problem, an algorithm is proposed; it is then applied to a two-dimensional problem [1313]. A non-integer identified model is used for solving an inverse heat conduction problem [1312]. A hybrid algorithm using the Laplace transform is developed for estimation of surface temperature in inverse heat conduction situations in two dimensions [1314]. An efficient sequential method is proposed for multidimensional inverse problems [1318]. For a steady inverse problem, a comparison of methods is conducted with parameter selection [1320]. Use of a reduced model is proposed for a large multidimensional inverse problem [1321]. A recursive solution is used in an inverse heat transfer problem [1319]. A method of multiple point and line heat sources is employed in multidimensional problems [1315,1316]. An inverse natural convection problem is solved by a type of Galerkin method to determine the strength of a heat source [1317].

14.3. Boundary element methods

A boundary element method (BEM) is used for solving a one-dimensional heat conduction problem [1325]. A coupled conduction–radiation problem is analyzed by the use of BEM [1322]. Inexact Newton–Krylov methods are constructed for the BEM treatment of forced convection [1324]. A finite-element BEM is proposed for the solution of advection–diffusion problems [1323].

14.4. Convection and diffusion

Higher-order compact schemes are proposed and applied to incompressible flows [1326,1328]. The stability and boundedness of convective discretized schemes are discussed [1329]. Preconditioning techniques for the conjugate gradient method are used for convection–diffusion problems formulated via higher-order upwind schemes [1327].

14.5. Phase change

For a phase-change problem, a mushy zone model is used in conjunction with the boundary integral technique [1330]. An interface tracking method for melting and solidification is formulated and applied [1334,1335]. An alternating direction implicit method is employed to predict phase change [1333]. Interface tracking methods for phase change are compared [1331]. Newton–Krylov methods are applied to flows with solidification [1332].

14.6. Fluid flow

A new block-implicit procedure is proposed for the treatment of velocity–pressure coupling [1339]. An artificial compressibility method is described for a non-orthogonal colocated grid [1341]. A modified version of SIMPLER is developed to enhance its convergence rate [1344]. A control-volume finite-element method is constructed by using mass-weighted interpolation [1342]. An unstructured finite-element scheme is formulated for flow in moving domains [1336]. The results of a flow-field-dependent mixed explicit–implicit method are compared with those of other methods and shown to be superior in accuracy and stability [1340]. The convergence of the SIMPLE algorithm is examined by choosing different velocity components as dependent variables [1338]. Finite-element solutions are presented for flows involving exit pressure boundary condition [1343]. Two accurate and efficient numerical methods are described for unsteady viscous flows [1337].

14.7. Flows with buoyancy

A new benchmark solution is presented for the buoyancy-driven cavity [1348]. An h-adaptive finite-element method is used for unsteady thermally driven cavity problem [1346]. An improved PISO algorithm is described for buoyancy-driven flows [1347]. A numerical method is constructed for the solution of thermal stratification in a circular pipe [1345].

14.8. Turbulence models

A fully coupled method is developed for computing turbulent flows [1350]. The use of genetic algorithms is proposed for the development of turbulence models [1352]. The results of a buoyancy-modified turbulence model are compared with those from three other models for a square cavity [1355]. A model is proposed for the laminar-turbulent transition in the presence of high free-stream turbulence [1354]. The development of a Reynolds-averaged algebraic turbulent scalar-flux model is described [1349]. Turbulent flow in irregular geometries is simulated by using a control-volume finite-element method [1353]. Turbulent combustion and flame speed in fires are calculated by the use of a parallel computation [1356]. A fuzzy rule set is used to control the convergence of the solution process for a turbulent flow [1351].

14.9. Multiphase and particulate flows

A multigrid acceleration procedure is presented for the computation of turbulent particle-laden flows [1357]. An effective particle-tracing scheme is described for structured/unstructured grids [1361]. A Lagrangian numerical scheme is employed for the simulation of particulate flows [1362]. In another paper, particulate flows are modeled by the use of an Eulerian–Lagrangian approach [1363]. Dispersed multiphase flows are simulated by the use of two-way coupling in an Eulerian–Lagrangian model [1360]. A numerical method for unsteady two-phase flows with open or periodic boundaries is presented [1364]. A fast Eulerian method is described for disperse two-phase flows [1359]. A unified formulation is constructed for the segregated class of algorithms for multiphase flow at all speeds [1358].

14.10. Other studies

Nonlinear viscoelastic models are implemented in a FVM [1367]. Two time-stepping schemes are compared for the calculation of convection in a fluid saturated medium [1366]. A numerical formulation is described for a free-surface flow; the procedure handles the discontinuity at the free surface without smearing it [1365]. A discretization approach is presented for the conjugate heat transfer in turbomachinery components [1368].

15. Properties

Emphasis has shifted from naturally occurring substances and relatively familiar circumstances to fabricated systems employed in novel situations.

15.1. Conductivity/thermal diffusivity

Experimental measurements range widely: The influence of structure on the thermal conductivity and diffusivity of Southern Atlantic Basalts; the steady-state hot-wire results for refrigerant mixtures R404A, R407C, R410A and R507C; calorimeter (equipped with thermistor) measured conductivities of mixture candidates for the thermal storage of energy; the examination of two types of monolithic activated carbons considered in designing a high performance generator for sorption refrigeration systems and heat pumps using ammonia as refrigerant [382,1373,1381,1384]. Other papers examine: the ratio of liquid and solid conductivities of lead bromide; the effect of bulk density and moisture content on the conductivity of some Jordanian soils; the acoustically controlled heat transfer enhancement of a ferromagnetic fluid in an external magnetic field; and the anisotropy of thermal diffusivity in Earth's upper mantle [1369,1380,1382,1383]. Several investigations are distinguished by the variety of experimental methods employed: the tapered element oscillating microbalance studies kinetic patterns for linear and branched C-6 alkanes in silicate-1; the transient thermal grating measures the thermal diffusivity of high-conducting solids; a convection-controlled shear cell measures solute diffusivities with the braking effect of a uniform magnetic field; photothermal radiometry yields precise measures of the thermal diffusivity of semi-infinite targets; a heat flux calorimeter determines the nature of heat flow in solid-gas reacting systems; and a TMDSC is applied to the glass transition region [1370,1371,1374,1375,1377, 1385]. Analytical papers address: the prediction of conductivity coefficients and boundary data for steady-state conduction in an anisotropic medium; a solution to the Pennes bioheat transfer equation in three dimensions with hyperthermia boundary conditions and random heating; the temperature dependence of thermal conductivity, and other physical properties for polycrystalline gadolinium sulphides; measurements of thermal diffusivity, conductivity, density and viscosity of molten slags [1372,1376,1378,1379].

15.2. Thin films, coatings and surface effects

An appreciable effort is directed toward the measurement and analysis of films and surface effects. For thin films conductivity of doped polysilicon layers depends on grain size and dopant atoms; thermoreflectance measures thermal diffusivities of thin metal films; the fabrication and thin-film properties of a superconducting material are studied; algorithms estimate thin-film thermal conductivity and contact resistance; heat transfer conditions in the polymer film influence electrode performance; and polyimide film thermal properties depend on molecular structure and orientation [1393,1395–1398,1402]. Coatings are studied in a number of contexts: a small-particle plasma spray investigates the effect of interfaces on thermal conductivity and phase stability; a nickel based alloy ($NiCrMoAlF_3$) is applied to a stainless steel substrate by a variety of methods which are then assessed; predictions of angle-dependent optical properties of glazings are discussed; the preparation and behavior of chameleon-type building coatings are investigated [1387,1389,1392,1400]. A number of works center on the alteration of surfaces and resulting effects: mechanical and thermal effects of substrate surface ion-bombardment etching; structural and photoluminescent properties in barium titanate nanocrystals; optical and solar parameters of irradiated lead-alkali-silicate glass; use of laser zone texture to improve tribology of glass substrate disks; properties of high-thermal-conductivity graphite sheets used in spacecrafts; controlling thermal conductivity of etch-released microstructures; Kapitza conductance of an oxidized copper surface in saturated HeII; probe design and fabrication for sub-100 nm scanning thermal microscopy [1386, 1388,1390,1391,1394,1399,1401,1403].

15.3. Composite materials

A number of papers consider composites designed to enhance heat transfer: conductive fillers in polymer composites for electronic thermal design; a new technique which allows significant improvement in metal hydride thermal conductivity; the superiority of microstructured materials to typical catalyst particulates for enhance mass and heat transfer. Several works seek to determine effective thermal conductivity of such composites by model and measurements [1404–1407,1410, 1412,1413]. Other composites seek for minimum thermal conductivity, fire resistance in wood–inorganic combination, and the minimization of warping in laminate manufacturing [1408,1409,1411].

15.4. Diffusion: mass and thermal

Mass diffusion measurements encompass a striking variety of systems of practical interest: composite blocks of PX-21 and natural graphite are molded and tested for methane adsorption for use in on-board natural gas vehicles; the effective diffusion of lithium in carbon fiber based anodes in lithium ion rechargeable batteries is studied; moisture vapor transmission rate for poly(ether-block-amide) breathable films is reported; the unique relationship between molecular diffusion and electrical conductivity is studied for four natural sandstones of different permeability; microscopic observation and experimental measurements of mass transfer in softwood allow the calculation of liquid and gaseous permeabilities [371,522,1416,1419, 1422]. Numerical models and estimations of diffusion coefficients are considered for the following systems: impurities diffusion in semiconductor crystals under mechanical stress, evaporation process from a non-solvent/solvent/polymer system, migrating gas bubbles and their influence on hydrostatic level measurement systems applied to pressure vessels, use of molecular diffusion theory to predict wax deposition during multiphase flow in pipelines and wellbores, and a two-temperature thermal diffusion model of spark ignition of a gas suspension. Other papers consider: heterogeneous models for the simultaneous diffusion, adsorption and reaction occurring in the catalytic cracking process, mass transport in the acid-fracturing process during hydrocarbon production, a diffusivity model of coupled solute-driven convection and mass transport, and the influence of manufacturing process upon thermal insulation and water–vapor permeability of polyacrylonitrile non-wovens intended for clothing [1414,1415,1417,1418,1420,1421,1423–1425].

15.5. Food science

A group of papers are oriented to food processing and preservation: conductivities and permeabilities for the freeze-drying of sliced and mashed apples, the use of differential scanning calorimeter to study oxidation induction periods for edible oils and polyolefins, determination of the rate of change in physical and thermal properties of ground beef during cooking, and the development of an artificial neural network (ANN) to predict heat and mass transfer during deep-fat frying [1426–1429].

15.6. Transport properties—viscosity and specific heats

Non-equilibrium transport coefficients are studied by several investigators: a quartz capillary microreactor investigates the global reaction rate for supercritical water oxidation; the glass fluxing technique determines heat capacities for various Cu–Ni melts; on-line measurements of Lyocell fibers yields information on elongational viscosity; and the thermophysical properties for a promising material for long-term, supercooled thermal energy storage (Super-TES) evaluated [1435,1440,1441, 1447]. Analytical approaches treat: approximate solutions of the Boltzmann equation for strong thermal non-equilibrium; first approximation of Chapman–Cowling theory models transport coefficients for high-temperature non-equilibrium (reentry) air flows; and compressible gas flow in tubular and annular tuyeres with heat source [1432,1434, 1445]. Other works consider: laser powder absorption, polymer–surfactant interactions, heat flow and nonreciprocity, and rheological properties effects on thermoforming [1430,1433,1437,1444]. A number of papers give property data for specific substances and applications, several of these involve amino acids in solution [1431,1436,1438,1439,1442,1443,1446].

16. Heat transfer applications—heat exchangers and heat pipes (thermosyphons)

Heat transfer enhancement, compact and micro exchangers, fouling and surface effects, mathematical modeling and analysis and factors affecting performance are investigated.

16.1. Heat exchangers

For compact heat exchangers the single-blow transient technique is improved by accounting for core conduction and fluid dispersion, a laminar flow exchanger with stainless steel macrotubes developed, geometric adaptations and elliptic tube effects assessed and the use of holographic interferometry to study heat and mass transfer subjected to a retrospective appraised [1449,1457,1453,1459,1460,1465,1467,1470]. Microchannel and microfin exchangers are studied for their efficacy when applied to refrigeration evaporators, electronic device cooling and air conditioning systems [1461,1455,1463,1456]. A number of papers explore the nature of membrane heat and mass transfer, wire-on-tube devices, and the response of a counter-flow double pipe exchanger to a step change of flow rate [1448,1454,1458,1462,1471]. Use specific investigations study cross-flow heat exchangers in aircraft, helium cooled, tungsten exchanger performance, tube-in-fin vehicle radiator performance, evaporative condensers/coolers characteristics, regenerator warm-up large utility boiler monitoring, and optimizing cooling tower size [1450–1452,1464,1466,1468,1469,1472].

16.2. Design

Noteworthy are the experimental studies of various design aspects of heat exchangers used in air-conditioning practice: comparison of oval versus round finned tubes, recirculation model for kettle reboiler tube bundles, and a universal design for small, commercial systems, evaluation of brazed aluminum condensers [1473,1476,1479,1480]. Mathematical models advance the design process for these systems: optimal single longitudinal fins with different coefficients on fin surfaces, counter-flow wet cooling towers, multistream plate-fin exchanger in networks, and a screening device (conceptual tool) employed prior to design [1474,1475,1477,1478].

16.3. Enhancement

Judging from the continuing flow of schemes for enhancing heat transfer the possibilities have not been exhausted. One novel concept, tested by experiments, uses a variable-roughness exchanger tube insert, made of shape-memory alloys, that can repeatedly fluctuate between enhanced and unenhanced behaviors. Another investigates the effect of inward-facing, raised, dimples on the inner tube of a coaxial-pipe exchanger and finds appreciable enhancement of heat transfer (25–137% at constant Reynolds number, 15–84% at constant pumping power). Yet other experiments consider heat transfer enhancement for: twisted-tape inserts in vertical and horizontal pipes; wall mounted rectangular blocks dispersed spanwise and streamwise along a rectangular channel; a vortex tube exchanger; a fluted inner tube exchanger to improve heat transfer for solutions containing drag-reducing additives; interrupted and wavy fins for fin-and-tube exchangers; and four-start spiral tubes with different corrugation angles [1483–1486, 1488–1490,1492]. Analytical investigations and mathematical modeling of heat transfer enhancements compliment the preceding experimental papers. Porous fins can enhance heat transfer from a given surface, and so can extremely thin fins, which swing back and forth in a flowing fluid. Other works consider: various enhancement devices appropriate for bayonet tube exchangers, straight ducts of square cross-section with four equal symmetrical, straight, thin, 100% efficient, internal fins; comparative performance of two coiled-tube exchangers—one with regular mixing, the other with chaotic mixing; performance criteria for enhanced heat transfer surfaces based on the entropy production theorem; and the summary experience of efforts to enhance convective heat transfer in heat exchangers commonly used in chemical process industries [1481,1482,1487,1491,1493, 1494].

16.4. Fouling and surface effects

Papers in this section range from attempts to understand and characterize the fouling mechanism to methods of mitigating fouling effects in operating heat exchangers. For boilers the concentration of C1 compounds in deposits and fly ash (resulting from combustion of agricultural and forest residues) is of interest. For pressurized water reactors and pressurized heavy water reactors the corrosion of carbon steel and Monel-400 and chemical cleaning of fouling effects based on EDTA formulations are studied. Electron microscopy examines gas-side fouling depositions in economizer and superheater for waste-heat-recovery boilers. Replacing oil shale pulverized firing boilers with fluidized-bed boilers in Estonian power plants requires the consideration of fouling and corrosion in the latter approach. The Australian Coal Industry Research Laboratory (ACIRL) calibrates its pilot-scale furnace against full-scale furnace data [1495,1497,1502,1505,1506]. Freezing fouling and the role of surface conditions in causing frost release from a cold surface are considered, as are the characteristics of corrosion-resistance of nickel alloy used in a triple effect LiBr/H_2O absorption chiller. A number of works consider specific products of fouling: calcium carbonate on electroless plating surface, on AlSl 316 stainless steel tubes and Na_2CO_3 and Na_2SO_4 on the surface of black-liquor evaporators [1498,1500,1501, 1504,1508,1509]. Mathematical analyses address: optimal scheduling of multipurpose plants operating under fouling conditions, performance of extended surfaces subjected to fouling, modeling the discrepancy between predictive models and actual fouling of heat exchangers by characterizing fouling as a correlated random process, and "solving" the fouling problem during boiling processes by adding solid particles to the boiling liquid [1496,1499,1503,1507].

16.5. Mathematical modeling/analysis

The activity in this area may be usefully organized by starting with the efforts to study selected factors affecting heat exchanger behavior, moving on to the investigation of tube bundles, and finally to complete exchanger analysis. A group of works deal with: radiators in turbulent flow with various fin shapes and spacing; two-row finned tube with herringbone wavy fin geometry; finned and unfinned tubes of circular and oval cross-section; active enhancement of heat transfer by vibrating screen, offset fin geometries causing oscillatory flow; and finned tube use in thermal storage systems [1519,1522,1528, 1530,1532–1534,1538,1541]. In the instance of tube bundles the focus of attention is directed to: alternate tube configurations for particle deposition rate reduction; heat transfer analogy for cross-rod bundle surfaces; turbulent gas-particle flow using a two-way coupling model [1511,1535,1542]. For *direct contact* exchangers a new method accounts for the major influences on cooling tower behavior; a gas–liquid–liquid three phase exchanger is studied; a dynamic model of a direct contact evaporator developed; and a counter-flow wet cooling tower modeled [1513,1529,1531,1545]. For complete heat exchangers a body of analytical works consider: convective heat and mass transfer in flow passages of tube-in devices, modeling the processes and parameters for a two-stage pulse-tube cooler, a counter-flow, bayonet configuration model for small-scale systems, regenerative devices in counter-flow, and condensation retention effects of fin-and-tube units [1515,1523–1525,1539]. Other papers examine: tube-to-tube heat transfer degradation effect on finned-tube exchangers, modeling clamshell exchangers in residential gas furnaces, applying the channel model to predict temperature profiles and composition in a steam methane reformer, and compare two steam surface condenser design methods. Neural network analysis aids predictions for humid air–water exchangers and fin-tube refrigerators [1517,1520,1526,1536,1537,1540,1544]. The concluding papers focus primarily upon the numerical schemes employed for exchanger analysis: a vorticity-based model for stratified flow, Monte Carlo method to study exchanger design sensitivity to physical properties estimation, attenuation of temperature variations, flexibility for exchanger networks, extension of the ANN technique, and NTU–ϵ model of vapor compression liquid chillers [1510–1512,1514,1516,1518,1521, 1527,1543].

16.6. Performance-factors affecting

Experimental efforts study the influence of factors affecting heat exchanger performance: effect of inclination on air-side performance of brazed aluminum exchanger under dry and wet conditions, the effect of number of tube rows on flat-plate finned tube exchanger behavior, optimal shapes of fully imbedded channels for conjugate cooling, heat regenerators–pressure drop and heat transfer efficiency, rectangular fin characteristics in wet conditions, and ammonia spray evaporator with triangular-pitch plane tube bundle results [1549–1553,1557,1558]. Other works treat liquid blockage of vapor transport lines due to capillary-driven flows in condensed annular films, HeII heat transfer in a short section of a quadruple exchanger and airside performance of staggered tube bundle with shallow tube rows [1546,1548,1555]. Analytical studies include flow distribution effects on a parallel flow exchanger, influence of thermal wakes on heat transfer in multilouvered fins, tube diameter and tubeside fin geometry effect on air-cooled condenser behavior and instability of a refrigerator with a thermostatic expansion-valve controlled evaporator [1547,1554,1556,1559].

16.7. Shell and tube/plate heat exchangers

For this familiar device experimental studies focus on: air-side results for slit fin-and-tube exchangers in wet conditions, counter-current gas–liquid flow in plate-fin (plain and perforated) exchangers; one- and two-row arrangements of plate fin and elliptic tube exchangers; low-pressure, filmwise condensation on small in-line tube bank; dissipation from five, duralumin, vertical rectangular fin-arrays and a mass exchanger for selective transfer of water vapor [1560,1564,1565,1568–1570]. Numerical approaches include: a model for the single-blow transient technique for testing plate-fin exchangers, a finite-element based model for transcritical CO_2 gas coolers, microporous-membrane mass exchangers and their heat exchanger analogs, optimum shape and arrangement of staggered pins in channel of plate heat exchanger, analysis (and experimental test) of a shell-and-tube latent heat storage device, influence of spiral baffle plates in shell-and-tube exchangers, and the performance of a cross-flow plate exchanger for dehumidification and cooling [1561–1563,1566,1567,1571, 1572].

16.8. Thermosyphons/heat pipes

Miniature heat pipes applied to electronic cooling are the focus of a number of experimental investigations. The distinguishing aspects of these efforts are: radial rotation and high temperature service, sintered dendritic copper powder wicks, woven wire wicks, biporous wicks yielding high performance, and the fabrication of a flexible macroheat-pipe panel for radiator use on long-term spacecraft missions [1577,1580,1582,1585,1586]. Yet other efforts study oscillating heat pipes with non-flammable fluorocarbon fluids (FC-72 and FC-75) as working fluids, annular-rimming flow in rotating devices, effect of body forces (gravitation, vibration and acceleration) on thermal performance of a flat copper/water heat pipe, thermosyphon reboilers, effect of working fluid supply on revolving helically grooved heat-pipe performance, and the performance of a high temperature sodium–stainless steel heat pipe [1573,1574,1576,1578,1579,1588]. Numerical analysis of miniature heat pipes include an advanced mechanism-pulsating two-phase flow—for achieving high heat flux and the development of software to predict and model flat heat pipes [1589,1581]. Other analytical works examine performance improvement using two fluids, models for looped and unlooped pulsating heat pipes, fin parameters (temperature distribution and efficiency) for specified fin-tip temperature, and the simulation of wickless heat-pipe exchanger thermal performance when used for naturally ventilated buildings [1575,1583,1584, 1587].

16.9. Miscellaneous

The final papers of this section are most usefully organized by the specific device or analytical principle. For *heat-pumps*: a steady-state two-stage flooded refrigerant evaporator model is validated; the effect of debonding in ground heat exchanger is studied and the potential of ammonia–water mixtures as working fluid tested [1606,1609,1611]. For *power devices*: a carbon monoxide prox reactor for fuel cell application has been designed, built and tested; a PC based diesel engine cycle and cooling system simulated; the influence of thermophysical property variations on exchanger size in ammonia–water power cycles reported; the utility of an approximation in analyzing heat exchangers for thermoacoustic engines studied [1602,1607,1610,1614]. For refrigerators investigations explore: egg-crate evaporators in domestic units, thermoelectric device performance, an irreversible (externally and internally) regenerated Brayton device, partial differential equations modeling of pulse-tube refrigerators, an algorithm for predicting film condensation of fin-tubes for selected refrigerants and mixtures, and solid desiccant hybrid air-conditioning systems [1593,1599–1601,1612,1613].

Thermodynamic analysis is applied to thermoelectric (semiconductor) heat pumps, the optimal design of heat exchangers for irreversible cycle refrigerators, optimizing the configuration of heat exchangers in an environmental control system, optimizing the humid air turbine cycle plant and the optimum allocation of heat exchangers according to thermoeconomic considerations [1590,1592,1595,1605,1608]. Specific effects or systems mark the papers which consider the role of thermal stresses in thick-walled pipes, the wind effect on natural draft cooling towers, the simulation of an agitated thin film evaporator used in fruit juice concentration and water-tunnel studies of heat balance in swimming makosharks [1591,1594,1598,1604]. The concluding papers deal with aspects of nuclear reactors: mixing phenomena within a passively cooled containment vessel, containment behavior in the event of core melt and gas release and physical property data for liquid alkali metals often used as heat transfer fluids [1596, 1597,1603].

17. Heat transfer applications—general

A number of papers in the 2001 heat transfer literature dealt with energy flux in structures and in the ground on which those are located—influenced probably by energy conservation concerns. Three new subsections in this review discuss them.

17.1. Aerospace

Thermomechanical design aspects for carbon fiber reinforced wing structures of large transport aircraft are studied [1615] by numerical simulation.

17.2. Gas turbines

Detailed heat transfer coefficients were measured [1618] on turbine blade tip and midspan with unsteady wakes generated at Strouhal numbers of 0.1. Cross-pin configurations and their effect on cooling were studied over a large range of Reynolds numbers [1617]. Experimental and computational studies compared sharp edged, rounded and squealer blade tips [1616].

17.3. Thermal power systems

Thermodynamic and thermoeconomic analysis [1619] includes the irreversibilities of finite rate heat transfer in heat exchange processes and heat leak loss of the heat source. The optimally operating region is determined. An air conditioning system operates in optimal condition when the system is charged with a specified amount of refrigerant [1620]. The performance is low when the charge drops below 80%. The performance of an air breathing fuel cell stack [1623] was found to be influenced by its effect on the humidity of the membrane. Optimum air flow rates are large. Use of a super critical heat recovery process in a Stirling engine [1621] with composite working fluid increases the thermal efficiency. Finite time thermodynamics shows that power output of Ericson and Stirling engines can be increased [1622]. A model using not fully connected neural networks for the forecasting of a seawater-refrigerated power plant performance [1624] is presented.

17.4. Combustion technology

Behavior of a planar burner-stabilized flame was analyzed [1626] with respect to instabilities. A computational model [1628] simulates combustion and inflation processes in airback inflators. The inference of dimethyl disulfide addition on CO production and on coke deposition was explored [1627] for a pilot steam cracking naphtha unit. A novel procedure [1630] for modeling cure kinetics for commercial resin transfer molding of epoxy is reported. A model was developed [1625] for thermally efficient production of natural gas by use of a cyclic steam injection process. A neural network predicted the dynamic heat transfer rate in a medium size bubble column [1631]. The riser exit geometry has an effect on the total riser geometry [1629].

17.5. Energy in buildings

Thermal systems depend on properties and boundary conditions [1633]. The U-factor of a window with cloth curtain inside determines heating and cooling energy of a building [1634]. The airflow in a ventilated building is dominated by gravity current from inlet and by buoyant plumes above internal heat sources [1637]. Numerical solution describes transient flow in super-heaters [1640] in parallel and counter-flow. Vertical air circulation in an airport passenger terminal is described when heated by jet fans [1636]. A nodal model describes room heat transfer by ventilation and chilled ceiling systems [1638]. Influence of position of thermal insulation on space cooling in high rise residential buildings in Hong Kong is described [1632]. Climatic measurements on 30 urban stations in Athens (Greece) assert the influence of urban climate [1639] on energy consumption in buildings. An electrostatic method of actuating window blinds [1635] was developed.

17.6. Ground effects

Simulation of periodic heat transfer between ground and underground structures is discussed [1648]. Anticipated permafrost distribution in Russia is supported [1645] by numerical simulation. A new flexible model improves boundary conditions for prediction of concrete slab temperatures [1641]. A new flexible model improves boundary conditions for prediction of concrete transportation [1641]. Earth contact heat transfer is simulated by a new technique [1649] incorporating [1642] response factors. The natural ventilation of a room is improved by prediction combined with laboratory analogy experiments [1644]. Air containers are widely used as doorways of cold rooms. A finite difference technique predicts heat and moisture transfer [1643]. Migration of chlorides, moisture and heat in concrete reinforced structures caused by seasonal variation of surface conditions is predicted [1646] by a finite-element formulation of mass conservation equations. The theoretical basis for predictions of heat transfer between ground and underground structures is based on heat transfer between ground and structures [1647].

17.7. Thermomechanical processing ground effects

Experimental and analytical studies were published for continuous casting [1650,1659] and for counter-pressure casting [1653] (to achieve porosity in the sample) for hot rolling of steel, and for the behavior of oxide scales [1654]. Infrared sensing techniques [1661] provide information on sample temperatures. Heat transfer from tools to atmosphere, lubricant and to cooling water during forging was studied [1656]. Weld-pool geometries were correlated with Peclet and Marangoni numbers [1657]. Submerged arc welding was modeled [1660]. Pultrusion is an effective method for making fiber reinforced polymer composite parts [1655]. An analytical thermal model [1651] for deep grinding is described. The effect of inclined angle of the heat source on the relevant grinding parameters is obtained [1652]. Previous models by Jaeger and Carlslaw of grinding as a sliding heat source have been improved [1658].

17.8. Chemical reactors

A novel type of packed bed reactors was designed [1665] with higher mass and heat transfer rate. Scale-up effects in bubble columns of reactors from 200 to 800 mm were studied and instantaneous heat transfer rates were measured in bubble columns [1663]. The influence of gas composition on water temperature in a tungsten chemical vapor deposition reactor was measured [1662]. The influence of different fluid types in a rectangular reactor on mass transfer was measured [1664]. A new heat transfer configuration for an exothermal batch-jacketed reactor was designed and its performance compared with other batch-jacketed reactors [1667]. A comparative study is available for gas–solids concurrent down flow and concurrent up flow of a circulating fluidized bed [1666].

17.9. Food technology

A study documents the effects of different heat transfer kinetics on lipid nutrient composition [1671] of regular ground beef patties. Moisture loss, product yield, and soluble proteins in chicken breast [1670] change during air convection cooking. Mass transfer coefficients are retrieved from literature and classified. The results are available [1669] in the form mass transfer number = function of Reynolds number. Blanching is used [1668] to control salt levels needed in the storage of brined cucumbers.

18. Solar energy

Papers are broadly divided into solar radiation, low-temperature solar applications, buildings, and high-temperature solar applications. Papers on solar energy that do not focus on heat transfer, for example, papers on photovoltaics (except for those that deal with building integrated components), wind energy, architectural aspects of buildings, and control of space heating or cooling systems are not included.

18.1. Radiation

Many papers in this category present new or modified modeling approaches to evaluate or use measured solar data. Ref. [1672] shows that it is not necessary to model the stochastic component of climatic variables in simulations of building thermal performance, solar process heat and photovoltaic systems. Ref. [1673] examines the performance of daily and hourly diffuse models for countries in the North Mediterranean Belt. In [1675], a statistical study of data recorded over 2 years at 22 sites in Edinburgh leads to an approach for modeling the spatial and temporal variability of solar energy. For the simulation of solar water heating systems, [1674] proposes a new method of determining a typical year from multiyear radiation data. A minor revision to the METSTAT model improves radiation estimates for conditions of high clouds and low ceilings [1676]. Comparison of simulations of photovoltaic and wind energy systems using the new TMY2 data and the original TMY data show some discrepancies in energy predictions for the US [1677]. Ref. [1678] evaluates the relationship between monthly averaged insolation and daylength. Modification of Muneer's models for the luminous efficiency of global and diffuse radiation are developed based on statistical analysis of measured data in Madrid [1679]. In [1680], a method for interpolating data to provide finer temporal resolution of direct, diffuse and global solar radiation is presented. An approach for estimating irradiation at any point from data measured at other sites is presented in [1682]. An alternative to the Angstrom method that allows non-linearities in solar irradiation with respect to sunshine duration to be determined is presented in [1681].

A model of the absolute radiometer designed to measure total solar irradiance in future satellite missions is presented in [1683].

18.2. Low-temperature applications

Low-temperature solar applications include solar water heating, solar space heating and cooling, solar desalination, solar cooking, and agricultural applications of solar energy. Within this category, papers on non-concentrating solar thermal collectors and thermal storage are discussed.

18.2.1. Flat-plate and low-concentrating collectors

Heat transfer rates in unglazed transpired air solar collectors are measured and a predictive model presented for a wide range of geometries [1686]. Ref. [1684] evaluated reflectivity and absorptivity of absorber samples over a range of temperatures and angles. A two-dimensional steady-state analysis of laminar film condensation is used to predict heat transfer coefficients for wickless heat pipes [1685]. A model of heat transfer in a commercial thermosyphon collector is presented by Zueva and Magiera [1687].

18.2.2. Storage

Most papers in this section address latent heat storage. Three papers by Sari and Kaygusuz [1692–1694] measure thermal performance and stability of palmitic, stearic and myristic acids. The corrosion-resistances of aluminum, brass, copper, steel and stainless steel in contact with various salt hydrates are measured by Cabeza et al. [1688]. A model of the discharge of a slab of pure molten material considers the cyclic effects of solar flux, sky temperature and fluid temperature on the freeze front progression [1689]. A phase-change material made of paraffin impregnated in graphite is discussed in terms of bulk density, and solidification time [1690].

The two papers on sensible heat storage paper focus on thermal stratification. Ref. [1691] models the effect of stratification on exergy storage capacity. Design of a porous manifold to prevent mixing is presented in [1695].

18.2.3. Water heating

Innovations in the design of integral collector storage systems that combine collection and water storage in a single component are the subject of [1696,1699–1701,1703]. Ref. [1698] reexamines the dimensionless groups used to correlate the thermal performance of flat-plate systems. Prevention of scaling in heat exchangers is discussed by Baker and Vliet [1697]. Methods of assessing creep of polymer tubes proposed for heat exchangers are presented by Wu et al. [1704]. Tests of an integrated photovoltaic and water heating system show that the design in economically feasible [1702].

18.2.4. Space heating and cooling

The majority of the papers in this area concern absorption cooling systems [1706,1710,1711,1713,1714,1716]. Ref. [1713] measured heat transfer coefficients for saturated nucleate boiling in a water/lithium bromide mixture. The effects of various designs and operating conditions on performance of a desiccant cooling system in Baghdad are discussed in [1709]. Binary mix sorption systems are compared in [1712]. Solar-driven refrigerators are modeled in [1705,1708,1715]. Ref. [1707] models a solar-assisted heat pump.

18.2.5. Solar desalination

Papers in this section are restricted to systems that use solar energy. Most papers present models. Refs. [1718,1719] consider a solar distiller with a capillary film. Measurements of a system in Algeria are compared to model results. A large scale low cost distillation system that uses a brine solar pond is presented in [1720]. Ref. [1721] presents a general model for evaporation and flashing processes; a database of physical properties of seawater is included. A spray-type evaporator is modeled by Kalogirou [1722]. A system with heat recovery is modeled by Schwarzer et al. [1723]. The effects of operating temperatures on the performance of a water–zeolite adsorption heat pump combined with an evaporation desalination process are modeled in [1717].

18.2.6. Solar cooking

Ref. [1724] determines the optimum orientation of a box-type solar cooker as a function of geographic location. A compound parabolic concentrator connected to a pressure cooker is described in [1725]. Measured and simulated performance of solar cookers coupled with heat pipes are presented in [1726].

18.2.7. Solar agricultural applications

Natural convective heat transfer coefficients for crop drying are measured for various crops in [1727]. Crop drying with a silica gel adsorption system is modeled by Hodali and Bougard [1730]. A model of a solar-heated anaerobic digester of swine manure is presented in [1728]. Recent experiences with a large industrial system installed in The Netherlands in 1995 for agricultural drying are reported in [1729].

18.2.8. Buildings

This section includes papers on building integrated solar systems, heat transfer in building components, and glazings.

Numerous papers published in the solar literature address urban planning to take advantage of the solar resource [1733,1739,1744,1746,1749,1751]. Ref. [1731] considers the use of cool surfaces and trees to reduce cooling loads in urban areas.

Analytical tools and a test facility to evaluate building integrated photovoltaics are presented in [1736,1738].

Models to estimate building thermal performance continue to be refined. A model to predict the thermal behavior of large highly glazed spaces is presented in [1752]. Other papers present models of heat transfer in rooms and buildings of various configurations [1735,1743,1753]. Passive concepts for various climates are presented in [1740,1742,1747,1748,1750]. A simple model to calculate building thermal loads is based on polynomial s-transfer functions of transient heat conduction [1754].

Coatings for glazing and other window treatments are discussed in numerous papers. Laminated solar control glazings are modeled in [1732]. Ref. [1741] determines night loss coefficients for advanced glazing systems. The analysis indicates that tripe-glazed windows with low emissivity coating are superior to the use of cavities with low conductivity gases. The use of prismatic panes to provide uniform indoor illumination is discussed in [1745]. An experimental study of the natural convection heat transfer from windows with heated blinds presents heat transfer coefficients as a function of heat flux and window-to-blind spacing [1737]. The performance of light shelves and structural overhangs are compared based on measurements obtained for one year in Spain [1734].

18.3. High temperature applications

High temperature solar thermal applications require use of concentrated solar energy. Uses include electricity generation, thermochemical reactors and industrial process heat. Papers address processes as well as system components such as heliostats, concentrators, and receivers/reactors.

Tests of a prototype non-imaging focusing heliostat consisting of a number of grouped slave mirrors are presented in [1758]. Algorithms for tracking the sun in concentrator systems are compared by Blanco-Muriel et al. [1757].

Studies of parabolic-trough concentrators include a model of the collection efficiency as a function of various operating and geometric parameters [1755], a combined model of optics and heat transfer [1759], and use of two troughs to make a point focusing solar concentrator [1772]. Ref. [1760] proposed a miniature (10 cm diameter) paraboloidal concentrating collector for use with high flux photovoltaic cells.

A special issue of the ASME *Journal of Solar Energy Engineering* was devoted to high temperature solar chemical processes. Papers addressed a variety of thermochemical processes including electrolysis of water from sodium hydroxide solutions [1761]; fullerene synthesis [1763]; zinc-oxide reduction and methane reformation [1765,1768,1770]; ammonia synthesis [1766]; photocatalytic oxidation of 2,4-dichlorophenol [1769]; photosynthesis of rose oxide [1771]; production of aluminum or silicon by reduction of their oxides [1773]; production of hydrogen-rich fuels by steam reformation [1775]; and melting of aluminum scrap [1762].

High temperature solar processes are also presented in other publications. Kraupl and Steinfeld present experimental study of the coproduction of zinc and synthesis of gas by the combined reduction of zinc-oxide and reformation of methane in [1764]. Ref. [1774] demonstrates thermochemical methane reformation in a concentrated Xe-lamp.

Performance of the Israeli DIAPR receiver was evaluated under various irradiation conditions in [1767]. Friction factors and local heat transfer characteristics for thermally and hydrodynamically developing flows such as those in solar chimney power plants are modeled in [1756].

19. Plasma heat transfer and magnetohydrodynamics

19.1. Plasma modeling and diagnostics

Modeling approaches for describing plasma heat transfer have attempted to describe situations close to those encountered in practical applications. Two papers by the same authors describe the plasma flow and heat transfer in a plasma torch and in the supersonic jet emanating into a low-pressure environment using a two-dimensional finite difference approach, assuming a fictitious anode attachment [1780,1781]. This modeling approach reflects the conditions of low-pressure plasma spraying. Two further papers from the same group report improvements to a finite difference approach for describing a free burning arc for improving numerical stability [1778], and a three-dimensional description of the arc with a cylindrical anode [1784]. Also inspired by a situation found in plasma spraying is a model for the heat transfer of a turbulent plasma jet impinging on a substrate using a low Reynolds number extension of a k–ϵ description [1777], and the authors report improved agreement with experimental data for this approach. Two publications deal with modeling the arc-cathode attachment with evaporation and ejection of liquid metal droplets [1785,1786], a situation found in circuit breaker arcs. The results point towards the importance of evaporation cooling, and the authors find that a Schottky enhanced thermionic electron emission process can describe the current transfer.

The arc anode attachment has been investigated experimentally for a flow directed towards the anode, and the influence of flow velocity and plasma temperature on the different arc attachments modes have been described quantitatively [1782]. A combined experimental and theoretical approach has been used to optimize the heat transfer rate to the anode for a similar geometric arrangement considering the application of melting waste material [1783]. The temperature, velocity and heat flux profiles have been determined with enthalpy probes for a configuration where three different plasma jets join [1776].

An experimental investigation of a high-pressure non-equilibrium plasma generated by either a dielectric barrier discharge or an atmospheric pressure glow discharge has determined the distribution of the dissipated energy using a combination of emission spectroscopy, gas chromatography, and calorimetric measurements [1787]. The coupling efficiency for a hydrogen microwave reactor has been investigated by a combination of modeling and emission spectroscopic measurements, and it has been found that over 90% of the energy has been used for heating the plasma [1779].

19.2. Plasma particle and plasma surface interaction

Two publications deal with the processing of particles suspended in a plasma flow. In one of these cases, the nitridation of molybdenum disilicide particles in a radio frequency induction plasma reactor is investigated, and the flow rate of the quench gas has been found to be the most important parameter [1793]. The other paper describes the spheroidization of TiC powder in a radio frequency induction reactor [1790]. A numerical study has investigated the stability of an oxide layer on a metal particle in a plasma jet as used in plasma spraying, and the influence of the cooling rate has been determined [1789]. Another numerical study describes the heating and acceleration of particles injected into a plasma flow, and the results confirm those of previous investigations [1792].

The plasma produced by a laser pulse hitting a solid surface has been investigated numerically for the conditions of a laser deposition process [1794]. Two papers describe the interaction of low-pressure plasmas with a surface. In one, differential scanning calorimetry has been used to determine the heat transfer due to de-excitation and recombination, from an oxygen plasma to a catalytic surface [1791]. The other study has investigated the heat and mass transfer from an oxygen plasma to a semiconductor surface, and determined the recombination and accommodation coefficients in order to relate these values to the electronic properties of the semiconductor [1788].

19.3. Specific plasma applications

Plasma spraying continues to be a fruitful field for plasma characterization studies. A numerical study using the LAVA code describes the heating and trajectories of two different types of particles injected at two different locations into a plasma flow, and the results compare well with measurements [1808]. A special animated visualization system has been developed to demonstrate the effect of operating parameters making this program easy to use for optimization of functionally graded coatings. Another modeling approach used a three-dimensional description of the injection of particles into a plasma stream, and comparison with experimental data shows that this program can be used to optimize the injection of particles with different properties [1802]. In another three-dimensional simulation of the particle injection process, the effect of the carrier gas on the melting behavior of ceramic particles has been investigated [1795]. All the different effects influencing particle injection in plasma spraying are described in a review publication [1807]. Plasma spraying of alumina powder of different mean diameters and with different injection velocities has been used to relate operating conditions to coating characteristics [1796]. An investigation of the metal droplet generation process during wire arc spraying found the strong influence of various fluid dynamic effects on the resulting particle size distributions and the trajectories [1804].

The thermal plasma CVD process for depositing films of Si–C–N has been investigated using different plasma reactors and different liquid precursors, and hard nanocrystalline or amorphous films have been found [1809]. Three papers describe aspects of the deposition of diamond or diamond—aluminum nitride composite films, including the effect of substrate movement and surface pretreatment methods to enhance the adhesion of diamond on steel surfaces [1797,1798,1800]. Carburizing of a surface using a low-pressure hydrocarbon plasma is also described in [1803], and the process is hailed as improvement of traditional carburizing using a high temperature carbon monoxide/hydrogen atmosphere.

Two papers describe new plasma sintering methods for densifying films. In one of these, the exposure to heat flux from a plasma resulted in rapid sintering of ceramic films, with higher heat fluxes yielding faster sintering and less grain growth [1805]. The other process described uses high voltage pulses applied to pressed silicon nitride samples contained in a carbon die, and Ohmic heating by the current passing through the die and the sample as well as spark discharges within the sample lead to rapid densification [1806].

The numerous physical effects encountered when mercury in high intensity discharge lamps is replaced by zinc are described by Born [1801], and the results demonstrate the attractiveness of this approach for eliminating a toxic substance from a household article. For the application of a plasma tundish heating during steel casting, a pilot furnace has been characterized using various diagnostic methods, and the difference between a carbon electrode and a water-cooled torch are described [1799].

19.4. Magnetohydrodynamics

Modeling of MHD flow and heat transfer effects continues to be very attractive, and a number of papers describe the flow of a conducting fluid in a porous medium. A review paper provides an overview of all the effects of interest for cooling fusion devices [1816]. The effects of Hall currents on free convection flow past a semi-infinite plate is described including mass transfer by diffusion with a uniform field [1813], a non-uniform magnetic field [1826], and with radiative heat transfer [1812]. The radiative effects have also been studied for natural convection in MHD flow in porous media for different boundary conditions [1825]. MHD flow past a infinite vertical porous plate is studied for unsteady conditions and including radiation absorption [1822]. A similar configuration of flow within a porous medium past a porous plate has been studied for unsteady flow including a heat source [1820], and with a moving porous plate [1821]. Adiabatic, compressible flow over a plate with adverse pressure gradient and steady or localized suction or mass injection is described in [1836]. The effect of suction is also studied for the configuration of steady laminar flow over an infinite disk with an axial magnetic field [1833]. Solutions are presented for unsteady flow over two-dimensional bodies with suction and with Joule heating [1827]. Natural convection and radiation transfer is calculated for flow along an accelerating plate with internal heat generation [1828], and three-dimensional Couette flow between parallel plates, one of which is providing sinusoidal mass injection the other uniform suction is described in [1829]. The unsteady laminar flow in a porous channel including heat generation with uniform electric and magnetic fields has been calculated using temperature-dependent properties [1817]. A perturbation technique has been used for describing the MHD two-fluid flow in an inclined channel [1824]. Unsteady flow of a dust laden non-Newtonian fluid through a porous medium is described in [1819], and the effect of a variable viscosity on such flow is discussed [1815]. The flow between parallel plates of a conducting fluid with non-conducting particles with a uniform transverse field has been calculated for different wall boundary conditions [1830]. Another calculation considered the flow of a non-Newtonian fluid between a moving surface and a parallel free stream [1823]. The effect of a transverse magnetic field on the flow through a fluidized bed with an immersed heater has been determined and the Nusselt number as function of the magnetic field has been calculated [1814]. Consideration of the effects of magnetic fields on turbulent flow has been shown in a three-dimensional flow calculation, and a reduction in vortices due to MHD diffusion has been found [1835]. An unsteady flow analysis calculated the boundary layer characteristics for a conducting fluid in the stagnation region of a rotating sphere [1831], and the same authors consider the unsteady flow due to sudden stretching of one surface [1832]. A similar situation is treated with a viscoelastic fluid and with suction through the surface [1810]. The Hall effects on free convection flow with a stretching surface and with internal heat generation and transverse magnetic fields is described in [1811].

One of the few published experimental investigations involved determination of the heat transfer in a liquid lithium cooling loop in an annular channel [1834]. Another study determined the velocity fluctuations in a turbulent flow of liquid sodium in a rectangular channel with a transverse magnetic field using electrostatic probes, and the measured turbulence intensity spectra were found to be different from those predicted by two-dimensional turbulent flow simulations [1818]. Measurements of the velocity distributions in the junction region of a circular manifold pipe have shown the influences of MHD effects [1837].

References

[1] T.C. Chen, Adaptive weighting input estimation method to contact conductance during metal casting problem, Numer. Heat Transfer Part B—Fundamentals 39 (4) (2001) 405.

[2] J.J. Fuller, E.E. Marotta, Thermal contact conductance of metal/polymer joints: an analytical and experimental investigation, J. Thermophys. Heat Transfer 15 (2) (2001) 228.

[3] S.S. Kumar, K. Ramamurthi, Prediction of thermal contact conductance in vacuum using Monte Carlo simulation, J. Thermophys. Heat Transfer 15 (1) (2001) 27.

[4] A. Lahmar, T.P. Nguyen, D. Sakami, S. Orain, Y. Scudeller, F. Danes, Experimental investigation on the thermal contact resistance between gold coating and ceramic substrates, Thin Solid Films 389 (1–2) (2001) 167.

[5] E.E. Marotta, L.S. Fletcher, T.A. Dietz, Thermal contact resistance modeling of non-flat, roughened surfaces with non-metallic coatings, J. Heat Transfer—Trans. ASME 123 (1) (2001) 11.

[6] Y.S. Muzychka, M. Stevanovic, M.M. Yovanovich, Thermal spreading resistances in compound annular sectors, J. Thermophys. Heat Transfer 15 (3) (2001) 354.

[7] Y.S. Muzychka, M.M. Yonanovich, Thermal resistance models for non-circular moving heat sources on a half

space, J. Heat Transfer—Trans. ASME 123 (4) (2001) 624.
[8] H.L. Noboa, J. Seyed-Yagoobi, Thermal contact conductance of a coated paper/metal interface, Drying Technol. 19 (6) (2001) 1125.
[9] R.S. Prasher, Surface chemistry and characteristics based model for the thermal contact resistance of fluidic interstitial thermal interface materials, J. Heat Transfer—Trans. ASME 123 (5) (2001) 969.
[10] R.S. Prasher, P.E. Phelan, A scattering-mediated acoustic mismatch model for the prediction of thermal boundary resistance, J. Heat Transfer—Trans. ASME 123 (1) (2001) 105.
[11] A.A. Rostami, A.Y. Hassan, P.C. Lim, Parametric study of thermal constriction resistance, Heat Mass Transfer 37 (1) (2001) 5.
[12] D. Sakami, A. Lahmar, Y. Scudeller, F. Danes, J.P. Bardon, Thermal contact resistance and adhesion studies on thin copper films on alumina substrates, J. Adhes. Sci. Technol. 15 (12) (2001) 1403.
[13] V. Sartre, M. Lallemand, Enhancement of thermal contact conductance for electronic systems, Appl. Therm. Eng. 21 (2) (2001) 221.
[14] K. Takahashi, H. Kuwahara, N. Kawasaki, T. Obata, E. Sugawa, Enhancement of thermal contact conductance between metal surfaces in an induction motor, J. Enhanc. Heat Transfer 8 (3) (2001) 201.
[15] N.S. Al-Hunti, M.A. Al-Nimr, M. Naji, Dynamic response of a rod due to a moving heat source under the hyperbolic heat conduction model, J. Sound Vib. 242 (4) (2001) 629.
[16] M.A. Al-Nimr, S. Kiwan, Effect of thermal losses on the microscopic two-step heat conduction model, Int. J. Heat Mass Transfer 44 (5) (2001) 1013.
[17] N. Bianco, O. Manca, V. Naso, Transient conductive–radiative numerical analysis of multilayer thin films heated by different laser pulses, Int. J. Therm. Sci. 40 (11) (2001) 959.
[18] A. Cenian, H. Gabriel, Ballistic energy transfer in dielectric Ar crystals, J. Phys.—Condens. Matter 13 (19) (2001) 4323.
[19] C. Cetinkaya, J. Wu, C. Li, An efficiency study of transient wave generation in a thermoelastic layer with a pulsed laser, J. Nondestruct. Eval. 20 (2) (2001) 49.
[20] J.R. Dryden, F. Zok, Thermal phase lag in a solid containing periodic planar cracks, Int. J. Heat Mass Transfer 44 (21) (2001) 4035.
[21] P. Duhamel, A new finite integral transform pair for hyperbolic conduction problems in heterogeneous media, Int. J. Heat Mass Transfer 44 (17) (2001) 3307.
[22] J.M. Kincaid, E.G.D. Cohen, E. Hernandez, Nanoscale heat transfer on the picosecond time scale, Fluid Phase Equilib. (SI) (2001) 389.
[23] V.V. Kulish, J.L. Lage, P.L. Komarov, P.E. Raad, A fractional-diffusion theory for calculating thermal properties of thin films from surface transient thermoreflectance measurements, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1133.
[24] D.M. Leitner, Vibrational energy transfer and heat conduction in a one-dimensional glass, Phys. Rev. B 6409 (9) (2001) 4201.
[25] L.H. Liu, H.P. Tan, Non-Fourier effects on transient coupled radiative–conductive heat transfer in one-dimensional semitransparent medium subjected to a periodic irradiation, J. Quant. Spectrosc. Radiat. Transfer 71 (1) (2001) 11.
[26] L.H. Liu, H.P. Tan, T.W. Tong, Non-Fourier effects on transient temperature response in semitransparent medium caused by laser pulse, Int. J. Heat Mass Transfer 44 (17) (2001) 3335.
[27] S. Mazumder, A. Majumdar, Monte Carlo study of phonon transport in solid thin films including dispersion and polarization, J. Heat Transfer—Trans. ASME 123 (4) (2001) 749.
[28] M. Oane, D. Sporea, Temperature profiles modeling in IR optical components during high power laser irradiation, Infrared Phys. Technol. 42 (1) (2001) 31.
[29] A.V. Savin, O.V. Gendel'man, On the finite thermal conductivity of a one-dimensional rotator lattice, Phys. Solid State 43 (2) (2001) 355.
[30] P.G. Sverdrup, Y.S. Ju, K.E. Goodson, Sub-continuum simulations of heat conduction in silicon-on-insulator transistors, J. Heat Transfer—Trans. ASME 123 (1) (2001) 130.
[31] D.Y. Tzou, K.S. Chiu, Temperature-dependent thermal lagging in ultrafast laser heating, Int. J. Heat Mass Transfer 44 (9) (2001) 1725.
[32] L.Q. Wang, M.T. Xu, X.S. Zhou, Well-posedness and solution structure of dual-phase-lagging heat conduction, Int. J. Heat Mass Transfer 44 (9) (2001) 1659.
[33] B.S. Yilbas, Electron kinetic theory approach—one- and three-dimensional heating with pulsed laser, Int. J. Heat Mass Transfer 44 (10) (2001) 1925.
[34] B.S. Yilbas, Laser short-pulse heating: moving heat source and convective boundary considerations, Physica A 293 (1–2) (2001) 157.
[35] B.S. Yilbas, A.F.M. Arif, Material response to thermal loading due to short pulse laser heating, Int. J. Heat Mass Transfer 44 (20) (2001) 3787.
[36] T.F. Zeng, G. Chen, Phonon heat conduction in thin films: impacts of thermal boundary resistance and internal heat generation, J. Heat Transfer—Trans. ASME 123 (2) (2001) 340.
[37] D.D.L. Chung, Thermal interface materials, J. Mater. Eng. Perform. 10 (1) (2001) 56.
[38] W. Grzesik, An investigation of the thermal effects in orthogonal cutting associated with multilayer coatings, Cirp Ann.—Manuf. Technol. 50 (1) (2001) 53.
[39] H.S. Kang, D.C. Look, Thermally asymmetric triangular fin analysis, J. Thermophys. Heat Transfer 15 (4) (2001) 427.
[40] B. Kundu, P.K. Das, Performance analysis and optimization of annular fin with a step change in thickness, J. Heat Transfer—Trans. ASME 123 (3) (2001) 601.
[41] R.P.A. Rocha, M.E. Cruz, Computation of the effective conductivity of unidirectional fibrous composites with an interfacial thermal resistance, Numer. Heat Transfer Part A—Applications 39 (2) (2001) 179.
[42] W.L. Vargas, J.J. McCarthy, Heat conduction in granular materials, AICHE J. 47 (5) (2001) 1052.

[43] R.H. Yeh, Optimum finned surfaces with longitudinal rectangular fins, J. Enhanc. Heat Transfer 8 (4) (2001) 279.
[44] B. Abu-Hijleh, Natural convection and entropy generation from a cylinder with high conductivity fins, Numer. Heat Transfer Part A—Applications 39 (4) (2001) 405.
[45] V.D. Fachinotti, A. Cardona, A.E. Huespe, Numerical simulation of conduction–advection problems with phase change, Latin Am. Appl. Res. 31 (1) (2001) 31.
[46] Z.Y. Guo, Mechanism and control of convective heat transfer—coordination of velocity and heat flow fields, Chin. Sci. Bull. 46 (7) (2001) 596.
[47] M. Leung, Phase-change heat transfer in laser transformation hardening by moving Gaussian rectangular heat source, J. Phys. D—Appl. Phys. 34 (24) (2001) 3434.
[48] H. Zhao, T. Debroy, Weld metal composition change during conduction mode laser welding of aluminum alloy 5182, Metall. Mater. Trans. B—Process Metall. Mater. Process. Sci. 32 (1) (2001) 163.
[49] R. Abou khachfe, Y. Jarny, Determination of heat sources and heat transfer coefficient for two-dimensional heat flow—numerical and experimental study, Int. J. Heat Mass Transfer 44 (7) (2001) 1309.
[50] M.A. Antar, Steady and transient numerical analysis of the performance of annular fins, Int. J. Energy Res. 25 (13) (2001) 1197.
[51] J.R. Berger, V.K. Tewary, Greens functions for boundary element analysis of anisotropic bimaterials, Eng. Anal. Bound. Elem. 25 (4–5) (2001) 279.
[52] R.X. Cai, N. Zhang, Some algebraically explicit analytical solutions of unsteady nonlinear heat conduction, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1189.
[53] A. Campo, Composite lumped model and algebraic solutions of unsteady temperatures and accumulated heat transfer, J. Thermophys. Heat Transfer 15 (3) (2001) 360.
[54] C.Y. Chang, C.C. Ma, Transient thermal conduction analysis of a rectangular plate with multiple insulated cracks by the alternating method, Int. J. Heat Mass Transfer 44 (13) (2001) 2423.
[55] B.S. Chen, Y.X. Gu, Z.Q. Guan, H.W. Zhang, Nonlinear transient heat conduction analysis with precise time integration method, Numer. Heat Transfer Part B—Fundamentals 40 (4) (2001) 325.
[56] H.T. Chen, K.C. Liu, Numerical analysis of non-Fickian diffusion problems in a potential field, Numer. Heat Transfer Part B—Fundamentals 40 (3) (2001) 265.
[57] J.K. Chen, J.E. Beraun, Numerical study of ultrashort laser pulse interactions with metal films, Numer. Heat Transfer Part A—Applications 40 (1) (2001) 1.
[58] K.D. Cole, D.H.Y. Yen, Green's functions, temperature and heat flux in the rectangle, Int. J. Heat Mass Transfer 44 (20) (2001) 3883.
[59] W. Dai, R. Nassar, A finite difference method for solving 3-D heat transport equations in a double-layered thin film with microscale thickness and nonlinear interfacial conditions, Numer. Heat Transfer Part A—Applications 39 (1) (2001) 21.
[60] W. Dai, R. Nassar, L. Mo, A domain decomposition method for solving 3-D heat transport equations in a double-layered cylindrical thin film with submicroscale thickness and nonlinear interfacial conditions, Numer. Heat Transfer Part A—Applications 40 (6) (2001) 619.
[61] K.J. Dowding, B.F. Blackwell, Sensitivity analysis for nonlinear heat conduction, J. Heat Transfer—Trans. ASME 123 (1) (2001) 1.
[62] C.H. Huang, S.C. Cheng, Three-dimensional inverse estimation of heat generation in board mounted chips, J. Thermophys. Heat Transfer 15 (4) (2001) 439.
[63] C.H. Lan, C.H. Cheng, C.Y. Wu, Shape design for heat conduction problems using curvilinear grid generation, conjugate gradient, and redistribution methods, Numer. Heat Transfer Part A—Applications 39 (5) (2001) 487.
[64] R.W. Lewis, M.T. Manzari, D.T. Gethin, Thermal optimisation in the sand casting process, Eng. Comput. (Swansea, Wales) 18 (3–4) (2001) 394.
[65] J.H. Lin, C.K. Chen, Y.T. Yang, Inverse method for estimating thermal conductivity in one-dimensional heat conduction problems, J. Thermophys. Heat Transfer 15 (1) (2001) 34.
[66] M. Monde, Y. Mitsutake, A new estimation method of thermal diffusivity using analytical inverse solution for one-dimensional heat conduction, Int. J. Heat Mass Transfer 44 (16) (2001) 3169.
[67] L. Olson, R. Throne, Estimation of tool/chip interface temperatures for on-line tool monitoring: an inverse problem approach, Inverse Probl. Eng. 9 (4) (2001) 367.
[68] M.A. Sheikh, S.C. Taylor, D.R. Hayhurst, R. Taylor, Microstructural finite-element modelling of a ceramic matrix composite to predict experimental measurements of its macro thermal properties, Model. Simul. Mater. Sci. Eng. 9 (1) (2001) 7.
[69] Z.Y. Zhang, Numerical simulation of short-pulsed laser processing of materials, Numer. Heat Transfer Part A—Applications 40 (5) (2001) 497.
[70] I. Al-Zaharnah, B.S. Yilbas, M.S.J. Hashmi, Pulsating flow in circular pipes—the analysis of thermal stresses, Int. J. Pres. Ves. Pip. 78 (8) (2001) 567.
[71] S.J. Kowalski, Thermomechanical approach to shrinking and cracking phenomena in drying, Drying Technol. 19 (5) (2001) 731.
[72] S.L. Lee, C.R. Ou, Gap formation and interfacial heat transfer between thermoelastic bodies in imperfect contact, J. Heat Transfer—Trans. ASME 123 (2) (2001) 205.
[73] M. Naji, R. Al-Nimr, N.S. Al-Huniti, Thermal stresses in a rapidly heated plate using the parabolic two-step heat conduction equation, J. Therm. Stresses 24 (5) (2001) 399.
[74] C.G. Speziale, On the coupled heat equation of linear thermoelasticity, Acta Mech. 150 (1–2) (2001) 121.
[75] M. Almogbel, A. Bejan, Constructal optimization of nonuniformly distributed tree-shaped flow structures for conduction, Int. J. Heat Mass Transfer 44 (22) (2001) 4185.
[76] A. Bandyopadhyay, B.V. Ramarao, E.C. Shih, Transient response of a paper sheet subjected to a traveling thermal pulse: evolution of temperature, moisture and

pressure fields, J. Imaging Sci. Technol. 45 (6) (2001) 598.
[77] Y.M. Chen, J.S. Shie, Feasibility study on a contact-less direct thermal printing with electrothermal SPICE simulation, Sens. Actuators A—Physical 88 (2) (2001) 93.
[78] S. Chirarattananon, A. Rajapakse, Determination of the divergence of calculation methods for heat gain though walls, Hvac&R Res. 7 (1) (2001) 15.
[79] P. Chuangchid, M. Krarti, Steady-state component of three-dimensional slab-on-grade foundation heat transfer, J. Sol. Energy Eng.—Trans. ASME 123 (1) (2001) 18.
[80] A. Davidy, E. Elias, S. Olek, Quenching of hot oxidizing surfaces, Nucl. Eng. Des. 204 (1–3) (2001) 361.
[81] S. Estrada-Flores, A.C. Cleland, D.J. Cleland, Prediction of the dynamic thermal behaviour of walls for refrigerated rooms using lumped and distributed parameter models, Int. J. Refrig. (Rev. Int. du Froid) 24 (3) (2001) 272.
[82] D. Gopinath, Y.K. Joshi, S. Azarm, Multi-objective placement optimization of power electronic devices on liquid cooled heat sinks, in: Seventeenth Annual IEEE Semiconductor Thermal Measurement and Management Symposium, Proceedings 2001, 2001, p. 117.
[83] A. Korpela, T. Kalliohaka, J. Lehtonen, R. Mikkonen, Protection of conduction cooled Nb3SnSMES coil, IEEE Trans. Appl. Supercond. (art 2) (2001) 2591.
[84] P. Lagonotte, M. Broussely, Y. Bertin, J.B. Saulnier, Improvement of thermal nodal models with negative compensation capacitors, Eur. Phys. J.—Appl. Phys. 13 (3) (2001) 177.
[85] W. Maref, M.C. Swinton, M.K. Kumaran, M.T. Bomberg, Three-dimensional analysis of thermal resistance of exterior basement insulation systems (EIBS), Build. Environ. 36 (4) (2001) 407.
[86] H.B. Nahor, N. Scheerlinck, R. Verniest, J. De Baerdemaeker, B.M. Nicolai, Optimal experimental design for the parameter estimation of conduction heated foods, J. Food Eng. 48 (2) (2001) 109.
[87] M. Neagu, A. Bejan, Constructal placement of high-conductivity inserts in a slab: optimal design of "roughness", J. Heat Transfer—Trans. ASME 123 (6) (2001) 1184.
[88] W.R. Panero, R. Jeanloz, Temperature gradients in the laser-heated diamond anvil cell, J. Geophys. Res.—Solid Earth 106 (B4) (2001) 6493.
[89] Y.F. Peng, Z.H. Cheng, Y.N. Zhang, J.L. Qiu, Temperature distributions and thermal deformations of mirror substrates in laser resonators, Appl. Opt. 40 (27) (2001) 4824.
[90] S.W. Rees, Z. Zhou, H.R. Thomas, The influence of soil moisture content variations on heat losses from earth-contact structures: an initial assessment, Build. Environ. 36 (2) (2001) 157.
[91] B.A. Rock, L.L. Ochs, Slab-on-grade heating load factors for wood-framed buildings, Energy Build. 33 (8) (2001) 759.
[92] A.K. Satapathy, R.K. Sahoo, Thermal analysis of an infinite tube during quenching, Heat Mass Transfer 37 (4–5) (2001) 493.
[93] M.N. Slyadnev, Y. Tanaka, M. Tokeshi, T. Kitamori, Photothermal temperature control of a chemical reaction on a microchip using an infrared diode laser, Anal. Chem. 73 (16) (2001) 4037.
[94] D.E. Smith, Optimization-based inverse heat transfer analysis for salt quenching of automotive components, Int. J. Vehicle Des (special issue SI) (2001) 23.
[95] Q.Z. Wang, E.C. Mathias, J.R. Heman, C.W. Smith, Gasdynamics and heat transfer modeling in rocket joints, J. Spacecraft Rockets 38 (5) (2001) 777.
[96] S. Wang, J. Tang, R.P. Cavalieri, Modeling fruit internal heating rates for hot air and hot water treatments, Postharvest Biol. Technol. 22 (3) (2001) 257.
[97] H. Zhang, A.K. Datta, A. Taub, C. Doona, Electromagnetics, heat transfer, and thermokinetics in microwave sterilization, AICHE J. 47 (9) (2001) 1957.
[98] R.J. Butler, A.R. Byerley, K. VanTreuren, J.W. Baughn, The effect of turbulence intensity and length scale on low-pressure turbine blade aerodynamics, Int. J. Heat Fluid Flow 22 (2) (2001) 123.
[99] L. Djenidi, R.A. Antonia, Calculation of the effect of concentrated wall suction on a turbulent boundary layer using a second-order moment closure, Int. J. Heat Fluid Flow 22 (5) (2001) 487.
[100] A. Mosyak, E. Pogrebnyak, G. Hetsroni, Effect of constant heat flux boundary condition on wall temperature fluctuations, J. Heat Transfer—Trans. ASME 123 (2) (2001) 213.
[101] I. Tiselj, E. Pogrebnyak, C. Li, A. Mosyak, G. Hetsroni, Effect of wall boundary condition on scalar transfer in a fully developed turbulent flume, Phys. Fluids 13 (4) (2001) 1028.
[102] G.J. Van Fossen, R.S. Bunker, Augmentation of stagnation region heat transfer due to turbulence from a DLN can combustor, J. Turbomachine.—Trans. ASME 123 (1) (2001) 140.
[103] E.M. AboEldahab, Convective heat transfer, by the presence of radiation, in an electrically conducting fluid at a stretching surface, Can. J. Phys. 79 (6) (2001) 929.
[104] B.A.K. Abu-Hijleh, Use of baffles for heat transfer reduction from a cylinder in cross flow, Numer. Heat Transfer Part A—Applications 40 (4) (2001) 421.
[105] M. Abu-Qudais, O.M. Haddad, A.M. Maqableh, Hydrodynamic and heat transfer characteristics of laminar flow past a parabolic cylinder with constant heat flux, Heat Mass Transfer 37 (2–3) (2001) 299.
[106] K.A. Batchelder, J.K. Eaton, Practical experience with the discrete Green's function approach to convective heat transfer, J. Heat Transfer—Trans. ASME 123 (1) (2001) 70.
[107] P. Calanca, A note on the roughness length for temperature over melting snow and ice, Quart. J. Roy. Meteorol. Soc. (art A) (2001) 255.
[108] M. Doichinova, C. Boyadjiev, Opposite-current flows in gas–liquid layers—III. Non-linear mass transfer, Int. J. Heat Mass Transfer 44 (11) (2001) 2121.

[109] W. Eifler, C.J. Donlon, Modeling the thermal surface signature of breaking waves, J. Geophys. Res.—Oceans 106 (C11) (2001) 27163.
[110] Z.G. Feng, E.E. Michaelides, Heat and mass transfer coefficients of viscous spheres, Int. J. Heat Mass Transfer 44 (23) (2001) 4445.
[111] G. Hetsroni, C.F. Li, A. Mosyak, I. Tiselj, Heat transfer and thermal pattern around a sphere in a turbulent boundary layer, Int. J. Multiphase Flow 27 (7) (2001) 1127.
[112] Y.B. Lee, S.T. Ro, An experimental study of frost formation on a horizontal cylinder under cross flow, Int. J. Refrig. (Rev. Int. du Froid) 24 (6) (2001) 468.
[113] K.O. Lund, T.R. Knowles, Enhanced laminar-flow heat transfer at fiber-flocked surfaces, Int. J. Heat Mass Transfer 44 (8) (2001) 1627.
[114] E. Magyari, M.E. Ali, B. Keller, Heat and mass transfer characteristics of the self-similar boundary-layer flows induced by continuous surfaces stretched with rapidly decreasing velocities, Heat Mass Transfer 38 (1–2) (2001) 65.
[115] E. Magyari, B. Keller, The wall jet as limiting case of a boundary-layer flow induced by a permeable stretching surface, Z. Angew. Math. Phys. 52 (4) (2001) 696.
[116] H. Nakamura, T. Igarashi, T. Tsutsui, Local heat transfer around a wall-mounted cube in the turbulent boundary layer, Int. J. Heat Mass Transfer 44 (18) (2001) 3385.
[117] A.N. Oo, C.Y. Ching, Effect of turbulence with different vortical structures on stagnation region heat transfer, J. Heat Transfer—Trans. ASME 123 (4) (2001) 665.
[118] M.A. Seddeek, Effects of Hall and ion-slip currents on magneto-micropolar fluid and heat transfer over a non-isothermal stretching sheet with suction and blowing, Proc. Roy. Soc. Lond. A—Math. Phys. Eng. Sci. 457 (2016) (2001) 3039.
[119] A. Slanciauskas, Two friendly rules for the turbulent heat transfer enhancement, Int. J. Heat Mass Transfer 44 (11) (2001) 2155.
[120] N. Syred, A. Khalatov, A. Kozlov, A. Shchukin, R. Agachev, Effect of surface curvature on heat transfer and hydrodynamics within a single hemispherical dimple, J. Turbomachine.—Trans. ASME 123 (3) (2001) 609.
[121] B. Tashtoush, E. Abu-Irshaid, Heat and fluid flow from a wavy surface subjected to a variable heat flux, Acta Mech. 152 (1–4) (2001) 1.
[122] B. Tashtoush, Z. Kodah, A. Al-Ghasem, On thermal boundary layer of a non-Newtonian fluid on a power-law stretched surface of variable temperature with suction or injection, Heat Mass Transfer 37 (4) (2001).
[123] K. Vajravelu, Viscous flow over a nonlinearly stretching sheet, Appl. Math. Comput. 124 (3) (2001) 281.
[124] M. Yoshiwara, Convective heat transfer from the wall surface of a cavity to the external stream (Effects of temperature nonuniformity on the wall surface for correlations of heat transfer model), JSME Int. J. B—Fluids Therm. Eng. 44 (2) (2001) 262.
[125] R.A. Ahmad, Discharge coefficients and heat transfer for axisymmetric supersonic nozzles, Heat Transfer Eng. 22 (6) (2001) 40.
[126] S.A. Berry, A.H. Auslender, A.D. Dilley, J.F. Calleja, Hypersonic boundary-layer trip development for Hyper-X, J. Spacecraft Rockets 38 (6) (2001) 853.
[127] S.A. Berry, T.J. Horvath, B.R. Hollis, R.A. Thompson, H.H. Hamilton, X-33 hypersonic boundary-layer transition, J. Spacecraft Rockets 38 (5) (2001) 646.
[128] S.M. Boldyrev, V.Y. Borovoy, A.Y. Chinilov, V.N. Gusev, S.N. Krutiy, I.V. Struminskaya, L.V. Yakovleva, J. Delery, B. Chanetz, A thorough experimental investigation of shock/shock interferences in high Mach number flows, Rech. Aerospatiale 5 (3) (2001) 167.
[129] U. Goldberg, Hypersonic flow heat transfer prediction using single equation turbulence models, J. Heat Transfer—Trans. ASME 123 (1) (2001) 65.
[130] T. Hirschler, W. Gretler, The influence of radiative heat transfer upon the collapse of a cylindrical shock wave, Phys. Fluids 13 (9) (2001) 2682.
[131] T.J. Horvath, S.A. Berry, B.R. Hollis, D.S. Liechty, H.H. Hamilton, N.R. Merski, X-33 experimental aeroheating at Mach 6 using phosphor thermography, J. Spacecraft Rockets 38 (5) (2001) 634.
[132] J.P. Hubner, B.F. Carroll, K.S. Schanze, H.F. Ji, M.S. Holden, Temperature- and pressure-sensitive paint measurements in short-duration hypersonic flow, AIAA J. 39 (4) (2001) 654.
[133] G.R. Inger, P.A. Gnoffo, Analytical and computational study of wall temperature jumps in supersonic flow, AIAA J. 39 (1) (2001) 79.
[134] E. Josyula, Oxygen atoms' effect on vibrational relaxation of nitrogen in blunt-body flows, J. Thermophys. Heat Transfer 15 (1) (2001) 106.
[135] E. Josyula, W.E. Bailey, Vibration–dissociation coupling using master equations in nonequilibrium hypersonic blunt-body flow, J. Thermophys. Heat Transfer 15 (2) (2001) 157.
[136] B. Meyer, H.F. Nelson, D.W. Riggins, Hypersonic drag and heat-transfer reduction using a forward-facing jet, J. Aircraft 38 (4) (2001) 680.
[137] F. Thivet, D.D. Knight, A.A. Zheltovodov, A.I. Maksimov, Insights in turbulence modeling for crossing-shock-wave/boundary-layer interactions, AIAA J. 39 (6) (2001) 985.
[138] X.D. Xiao, J.R. Edwards, H.A. Hassan, Transitional flow over an elliptic cone at Mach 8, J. Spacecraft Rockets 38 (6) (2001) 941.
[139] S. Bae, H.J. Sung, Breakdown of the Reynolds analogy in a stagnation region under inflow disturbances, Theor. Comput. Fluid Dyn. 14 (6) (2001) 377.
[140] M.J. Barrett, D.K. Hollingsworth, On the calculation of length scales for turbulent heat transfer correlation, J. Heat Transfer—Trans. ASME 123 (5) (2001) 878.
[141] M.Y. Chen, Q. Chen, J. Zhe, V. Modi, High Schmidt number mass transfer using Chapman–Kuhn's near wall coherent structure model, Int. J. Heat Mass Transfer 44 (20) (2001) 3833.
[142] B.Q. Deng, W.Q. Wu, S.T. Xi, A near-wall two-equation heat transfer model for wall turbulent flows, Int. J. Heat Mass Transfer 44 (4) (2001) 691.
[143] W. Devenport, J. Schetz, Boundary layer computer codes in JAVA, Z. Angew. Math. Mech. 4 (2001) S919.

[144] E.R.G. Eckert, H. Sakamoto, T.W. Simon, The heat/mass transfer analogy factor, Nu/Sh, for boundary layers on turbine blade profiles, Int. J. Heat Mass Transfer 44 (6) (2001) 1223.
[145] V.K. Garg, A.A. Ameri, Two-equation turbulence models for prediction of heat transfer on a transonic turbine blade, Int. J. Heat Fluid Flow 22 (6) (2001) 593.
[146] U. Goldberg, P. Batten, Heat transfer predictions using a dual-dissipation κ–ϵ turbulence closure, J. Thermophys. Heat Transfer 15 (2) (2001) 197.
[147] P.Y. Lagree, Removing the marching breakdown of the boundary-layer equations for mixed convection above a horizontal plate, Int. J. Heat Mass Transfer 44 (17) (2001) 3359.
[148] B. Mohammadi, G. Puigt, Generalized wall functions for high-speed separated flows over adiabatic and isothermal walls, Int. J. Comput. Fluid Dyn. 14 (3) (2001) 183.
[149] S. Moissette, B. Oesterle, P. Boulet, Temperature fluctuations of discrete particles in a homogeneous turbulent flow: a Lagrangian model, Int. J. Heat Fluid Flow 22 (3) (2001) 220.
[150] F. Porte-Agel, M.B. Parlange, C. Meneveau, W.E. Eichinger, A priori field study of the subgrid-scale heat fluxes and dissipation in the atmospheric surface layer, J. Atmos. Sci. 58 (18) (2001) 2673.
[151] J.M. Roux, P. Mahe, B. Sauthier, J.M. Duboue, Aerothermal predictions with transition models for high-pressure turbine blades, Proc. Inst. Mech. Eng. Part A—J. Power Energy 215 (A6) (2001) 735.
[152] R. Schook, H.C. de Lange, A.A. van Steenhoven, Heat transfer measurements in transitional boundary layers, Int. J. Heat Mass Transfer 44 (5) (2001) 1019.
[153] R. Schook, H.C. de Lange, A.A. van Steenhoven, Unsteady heat transfer in subsonic boundary layers, Int. J. Heat Fluid Flow 22 (3) (2001) 272.
[154] A.N. Secundov, M.K. Strelets, A.K. Travin, Generalization of nu(t)-92 turbulence model for shear-free and stagnation point flows, J. Fluids Eng.—Trans. ASME 123 (1) (2001) 11.
[155] M.M. Yovanovich, P. Teertstra, Laminar forced convection modeling of isothermal rectangular plates, J. Thermophys. Heat Transfer 15 (2) (2001) 205.
[156] H. Fujimoto, T. Ogino, H. Takuda, N. Hatta, Collision of a droplet with a hemispherical static droplet on a solid, Int. J. Multiphase Flow 27 (7) (2001) 1227.
[157] S.D. Harris, D.B. Ingham, I. Pop, Transient boundary-layer heat transfer from a flat plate subjected to a sudden change in heat flux, Eur. J. Mech. B—Fluids 20 (2) (2001) 187.
[158] W.M. Healy, J.G. Hartley, S.I. Abdel-Khalik, On the validity of the adiabatic spreading assumption in droplet impact cooling, Int. J. Heat Mass Transfer 44 (20) (2001) 3869.
[159] W.M. Healy, J.G. Hartley, S.I. Abdel-Khalik, Surface wetting effects on the spreading of liquid droplets impacting a solid surface at low Weber numbers, Int. J. Heat Mass Transfer 44 (1) (2001) 235.
[160] Z.S. Mao, T.W. Li, J.Y. Chen, Numerical simulation of steady and transient mass transfer to a single drop dominated by external resistance, Int. J. Heat Mass Transfer 44 (6) (2001) 1235.
[161] M. Pasandideh-Fard, S.D. Aziz, S. Chandra, J. Mostaghimi, Cooling effectiveness of a water drop impinging on a hot surface, Int. J. Heat Fluid Flow 22 (2) (2001) 201.
[162] A. Pozzi, R. Tognaccini, Symmetrical impulsive thermofluid dynamic field along a thick plate, Int. J. Heat Mass Transfer 44 (17) (2001) 3281.
[163] S.S. Sazhin, V.A. Gol'dshtein, M.R. Heikal, A transient formulation of Newton's cooling law for spherical bodies, J. Heat Transfer—Trans. ASME 123 (1) (2001) 63.
[164] M.H.K. Siddiqui, M.R. Loewen, C. Richardson, W.E. Asher, A.T. Jessup, Simultaneous particle image velocimetry and infrared imagery of microscale breaking waves, Phys. Fluids 13 (7) (2001) 1891.
[165] B.S. Tilley, S.H. Davis, S.G. Bankoff, Unsteady Stokes flow near an oscillating, heated contact line, J. Fluid Mech. 438 (2001) 339.
[166] J.L. Lockshin, M.K. Zakharov, Exact solutions for heat and mass transfer in a falling laminar film, Int. J. Heat Mass Transfer 44 (23) (2001) 4541.
[167] W.A. Miller, M. Keyhani, The correlation of simultaneous heat and mass transfer experimental data for aqueous lithium bromide vertical falling film absorption, J. Sol. Energy Eng.—Trans. ASME 123 (1) (2001) 30.
[168] S. Negny, M. Meyer, M. Prevost, Enhancement of absorption efficiency for a laminar film flow by hydrodynamic conditions generated by a new type of column wall, Chem. Eng. J. 83 (1) (2001) 7.
[169] S. Negny, M. Meyer, M. Prevost, Study of a laminar falling film flowing over a wavy wall column: Part I. Numerical investigation of the flow pattern and the coupled heat and mass transfer, Int. J. Heat Mass Transfer 44 (11) (2001) 2137.
[170] S. Negny, M. Meyer, M. Prevost, Study of a laminar falling film flowing over a wavy wall column: Part II. Experimental validation of hydrodynamic model, Int. J. Heat Mass Transfer 44 (11) (2001) 2147.
[171] S.H. Park, J.G. Weng, C.L. Tien, A molecular dynamics study on surface tension of microbubbles, Int. J. Heat Mass Transfer 44 (10) (2001) 1849.
[172] G. Aguilar, K. Gasljevic, E.F. Matthys, Asymptotes of maximum friction and heat transfer reductions for drag-reducing surfactant solutions, Int. J. Heat Mass Transfer 44 (15) (2001) 2835.
[173] J. Ahlqvist, Atherosclerosis, and Newton, Poiseuille, Reynolds and Prandtl, Med. Hypotheses 57 (4) (2001) 446.
[174] M.M. Alimov, Asymptotic solution of the problem of heat transfer between a plate and an unbounded uniform fluid flow, PMM J. Appl. Math. Mech. 65 (1) (2001) 81.
[175] O. Chernukha, On diffusion processes in a two-phase random nonhomogeneous stratified semispace, Int. J. Heat Mass Transfer 44 (13) (2001) 2535.
[176] I.V. Derevich, Influence of internal turbulent structure on intensity of velocity and temperature fluctuations

of particles, Int. J. Heat Mass Transfer 44 (23) (2001) 4505.
[177] C. Feiler, Drag coefficient reduction in the presence of pressure gradients by heat transfer, AIAA J. 39 (12) (2001) 2262.
[178] W. Kast, Diffusive mass transfer with superimposed frictional flow, Int. J. Heat Mass Transfer 44 (24) (2001) 4717.
[179] T. Kunugi, S. Satake, A. Sagara, Direct numerical simulation of turbulent free-surface high Prandtl number fluid flows in fusion reactors, Nucl. Instr. Meth. Phys. Res. Section A—Accelerators Spectrometers Detectors Associated Equipment 464 (1–3) (2001) 165.
[180] M. Massoudi, Local non-similarity solutions for the flow of a non-Newtonian fluid over a wedge, Int. J. Non-Lin. Mech. 36 (6) (2001) 961.
[181] M. Massoudi, T.X. Phuoc, Fully developed flow of a modified second grade fluid with temperature dependent viscosity, Acta Mech. 150 (1–2) (2001) 23.
[182] A.A. Mohammadein, R.S.R. Gorla, Heat transfer in a micropolar fluid over a stretching sheet with viscous dissipation and internal heat generation, Int. J. Numer. Meth. Heat Fluid Flow 11 (1) (2001) 50.
[183] K. Noto, T. Miyake, T. Nakajima, Generation of the Karman vortex street at low Reynolds number due to cooling a cylinder: cause and fluid type effect by numerical computation, Numer. Heat Transfer Part A—Applications 40 (6) (2001) 659.
[184] C.C. Wang, C.K. Chen, Transient force and free convection along a vertical wavy surface in micropolar fluids, Int. J. Heat Mass Transfer 44 (17) (2001) 3241.
[185] A. Caldeira-Pires, M.V. Heitor, Characteristics of turbulent heat transport in nonpremixed jet flames, Combust. Flame 124 (1–2) (2001) 213.
[186] S.S. Ibrahim, G.K. Hargrave, T.C. Williams, Experimental investigation of flame/solid interactions in turbulent premixed combustion, Exp. Therm. Fluid Sci. 24 (3–4) (2001) 99.
[187] T. Lieuwen, Theoretical investigation of unsteady flow interactions with a premixed planar flame, J. Fluid Mech. 435 (2001) 289.
[188] F. Mashayek, G.B. Jacobs, Temperature-dependent reaction in droplet-laden homogeneous turbulence, Numer. Heat Transfer Part A—Applications 39 (2) (2001) 101.
[189] M. Taghizadeh, C. Jallut, M. Tayakout-Fayolle, J. Lieto, Non-isothermal gas–liquid absorption with chemical reaction studies—temperature measurements of a spherical laminar him surface and comparison with a model for the CO_2/NaOH system, Chem. Eng. J. (special issue SI) (2001) 143.
[190] M.A. Al-Nimr, B.A. Abu-Hijleh, Validation of the thermal equilibrium assumption in the transient conjugated forced convection channel flow, Heat Mass Transfer 37 (4–5) (2001) 511.
[191] S.A. Argyropoulos, A.C. Mikrovas, D.A. Doutre, Dimensionless correlations for forced convection in liquid metals: Part I. Single-phase flow, Metall. Mater. Trans. B—Process Metall. Mater. Process. Sci. 32 (2) (2001) 239.
[192] W.K.S. Chiu, C.J. Richards, Y. Jaluria, Experimental and numerical study of conjugate heat transfer in a horizontal channel heated from below, J. Heat Transfer—Trans. ASME 123 (4) (2001) 688.
[193] M.A.I. El-Shaarawi, S.A. Haider, Critical conductivity ratio for conjugate heat transfer in eccentric annuli, Int. J. Numer. Meth. Heat Fluid Flow 11 (2–3) (2001) 255.
[194] G. Evans, R. Greif, Characterization of energy transport by mass diffusion including an application to elliptic channel flow, Int. J. Heat Mass Transfer 44 (4) (2001) 753.
[195] S. Fuzier, B. Baudouy, S.W. Van Sciver, Steady-state pressure drop and heat transfer in HeII forced flow at high Reynolds number, Cryogenics 41 (5–6) (2001) 453.
[196] S. Kang, B. Patil, J.A. Zarate, R.P. Roy, Isothermal and heated turbulent upflow in a vertical annular channel—Part I. Experimental measurements, Int. J. Heat Mass Transfer 44 (6) (2001) 1171.
[197] S.Y. Kim, B.H. Kang, J.H. Kim, Forced convection from aluminum foam materials in an asymmetrically heated channel, Int. J. Heat Mass Transfer 44 (7) (2001) 1451.
[198] V.N. Kolodezhnov, A.V. Koltakov, Analysis of the process of heat transfer for free steady-state flow of liquid in a flat channel in view of the dissipation of mechanical energy and of the temperature dependence of viscosity, High Temp.—USSR 39 (2) (2001) 277.
[199] N. Mahinpey, M. Ojha, O. Trass, Transient mass and heat transfer in a smooth pipe, Int. J. Heat Mass Transfer 44 (20) (2001) 3919.
[200] K. Matsubara, M. Kobayashi, T. Sakai, H. Suto, A study on spanwise heat transfer in a turbulent channel flow—eduction of coherent structures by a conditional sampling technique, Int. J. Heat Fluid Flow 22 (3) (2001) 213.
[201] A.V. Melkikh, V.D. Seleznev, Bistability of heat transfer of viscous liquid under conditions of flow in a channel, High Temp.—USSR 39 (1) (2001) 124.
[202] E.R.L. Mercado, V.C. Souza, R. Guirardello, J.R. Nunhez, Modeling flow and heat transfer in tubes using a fast CFD formulation, Comput. Chem. Eng. 25 (4–6) (2001) 713.
[203] S.S. Pitla, E.A. Groll, S. Ramadhyani, Convective heat transfer from in-tube cooling of turbulent supercritical carbon dioxide: Part 2—Experimental data and numerical predictions, Hvac&R Res. 7 (4) (2001) 367.
[204] S.S. Pitla, E.A. Groll, S. Ramadhyani, Convective heat transfer from in-tube flow of turbulent supercritical carbon dioxide: Part 1—Numerical analysis, Hvac&R Res. 7 (4) (2001) 345.
[205] M. Rokni, T.B. Gatski, Predicting turbulent convective heat transfer in fully developed duct flows, Int. J. Heat Fluid Flow 22 (4) (2001) 381.
[206] J. Severin, K. Beckert, H. Herwig, Plane channel flow with heat transfer: stability analysis with a commercial CFD-code, Z. Angew. Math. Mech. 3 (2001) S511.
[207] J. Severin, K. Beckert, H. Herwig, Spatial development of disturbances in plane Poiseuille flow: a direct numerical simulation using a commercial CFD code, Int. J. Heat Mass Transfer 44 (22) (2001) 4359.

[208] K.D. Singh, R. Sharma, Three-dimensional flow between two parallel porous plates with heat transfer, Z. Naturforsch. Section A—J. Phys. Sci. 56 (8) (2001) 596.

[209] D. Stojkovic, V.D. Djordjevic, P.S. Cvijanovic, On the effect of friction in steady flow of dense gases in pipes, Int. J. Heat Fluid Flow 22 (4) (2001) 480.

[210] J. Su, A.J.D. Neto, Simultaneous estimation of inlet temperature and wall heat flux in turbulent circular pipe flow, Numer. Heat Transfer Part A—Applications 40 (7) (2001) 751.

[211] A.S. Telles, E.M. Queiroz, G. Elmor, Solutions of the extended Graetz problem, Int. J. Heat Mass Transfer 44 (2) (2001) 471.

[212] N.M. Thanu, R.L. Sawhney, R.N. Khare, D. Buddhi, An experimental study of the thermal performance of an earth-air-pipe system in single pass mode, Sol. Energy 71 (6) (2001) 353.

[213] I. Tiselj, R. Bergant, B. Mavko, I. Bajsic, G. Hetsroni, DNS of turbulent heat transfer in channel flow with heat conduction in the solid wall, J. Heat Transfer—Trans. ASME 123 (5) (2001) 849.

[214] R. Waxler, Stationary velocity and pressure gradients in a thermoacoustic stack, J. Acoust. Soc. Am. 109 (6) (2001) 2739.

[215] B. Weigand, M. Kanzamar, H. Beer, The extended Graetz problem with piecewise constant wall heat flux for pipe and channel flows, Int. J. Heat Mass Transfer 44 (20) (2001) 3941.

[216] Y. Yamamoto, T. Kunugi, A. Serizawa, Turbulence statistics and scalar transport in an open-channel flow, J. Turbulence 2 (2001) 1.

[217] B. Yu, H. Ozoe, S.W. Churchill, The characteristics of fully developed turbulent convection in a round tube, Chem. Eng. Sci. 56 (5) (2001) 1781.

[218] J.L. Yuan, M. Rokni, B. Sunden, Buoyancy effects on developing laminar gas flow and heat transfer in a rectangular fuel cell duct, Numer. Heat Transfer Part A—Applications 39 (8) (2001) 801.

[219] J.L. Yuan, M. Rokni, B. Sunden, Simulation of fully developed laminar heat and mass transfer in fuel cell ducts with different cross-sections, Int. J. Heat Mass Transfer 44 (21) (2001) 4047.

[220] J.A. Zarate, R.P. Roy, A. Laporta, Isothermal and heated turbulent upflow in a vertical annular channel—Part II. Numerical simulations, Int. J. Heat Mass Transfer 44 (6) (2001) 1185.

[221] G. An, J.M. Li, B.X. Wang, Convective heat transfer for incompressible laminar gas flow in micropassage with constant wall temperature, Sci. China E—Technol. Sci. 44 (2) (2001) 164.

[222] C. Aubert, S. Colin, High-order boundary conditions for gaseous flows in rectangular microducts, Microscale Thermophys. Eng. 5 (1) (2001) 41.

[223] R.S. Bhatia, R.L. Webb, Numerical study of turbulent flow and heat transfer in micro-fin tubes—Part 1, Model validation, J. Enhanc. Heat Transfer 8 (5) (2001) 291.

[224] R.S. Bhatia, R.L. Webb, Numerical study of turbulent flow and heat transfer in micro-fin tubes—Part 2, Parametric study, J. Enhanc. Heat Transfer 8 (5) (2001) 305.

[225] S.M. Ghiaasiaan, T.S. Laker, Turbulent forced convection in microtubes, Int. J. Heat Mass Transfer 44 (14) (2001) 2777.

[226] J.S. Go, S.J. Kim, G. Lim, H. Yun, J. Lee, I. Song, Y.E. Pak, Heat transfer enhancement using flow-induced vibration of a microfin array, Sens. Actuators A—Physical 90 (3) (2001) 232.

[227] W.W. Liou, Y.C. Fang, Heat transfer in microchannel devices using DSMC, J. Microelectromech. Syst. 10 (2) (2001) 274.

[228] D.R. Mott, E.S. Oran, C.R. Kaplan, Microfilter simulations and scaling laws, J. Thermophys. Heat Transfer 15 (4) (2001) 473.

[229] E.Y.K. Ng, S.T. Poh, CFD analysis of double-layer microchannel conjugate parallel liquid flows with electric double-layer effects, Numer. Heat Transfer Part A—Applications 40 (7) (2001) 735.

[230] M.N. Sabry, Transverse temperature gradient effect on fin efficiency for micro-channel design, J. Electron. Packag. 123 (4) (2001) 344.

[231] C.B. Sobhan, S.V. Garimella, A comparative analysis of studies on heat transfer and fluid flow in microchannels, Microscale Thermophys. Eng. 5 (4) (2001) 293.

[232] G. Tunc, Y. Bayazitoglu, Heat transfer in microtubes with viscous dissipation, Int. J. Heat Mass Transfer 44 (13) (2001) 2395.

[233] M. Vasudevaiah, K. Balamurugan, Heat transfer of rarefied gases in a corrugated microchannel, Int. J. Therm. Sci. 40 (5) (2001) 454.

[234] H. Xue, H.M. Ji, C. Shu, Analysis of micro-Couette flow using the Burnett equations, Int. J. Heat Mass Transfer 44 (21) (2001) 4139.

[235] R.J. Yang, L.M. Fu, Y.C. Lin, Electroosmotic flow in microchannels, J. Colloid Interf. Sci. 239 (1) (2001) 98.

[236] S.P. Yu, T.A. Ameel, Slip-flow heat transfer in rectangular microchannels, Int. J. Heat Mass Transfer 44 (22) (2001) 4225.

[237] H. Abbassi, S. Turki, S. Ben Nasrallah, Numerical investigation of forced convection in a plane channel with a built-in triangular prism, Int. J. Therm. Sci. 40 (7) (2001) 649.

[238] A. Bejan, The tree of convective heat streams: its thermal insulation function and the predicted 3/4-power relation between body heat loss and body size, Int. J. Heat Mass Transfer 44 (4) (2001) 699.

[239] H. Brod, Invariance relations for laminar forced convection in ducts with slowly varying cross-section, Int. J. Heat Mass Transfer 44 (5) (2001) 977.

[240] M.J. Colaco, H.R.B. Orlande, Inverse forced convection problem of simultaneous estimation of two boundary heat fluxes in irregularly shaped channels, Numer. Heat Transfer Part A: Applications 39 (7) (2001) 737.

[241] T.Z. Fahidy, F. Coeuret, A re-examination of heat transfer in laminar divergent flow between two parallel fixed discs, Can. J. Chem. Eng. 79 (1) (2001) 132.

[242] P.W. Li, Y. Kawaguchi, H. Daisaka, A. Yabe, K. Hishida, M. Maeda, Heat transfer enhancement to the drag-reducing flow of surfactant solution in two-dimensional channel with mesh-screen inserts at the inlet, J. Heat Transfer—Trans. ASME 123 (4) (2001) 779.

[243] P.W. Li, Y. Kawaguchi, A. Yabe, Transitional heat transfer and turbulent characteristics of drag-reducing flow through a contracted channel, J. Enhanc. Heat Transfer 8 (1) (2001) 23.

[244] S. Masiuk, M. Popielewska, Influence of a mixing device on a convective heat-transfer in a static mixer, Inzynieria Chemiczna i Procesowa 22 (3D) (2001) 911.

[245] T.J. Remley, S.I. Abdel-Khalik, S.M. Jeter, S.M. Ghiaasiaan, M.F. Dowling, Effect of non-uniform heat flux on wall friction and convection heat transfer coefficient in a trapezoidal channel, Int. J. Heat Mass Transfer 44 (13) (2001) 2453.

[246] D.N. Sorensen, S.L. Hvid, M.B. Hansen, K.E. Meyer, Local heat transfer and flow distribution in a three-pass industrial heat exchanger, Int. J. Heat Mass Transfer 44 (16) (2001) 3179.

[247] A. Syuhada, M. Hirota, H. Fujita, S. Araki, M. Yanagida, T. Tanaka, Heat (mass) transfer in serpentine flow passage with rectangular cross-section, Energy Convers. Manage. 42 (15–17) (2001) 1867.

[248] B. Tashtoush, M. Tahat, D. Probert, Heat transfers and radial flows via a viscous fluid squeezed between two parallel disks, Appl. Energy 68 (3) (2001) 275.

[249] S.K. Thomas, R.C. Lykins, K.L. Yerkes, Fully developed laminar flow in trapezoidal grooves with shear stress at the liquid–vapor interface, Int. J. Heat Mass Transfer 44 (18) (2001) 3397.

[250] D.L. Thomson, Y. Bayazitoglu, A.J. Meade, Series solution of low Dean and Germano number flows in helical rectangular ducts, Int. J. Therm. Sci. 40 (11) (2001) 937.

[251] L.M. Ul'ev, Laminar heart transfer in a liquid flowing in a diverging conical annular channel with a varied inner-wall temperature, Theor. Found. Chem. Eng. (English Translation of Teoreticheskie Osnovy Khimicheskoi Tekhnologii) 35 (1) (2001) 30.

[252] L.B. Wang, W.Q. Tao, Q.W. Wang, Y.L. He, Experimental and numerical study of turbulent heat transfer in twisted square ducts, J. Heat Transfer—Trans. ASME 123 (5) (2001) 868.

[253] K. Willenborg, S. Kim, S. Wittig, Effects of Reynolds number and pressure ratio on leakage loss and heat transfer in a stepped labyrinth seal, J. Turbomachine.—Trans. ASME 123 (4) (2001) 815.

[254] S.W. Ahn, Friction factor and heat transfer in equilateral triangular ducts with surface roughness, KSME J. 15 (5) (2001) 639.

[255] K. Bilen, U. Akyol, S. Yapici, Heat transfer and friction correlations and thermal performance analysis for a finned surface, Energy Convers. Manage. 42 (9) (2001) 1071.

[256] C. Castelain, A. Mokrani, Y. Le Guer, H. Peerhossaini, Experimental study of chaotic advection regime in a twisted duct flow, Eur. J. Mech. B—Fluids 20 (2) (2001) 205.

[257] S.W. Chang, Forced convective heat transfer of parallel-mode reciprocating tube fitted with a twisted tape with application to piston cooling, J. Eng. Gas Turbines Power—Trans. ASME 123 (1) (2001) 146.

[258] S.W. Chang, L.M. Su, Heat transfer of reciprocating helical tube fitted with full circumferential ribs, Int. J. Heat Mass Transfer 44 (16) (2001) 3025.

[259] W.S. Fu, W.W. Ke, K.N. Wang, Laminar forced convection in a channel with a moving block, Int. J. Heat Mass Transfer 44 (13) (2001) 2385.

[260] X. Gao, B. Sunden, Heat transfer distribution in rectangular ducts with V-shaped ribs, Heat Mass Transfer 37 (4–5) (2001) 315.

[261] X.F. Gao, B. Sunden, Heat transfer and pressure drop measurements in rib-roughened rectangular ducts, Exp. Therm. Fluid Sci. 24 (1) (2001).

[262] C. Herman, E. Kang, Comparative evaluation of three heat transfer enhancement strategies in a grooved channel, Heat Mass Transfer 37 (6) (2001) 563.

[263] S.S. Hsieh, L.C. Chang, T.Y. Yang, Developing 3-D turbulent mixed convection in a circular duct inserted with longitudinal strips, Int. J. Eng. Sci. 39 (12) (2001) 1327.

[264] J.J. Hwang, C.C. Lu, Lateral-flow effect on endwall heat transfer and pressure drop in a pin-fin trapezoidal duet of various pin shapes, J. Turbomachine.—Trans. ASME 123 (1) (2001) 133.

[265] H. Iacovides, M. Raisee, Computation of flow and heat transfer in two-dimensional rib-roughened passages, using low-Reynolds-number turbulence models, Int. J. Numer. Meth. Heat Fluid Flow 11 (2–3) (2001) 138.

[266] Y.J. Jang, H.C. Chen, J.C. Han, Computation of flow and heat transfer in two-pass channels with 60° ribs, J. Heat Transfer—Trans. ASME 123 (3) (2001) 563.

[267] R. Kiml, S. Mochizuki, A. Murata, Effects of rib arrangements on heat transfer and flow behavior in a rectangular rib-roughened passage: application to cooling of gas turbine blade trailing edge, J. Heat Transfer—Trans. ASME 123 (4) (2001) 675.

[268] C.W. Leung, T.L. Chan, S. Chen, Forced convection and friction in triangular duct with uniformly spaced square ribs on inner surfaces, Heat Mass Transfer 37 (1) (2001) 19.

[269] C.W. Leung, T.T. Wong, S.D. Probert, Enhanced forced-convection from ribbed or machine-roughened inner surfaces within triangular ducts, Appl. Energy 69 (2) (2001) 87.

[270] P.M. Ligrani, G.I. Mahmood, J.L. Harrison, C.M. Clayton, D.L. Nelson, Flow structure and local Nusselt number variations in a channel with dimples and protrusions on opposite walls, Int. J. Heat Mass Transfer 44 (23) (2001) 4413.

[271] X.Y. Liu, M.K. Jensen, Geometry effects on turbulent flow and heat transfer in internally finned tubes, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1035.

[272] G.I. Mahmood, M.L. Hill, L. Nelson, P.M. Ligrani, H.K. Moon, B. Glezer, Local heat transfer and flow structure on and above a dimpled surface in a channel, J. Turbomachine.—Trans. ASME 123 (1) (2001) 115.

[273] G.I. Mahmood, M.Z. Sabbagh, P.M. Ligrani, Heat-transfer in a channel with dimples and protrusions on opposite walls, J. Thermophys. Heat Transfer 15 (3) (2001) 275.

[274] R. Matsumoto, S. Kikkawa, M. Senda, M. Suzuki, Heat transfer characteristics of an endwall with single

row of oblique pin fins, JSME Int. J. B—Fluids Therm. Eng. 44 (4) (2001) 599.

[275] Y. Miyake, K. Tsujimoto, M. Nakaji, Direct numerical simulation of rough-wall heat transfer in a turbulent channel flow, Int. J. Heat Fluid Flow 22 (3) (2001) 237.

[276] A. Murata, S. Mochizuki, Comparison between laminar and turbulent heat transfer in a stationary square duct with transverse or angled rib turbulators, Int. J. Heat Mass Transfer 44 (6) (2001) 1127.

[277] S. Ray, A.W. Date, Laminar flow and heat transfer through square duct with twisted tape insert, Int. J. Heat Fluid Flow 22 (4) (2001) 460.

[278] J.L. Rosales, A. Ortega, J.A.C. Humphrey, A numerical simulation of the convective heat transfer in confined channel flow past square cylinders: comparison of inline and offset tandem pairs, Int. J. Heat Mass Transfer 44 (3) (2001) 587.

[279] S.K. Saha, A. Dutta, Thermohydraulic study of laminar swirl flow through a circular tube fitted with twisted tapes, J. Heat Transfer—Trans. ASME 123 (3) (2001) 417.

[280] S.K. Saha, A. Dutta, S.K. Dhal, Friction and heat transfer characteristics of laminar swirl flow through a circular tube fitted with regularly spaced twisted-tape elements, Int. J. Heat Mass Transfer 44 (22) (2001) 4211.

[281] A. Saidi, B. Sunden, On prediction of thermal-hydraulic characteristics of square-sectioned ribbed cooling ducts, J. Turbomachine.—Trans. ASME 123 (3) (2001) 614.

[282] O.N. Sara, T. Pekdemir, S. Yapici, M. Yilmaz, Enhancement of heat transfer from a flat surface in a channel flow by attachment of rectangular blocks, Int. J. Energy Res. 25 (7) (2001) 563.

[283] O.N. Sara, T. Pekdemir, S. Yapici, M. Yilmaz, Heat-transfer enhancement in a channel flow with perforated rectangular blocks, Int. J. Heat Fluid Flow 22 (5) (2001) 509.

[284] L.F. Silva, L.D.F. Marczak, S.V. Moller, Determination of the local heat transfer coefficient in pipes with helical turbulence promoters through the naphthalene sublimation technique, Latin Am. Appl. Res. 31 (5) (2001) 495.

[285] A. Sokankar, L. Davidson, Effect of inclined vortex generators on heat transfer enhancement in a three-dimensional channel, Numer. Heat Transfer Part A—Applications 39 (5) (2001) 433.

[286] G. Tanda, Heat transfer and pressure drop in a rectangular channel with diamond-shaped elements, Int. J. Heat Mass Transfer 44 (18) (2001) 3529.

[287] D. Thurman, P. Poinsatte, Experimental heat transfer and bulk air temperature measurements for a multipass internal cooling model with ribs and bleed, J. Turbomachine.—Trans. ASME 123 (1) (2001) 90.

[288] L.B. Wang, W.Q. Tao, Q.W. Wang, T.T. Wong, Experimental study of developing turbulent flow and heat transfer in ribbed convergent/divergent square ducts, Int. J. Heat Fluid Flow 22 (6) (2001) 603.

[289] S. Wang, Z.Y. Guo, Z.X. Li, Heat transfer enhancement by using metallic filament insert in channel flow, Int. J. Heat Mass Transfer 44 (7) (2001) 1373.

[290] D. Yang, H.X. Li, T.K. Chen, Pressure drop, heat transfer and performance of single-phase turbulent flow in spirally corrugated tubes, Exp. Therm. Fluid Sci. 24 (3–4) (2001) 131.

[291] V. Zimparov, Enhancement of heat transfer by a combination of three-start spirally corrugated tubes with a twisted tape, Int. J. Heat Mass Transfer 44 (3) (2001) 551.

[292] T. Adachi, H. Uehara, Correlation between heat transfer and pressure drop in channels with periodically grooved parts, Int. J. Heat Mass Transfer 44 (22) (2001) 4333.

[293] C. Herman, E. Kang, Experimental visualization of temperature fields and study of heat transfer enhancement in oscillatory flow in a grooved channel, Heat Mass Transfer 37 (1) (2001) 87.

[294] S.P. Kearney, A.M. Jacobi, R.P. Lucht, Time-resolved thermal boundary-layer structure in a pulsatile reversing channel flow, J. Heat Transfer—Trans. ASME 123 (4) (2001) 655.

[295] P.V. Korolev, A.P. Kryukov, Unsteady-state flow of liquid of high thermal conductivity in a vapor-filled capillary in the presence of longitudinal heat flux, High Temp.—USSR 39 (2) (2001) 315.

[296] B. Niceno, E. Nobile, Numerical analysis of fluid flow and heat transfer in periodic wavy channels, Int. J. Heat Fluid Flow 22 (2) (2001) 156.

[297] H.Z. Tang, P. Cheng, K. Xu, Numerical simulations of resonant oscillations in a tube, Numer. Heat Transfer Part A—Applications 40 (1) (2001) 37.

[298] A. Valencia, J.S. Martin, R. Gormaz, Numerical study of the unsteady flow and heat transfer in channels with periodically mounted square bars, Heat Mass Transfer 37 (2–3) (2001) 265.

[299] L.Z. Zhang, J.L. Niu, A numerical study of laminar forced convection in sinusoidal ducts with arc lower boundaries under uniform wall temperature, Numer. Heat Transfer Part A—Applications 40 (1) (2001) 55.

[300] M. Choi, K. Cho, Effect of the aspect ratio of rectangular channels on the heat transfer and hydrodynamics of paraffin slurry flow, Int. J. Heat Mass Transfer 44 (1) (2001) 55.

[301] J.R. Herrera-Velarde, R. Zenit, B. Mena, Viscous dissipation of a power law fluid in an oscillatory pipe flow, Revista Mexicana de Fisica 47 (4) (2001) 351.

[302] D.B.R. Kenning, Y.Y. Yan, Saturated flow boiling of water in a narrow channel: experimental investigation of local phenomena, Chem. Eng. Res. Des. 79 (A4) (2001) 425.

[303] D. Kim, Heat transfer correlations for air–water two-phase flow of different flow patterns in a horizontal pipe, KSME J. 15 (12) (2001) 1711.

[304] D.R. Lee, S. Park, Predictions of heat transfer and pressure drop for a modified power law fluid flow in a square duct, Kor. J. Chem. Eng. 18 (3) (2001) 277.

[305] K.D.P. Nigam, S. Agarwal, V.K. Srivastava, Laminar convection of non-Newtonian fluids in the thermal entrance region of coiled circular tubes, Chem. Eng. J. 84 (3) (2001) 223.

[306] S. Park, D.R. Lee, Anomalous predictions of pressure drop and heat transfer in ducts of arbitrary

cross-section with modified power law fluids, Heat Mass Transfer 38 (1–2) (2001) 141.
[307] R.A. Sorensen, J.D. Seader, B.S. Brewster, Pressure drop and heat transfer for cocurrent upflow of dilute gas–coal particle suspensions in a circular tube, Ind. Eng. Chem. Res. 40 (1) (2001) 457.
[308] M.J.G. Viana, U.C.S. Nascimento, J.N.N. Quaresma, E.N. Macedo, Integral transform method for laminar heat transfer convection of Herschel–Bulkley fluids within concentric annular ducts, Braz. J. Chem. Eng. 18 (4) (2001) 337.
[309] M.R. Zareifard, H.S. Ramaswamy, Evaluation of tube-flow fluid-to-particle heat transfer coefficients under controlled particle oscillatory motion, Food Res. Int. 34 (4) (2001) 289.
[310] H.I. Abu-Mulaweh, B.F. Armaly, T.S. Chen, Turbulent mixed convection flow over a backward-facing step, Int. J. Heat Mass Transfer 44 (14) (2001) 2661.
[311] E.H. Ahmad, H.M. Badr, Mixed convection from an elliptic tube placed in a fluctuating free stream, Int. J. Eng. Sci. 39 (6) (2001) 669.
[312] P. Bagchi, M.Y. Ha, S. Balachandar, Direct numerical simulation of flow and heat transfer from a sphere in a uniform cross-flow, J. Fluids Eng.—Trans. ASME 123 (2) (2001) 347.
[313] A. Bhunia, Y. Kamotani, Flow around a bubble on a heated wall in a cross-flowing liquid under microgravity condition, Int. J. Heat Mass Transfer 44 (20) (2001) 3895.
[314] K.W. Cassel, The effect of convective heat transfer on unsteady boundary-layer separation, J. Fluid Mech. 428 (2001) 107.
[315] T.S. Chang, Y.L. Tsay, Natural convection heat transfer in an enclosure with a heated backward step, Int. J. Heat Mass Transfer 44 (20) (2001) 3963.
[316] P.G. Daniels, J.T. Ratnanather, On the thermal field of a separating wall jet, J. Eng. Math. 41 (4) (2001) 329.
[317] R.A. East, J.A. Edwards, Hypersonic missiles—some problem areas, Aeronaut. J. 105 (1053) (2001) 643.
[318] W.S. Fu, S.J. Yang, Heat transfer induced by a body moving in opposition to a flowing fluid, Int. J. Heat Mass Transfer 44 (1) (2001) 89.
[319] C. Gau, S.X. Wu, H.S. Su, Synchronization of vortex shedding and heat transfer enhancement over a heated cylinder oscillating with small amplitude in streamwise direction, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1139.
[320] R.J. Goldstein, B.Y. He, Energy separation and acoustic interaction in flow across a circular cylinder, J. Heat Transfer—Trans. ASME 123 (4) (2001) 682.
[321] K. Hozumi, Y. Yamamoto, K. Fujii, J.P. Ledy, D. Devezeaux, J. Fontaine, Investigation of hypersonic compression ramp heating at high angles of attack, J. Spacecraft Rockets 38 (4) (2001) 488.
[322] T. Igarashi, Y. Mayumi, Fluid flow and heat transfer around a rectangular cylinder with small inclined angle (the case of a width/height ratio of a section of 5), Int. J. Heat Fluid Flow 22 (3) (2001) 279.
[323] T.C. Jue, H.W. Wu, S.Y. Huang, Heat transfer predictions around three heated cylinders between two parallel plates, Numer. Heat Transfer Part A—Applications 40 (7) (2001) 715.
[324] G. Juncu, Unsteady heat and/or mass transfer from a fluid sphere in creeping flow, Int. J. Heat Mass Transfer 44 (12) (2001) 2239.
[325] A.M. Leshansky, O.M. Lavrenteva, A. Nir, Thermocapillary migration of bubbles: convective effects at low Peclet number, J. Fluid Mech. 443 (2001) 377.
[326] A.M. Leshansky, A. Nir, Thermocapillary alignment of gas bubbles induced by convective transport, J. Colloid Interf. Sci. 240 (2) (2001) 544.
[327] L. Mathelin, F. Bataille, A. Lallemand, Near wake of a circular cylinder submitted to blowing—I. Boundary layers evolution, Int. J. Heat Mass Transfer 44 (19) (2001) 3701.
[328] H. Nakamura, T. Igarashi, T. Tsutsui, Fluid flow and local heat transfer around two cubes arranged in tandem on a flat plate turbulent boundary layer, JSME Int. J. B—Fluids Therm. Eng. 44 (4) (2001) 584.
[329] J.E. O'Brien, M.S. Sohal, Local fin-surface heat transfer for flow around a circular cylinder with and without vortex-generating winglets, J. Heat Transfer—Trans. ASME 123 (4) (2001) 623.
[330] G. Papadakis, G. Bergeles, Numerical simulation of the flow and heat transfer around a cylinder with a pulsating approaching flow at a low Reynolds number, Proc. Inst. Mech. Eng. Part C—J. Mech. Eng. Sci. 215 (1) (2001) 105.
[331] H.G. Park, M. Gharib, Experimental study of heat convection from stationary and oscillating circular cylinder in cross flow, J. Heat Transfer—Trans. ASME 123 (1) (2001) 51.
[332] O.A. Powell, J.P. Bons, Heat transfer to the inclined trailing wall of an open cavity, J. Thermophys. Heat Transfer 15 (3) (2001) 293.
[333] R.C.K. Rock, M.F. Lightstone, A numerical investigation of turbulent interchange mixing of axial coolant flow in rod bundle geometries, Numer. Heat Transfer Part A—Applications 40 (3) (2001) 221.
[334] S. Roy, Non-uniform mass transfer or wall enthalpy into a compressible flow over yawed cylinder, Int. J. Heat Mass Transfer 44 (16) (2001) 3017.
[335] S. Sanitjai, R.J. Goldstein, Effect of free stream turbulence on local mass transfer from a circular cylinder, Int. J. Heat Mass Transfer 44 (15) (2001) 2863.
[336] T. Tsutsui, T. Igarashi, H. Nakamura, Drag reduction and heat transfer enhancement of a square prism, JSME Int. J. B—Fluids Therm. Eng. 44 (4) (2001) 575.
[337] E.B. Vasilevskii, L.A. Dombrovskii, D.S. Mikhatulin, Y.V. Polezhaev, Heat transfer in the neighborhood of the stagnation point under conditions of hypersonic heterogeneous slip flow past bodies, High Temp. 39 (6) (2001) 860.
[338] A.I. Volokitin, B.N.J. Persson, The frictional drag force between quantum wells mediated by a fluctuating electromagnetic field, J. Phys.—Condens. Matter 13 (5) (2001) 859.
[339] A. Wadewitz, E. Specht, Limit value of the Nusselt number for particles of different shape, Int. J. Heat Mass Transfer 44 (5) (2001) 967.

[340] A.B. Wang, Z. Travnicek, On the linear heat transfer correlation of a heated circular cylinder in laminar crossflow using a new representative temperature concept, Int. J. Heat Mass Transfer 44 (24) (2001) 4635.
[341] J.T. Yang, J.D. Gu, W.J. Ma, Transient cooling effect by wall mass injection after backstep in high temperature flow field, Int. J. Heat Mass Transfer 44 (4) (2001) 843.
[342] S.J. Yang, W.S. Fu, Numerical investigation of heat transfer from a heated oscillating rectangular cylinder in a cross flow, Numer. Heat Transfer Part A—Applications 39 (6) (2001) 569.
[343] B. Alazmi, K. Vafai, Analysis of fluid flow and heat transfer interfacial conditions between a porous medium and a fluid layer, Int. J. Heat Mass Transfer 44 (9) (2001) 1735.
[344] R.A. Bortolozzi, J.A. Deiber, Comparison between two- and one-field models for natural convection in porous media, Chem. Eng. Sci. 56 (1) (2001) 157.
[345] M.J.S. de Lemos, M.H.J. Pedras, Recent mathematical models for turbulent flow in saturated rigid porous media, J. Fluids Eng.—Trans. ASME 123 (4) (2001) 935.
[346] V.E. Dontsov, V.E. Nakoryakov, Enhancement of shock waves in a porous medium saturated with a liquid containing soluble-gas bubbles, Int. J. Multiphase Flow 27 (12) (2001) 2023.
[347] K.T. Harris, A. Haji-Sheikh, A.G.A. Nnanna, Phase-change phenomena in porous media—a non-local thermal equilibrium model, Int. J. Heat Mass Transfer 44 (8) (2001) 1619.
[348] E. Holzbecher, On the relevance of oscillatory convection regimes in porous media—review and numerical experiments, Comput. Fluids 30 (2) (2001) 189.
[349] R. Jecl, L. Skerget, E. Petresin, Boundary domain integral method for transport phenomena in porous media, Int. J. Numer. Meth. Fluids 35 (1) (2001) 39.
[350] P.X. Jiang, Z.P. Ren, Numerical investigation of forced convection heat transfer in porous media using a thermal non-equilibrium model, Int. J. Heat Fluid Flow 22 (1) (2001) 102.
[351] N. Khalili, B. Loret, An elasto-plastic model for non-isothermal analysis of flow and deformation in unsaturated porous media: formulation, Int. J. Solids Struct. 38 (46–47) (2001) 8305.
[352] S.J. Kim, D. Kim, Thermal interaction at the interface between a porous medium and an impermeable wall, J. Heat Transfer—Trans. ASME 123 (3) (2001) 527.
[353] F. Kuwahara, M. Shirota, A. Nakayama, A numerical study of interfacial convective heat transfer coefficient in two-energy equation model for convection in porous media, Int. J. Heat Mass Transfer 44 (6) (2001) 1153.
[354] J.C. Leong, F.C. Lai, Effective permeability of a layered porous cavity, J. Heat Transfer—Trans. ASME 123 (3) (2001) 512.
[355] E. Magyari, I. Pop, B. Keller, Exact dual solutions occurring in the Darcy mixed convection flow, Int. J. Heat Mass Transfer 44 (23) (2001) 4563.
[356] G. Massarani, A.S. Telles, An extended capillary model for flows in porous media, J. Porous Media 4 (4) (2001) 297.
[357] N. Massarotti, P. Nithiarasu, O.C. Zienkiewicz, Natural convection in porous medium-fluid interface problems—a finite element analysis by using the CBS procedure, Int. J. Numer. Meth. Heat Fluid Flow 11 (5–6) (2001) 473.
[358] A. Nakayama, F. Kuwahara, M. Sugiyama, G.L. Xu, A two-energy equation model for conduction and convection in porous media, Int. J. Heat Mass Transfer 44 (22) (2001) 4375.
[359] F.M. Neto, S.T. Melo, Darcy's law for a heterogeneous porous medium, J. Porous Media 4 (2) (2001) 165.
[360] P. Nithiarasu, A comparative study on the performance of two time stepping schemes for convection in a fluid saturated porous medium, Int. J. Numer. Meth. Heat Fluid Flow 11 (4) (2001) 308.
[361] M.H.J. Pedras, M.J.S. de Lemos, Macroscopic turbulence modeling for incompressible flow through undeformable porous media, Int. J. Heat Mass Transfer 44 (6) (2001) 1081.
[362] M.H.J. Pedras, M.J.S. de Lemos, On the mathematical description and simulation of turbulent flow in a porous medium formed by an array of elliptic rods, J. Fluids Eng.—Trans. ASME 123 (4) (2001) 941.
[363] M.H.J. Pedras, M.J.S. de Lemos, Simulation of turbulent flow in porous media using a spatially periodic array and a low Re two-equation closure, Numer. Heat Transfer Part A—Applications 39 (1) (2001) 35.
[364] N. Rudraiah, Nonlinear study of stratified fluid through porous media, J. Porous Media 4 (2) (2001) 127.
[365] M.Z. Saghir, M. Nejad, H.H. Vaziri, M.R. Islam, Modeling of heat and mass transfer in a fractured porous medium, Int. J. Comput. Fluid Dyn. 15 (4) (2001) 279.
[366] P. Vadasz, Heat transfer regimes and hysteresis in porous media convection, J. Heat Transfer—Trans. ASME 123 (1) (2001) 145.
[367] W. Wang, A. Prosperetti, Flow of spatially non-uniform suspensions. Part III. Closure relations for porous media and spinning particles, Int. J. Multiphase Flow 27 (9) (2001) 1627.
[368] S.J. Ying, Y.C. Lam, S.C.M. Yu, K.C. Tam, Two-dimensional simulation of mass transport in polymer removal from a powder injection molding compact by thermal debinding, J. Mater. Res. 16 (8) (2001) 2436.
[369] S.V. Bondarenko, S.G. Garanin, G.A. Kirillov, Y.F. Kir'yanov, G.G. Kochemasov, Energy transfer in a volume-structured medium, Quantum Electron. 31 (1) (2001) 39.
[370] M. Bonnissel, L. Luo, D. Tondeur, Compacted exfoliated natural graphite as heat conduction medium, Carbon 39 (14) (2001) 2151.
[371] A.A. Garrouch, L. Ali, F. Qasem, Using diffusion and electrical measurements to assess tortuosity of porous media, Ind. Eng. Chem. Res. 40 (20) (2001) 4363.
[372] S. Gu, T.J. Lu, A.G. Evans, On the design of two-dimensional cellular metals for combined heat

dissipation and structural load capacity, Int. J. Heat Mass Transfer 44 (11) (2001) 2163.
[373] J.H. Han, K.H. Lee, Gas permeability of expanded graphite-metallic salt composite, Appl. Therm. Eng. 21 (4) (2001) 453.
[374] X.J. Hu, J.H. Du, S.Y. Lei, B.X. Wang, A model for the thermal conductivity of unconsolidated porous media based on capillary pressure-saturation relation, Int. J. Heat Mass Transfer 44 (1) (2001) 247.
[375] S. Kikuchi, Numerical analysis model for thermal conductivities of packed beds with high solid-to-gas conductivity ratio, Int. J. Heat Mass Transfer 44 (6) (2001) 1213.
[376] R. Lopes, L.M. Moura, D. Baillis, Directional spectral emittance of a packed bed: correlation between theoretical prediction and experimental data, J. Heat Transfer—Trans. ASME 123 (2) (2001) 240.
[377] I. Malico, J.C.F. Pereira, Numerical study on the influence of radiative properties in porous media combustion, J. Heat Transfer—Trans. ASME 123 (5) (2001) 951.
[378] R. Neffati, J. Rault, Pore size distribution in porous glass: fractal dimension obtained by calorimetry, Eur. Phys. J. B 21 (2) (2001) 205.
[379] N. Ngo, K.K. Tamma, Microscale permeability predictions of porous fibrous media, Int. J. Heat Mass Transfer 44 (16) (2001) 3135.
[380] T.D. Papathanasiou, Flow across structured fiber bundles: a dimensionless correlation, Int. J. Multiphase Flow 27 (8) (2001) 1451.
[381] T.D. Papathanasiou, B. Markicevic, E.D. Dendy, A computational evaluation of the Ergun and Forchheimer equations for fibrous porous media, Phys. Fluids 13 (10) (2001) 2795.
[382] G.I. Petrunin, V.G. Popov, V.M. Ladygin, Thermal properties of basalts from the Bouvet triple junction and their implications for petrophysical characteristics, Izvestiya—Phys. Solid Earth 37 (6) (2001) 441.
[383] D. Wildenschild, J.J. Roberts, Experimental tests of enhancement of vapor diffusion in Topopah Spring Tuff, J. Porous Media 4 (1) (2001) 1.
[384] W. Zheng, L. Robillard, P. Vasseur, Convection in a square cavity filled with an anisotropic porous medium saturated with water near 4 °C, Int. J. Heat Mass Transfer 44 (18) (2001) 3463.
[385] M.S. Abel, S.K. Khan, K.V. Prasad, Convective heat and mass transfer in a visco-elastic fluid flow through a porous medium over a stretching sheet, Int. J. Numer. Meth. Heat Fluid Flow 11 (8) (2001) 779.
[386] E.M. Abo-Eldahab, M.S. El Gendy, Convective heat transfer past a continuously moving plate embedded in a non-Darcian porous medium in the presence of a magnetic field, Can. J. Phys. 79 (7) (2001) 1031.
[387] B.A.K. Abu-Hijleh, Laminar forced convection heat transfer from a cylinder covered with an orthotropic porous layer in cross-flow, Int. J. Numer. Meth. Heat Fluid Flow 11 (2) (2001).
[388] B.A.K. Abu-Hijleh, Natural convection heat transfer from a cylinder covered with an orthotropic porous layer, Numer. Heat Transfer Part A—Applications 40 (7) (2001) 767.
[389] N. Beithou, H.S. Aybar, K. Albayrak, O. Erenay, Free convection flow of Newtonian fluid along a vertical plate embedded in a double layer porous medium, JSME Int. J. B—Fluids Therm. Eng. 44 (2) (2001) 255.
[390] A.J. Chamkha, M.M.A. Quadri, Heat and mass transfer from a permeable cylinder in a porous medium with magnetic field and heat generation/absorption effects, Numer. Heat Transfer Part A—Applications 40 (4) (2001) 387.
[391] M.A. El-Hakiem, Combined convection in non-Newtonian fluids along a nonisothermal vertical plate in a porous medium with lateral mass flux, Heat Mass Transfer 37 (4–5) (2001) 379.
[392] M.A. El-Hakiem, M.F. El-Amin, Mass transfer effects on the non-Newtonian fluids past a vertical plate embedded in a porous medium with non-uniform surface heat flux, Heat Mass Transfer 37 (2–3) (2001) 293.
[393] M.A. El-Hakiem, M.F. El-Amin, Thermal radiation effect on non-Darcy natural convection with lateral mass transfer, Heat Mass Transfer 37 (2–3) (2001) 161.
[394] E.M.A. Elbashbeshy, Laminar mixed convection over horizontal flat plate embedded in a non-Darcian porous medium with suction and injection, Appl. Math. Comput. 121 (2–3) (2001) 123.
[395] Y. Fujii, W.E. Tobler, T.D. Snyder, Prediction of wet band brake dynamic engagement behaviour—Part 1: Mathematical model development, Proc. Inst. Mech. Eng., Part D, J. Automobile Eng. 215 (D5) (2001) 479.
[396] Y. Fujii, W.E. Tobler, T.D. Snyder, Prediction of wet band brake dynamic engagement behaviour—Part 2: Experimental model validation, Proc. Inst. Mech. Eng., Part D, J. Automobile Eng. 215 (D5) (2001) 603.
[397] M.A. Hossain, I. Pop, Radiation effects on free convection over a vertical flat plate embedded in a porous medium with high porosity, Int. J. Therm. Sci. 40 (3) (2001) 289.
[398] B.S. Jaiswal, V.M. Soundalgekar, Oscillating plate temperature effects on a flow past an infinite vertical porous plate with constant suction and embedded in a porous medium, Heat Mass Transfer 37 (2–3) (2001) 125.
[399] R.Y. Jumah, F.A. Banat, F. Abu-Al-Rub, Darcy–Forchheimer mixed convection heat and mass transfer in fluid saturated porous media, Int. J. Numer. Meth. Heat Fluid Flow 11 (5) (2001).
[400] R.Y. Jumah, A.S. Mujumdar, Natural convection heat and mass transfer from a vertical flat plate with variable wall temperature and concentration to power-law fluids with yield stress in a porous medium, Chem. Eng. Commun. 185 (2001) 165.
[401] Y.J. Kim, The Falkner–Skan wedge flows of power-law fluids embedded in a porous medium, Transport Porous Media 44 (2) (2001) 267.
[402] Y.J. Kim, Unsteady convection flow of micropolar fluids past a vertical porous plate embedded in a porous medium, Acta Mech. 148 (1–4) (2001) 105.
[403] S. Kiwan, M.A. Al-Nimr, Using porous fins for heat transfer enhancement, J. Heat Transfer—Trans. ASME 123 (4) (2001) 790.

[404] M. Kumari, H.S. Takhar, G. Nath, Mixed convection flow over a vertical wedge embedded in a highly porous medium, Heat Mass Transfer 37 (2) (2001).

[405] V.N. Kurdyumov, A. Linan, Free and forced convection around line sources of heat and heated cylinders in porous media, J. Fluid Mech. 427 (2001) 389.

[406] A.A. Mohamad, Natural convection from a vertical plate in a saturated porous medium: nonequilibrium theory, J. Porous Media 4 (2) (2001) 181.

[407] P. Murthy, Effect of viscous dissipation on mixed convection in a non-Darcy porous medium, J. Porous Media 4 (1) (2001) 23.

[408] A.F. Polyakov, D.L. Reviznikov, Q. Shen, J.R. Tang, S.R. Wei, Conjugate model for heat and mass transfer of porous wall in the high temperature gas flow, Acta Mech. Sinica 17 (3) (2001) 245.

[409] M. Prakash, O.F. Turan, Y.G. Li, J. Mahoney, G.R. Thorpe, Impinging round jet studies in a cylindrical enclosure with and without a porous layer: Part II—LDV measurements and simulations, Chem. Eng. Sci. 56 (12) (2001) 3879.

[410] M. Prakesh, O.F. Turan, Y.G. Li, J. Mahoney, G.R. Thorpe, Impinging round jet studies in a cylindrical enclosure with and without a porous layer: Part I—Flow visualisations and simulations, Chem. Eng. Sci. 56 (12) (2001) 3855.

[411] A. Raptis, Radiation and flow through a porous medium, J. Porous Media 4 (3) (2001) 271.

[412] D.A.S. Rees, I. Pop, The effect of g-jitter on free convection near a stagnation point in a porous medium, Int. J. Heat Mass Transfer 44 (4) (2001) 877.

[413] B.A. Abu-Hijleh, M.A. Al-Nimr, The effect of the local inertial term on the fluid flow in channels partially filled with porous material, Int. J. Heat Mass Transfer 44 (8) (2001) 1565.

[414] A.K. Al-Hadhrami, L. Elliott, D.B. Ingham, X. Wen, Analytical solutions of fluid flows through composite channels, J. Porous Media 4 (2) (2001) 149.

[415] M.A. Al-Nimr, M.A. Hader, M. Naji, Transient pulsating flow in channels partially filled with a porous material, J. Porous Media 4 (2) (2001) 187.

[416] Z. Al-Qodah, M. Al-Busoul, M. Al-Hassan, Hydrothermal behavior of magnetically stabilized fluidized beds, Powder Technol. 115 (1) (2001) 58.

[417] M.K. Alkam, M.A. Al-Nimr, M.O. Hamdan, Enhancing heat transfer in parallel-plate channels by using porous inserts, Int. J. Heat Mass Transfer 44 (5) (2001) 931.

[418] O. Bey, G. Eigenberger, Gas flow and heat transfer through catalyst filled tubes, Int. J. Therm. Sci. 40 (2) (2001) 152.

[419] J.G. Boelhouwer, H.W. Piepers, A.A.H. Drinkenburg, Particle-liquid heat transfer in trickle-bed reactors, Chem. Eng. Sci. 56 (3) (2001) 1181.

[420] C. Breitholtz, B. Leckner, A.P. Baskakov, Wall average heat transfer in CFB boilers, Powder Technol. (special issue SI) (2001) 41.

[421] C.Y. Chen, S.W. Wang, Miscible displacement of a layer with finite width in porous media, Int. J. Numer. Meth. Heat Fluid Flow 11 (8) (2001) 761.

[422] G.H. Chen, W. Wang, A.S. Mujumdar, Theoretical study of microwave heating patterns on batch fluidized bed drying of porous material, Chem. Eng. Sci. 56 (24) (2001) 6823.

[423] S. Chiba, S. Toda, K. Yuki, A. Sagara, Heat transfer enhancement for a molten salt FLiBe channel, Fusion Technol. (art 2) (2001) 779.

[424] Y.J. Cho, S.J. Kim, S.H. Nam, Y. Kang, S.D. Kim, Heat transfer and bubble properties in three-phase circulating fluidized beds, Chem. Eng. Sci. 56 (21–22) (2001) 6107.

[425] C. Cui, X.Y. Huang, C.Y. Liu, Forced convection in a porous channel with discrete heat sources, J. Heat Transfer—Trans. ASME 123 (2) (2001) 404.

[426] A.G. Dixon, M. Nijemeisland, CFD as a design tool for fixed-bed reactors, Ind. Eng. Chem. Res. 40 (23) (2001) 5246.

[427] J.H. Du, X.J. Hu, B. Ma, W. Wu, B.X. Wang, Infrared experiment on the wall temperature distribution for a particle packed channel with constant heat flux, Chin. Sci. Bull. 46 (18) (2001) 1566.

[428] H.J. Franke, T. Shimizu, Y. Takano, S. Hori, M. Strziga, M. Inagaki, M. Tanaka, Reduction of devolatilization rate of fuel during bubbling fluidized bed combustion using porous bed material, Chem. Eng. Technol. 24 (7) (2001) 725.

[429] H.L. Fu, K.C. Leong, X.Y. Huang, C.Y. Liu, An experimental study of heat transfer of a porous channel subjected to oscillating flaw, J. Heat Transfer—Trans. ASME 123 (1) (2001) 162.

[430] W.S. Fu, K.N. Wang, W.W. Ke, Heat transfer of porous medium with random porosity model in a laminar channel flow, Chung-Kuo Kung Ch'Eng Hsueh K'An/J. Chin. Inst. Eng. 24 (4) (2001) 431.

[431] R. Gort, J.J.H. Brouwers, Theoretical analysis of the propagation of a reaction front in a packed bed, Combust. Flame 124 (1–2) (2001) 1.

[432] K.L. Hohn, L.D. Schmidt, Partial oxidation of methane to syngas at high space velocities over Rh-coated spheres, Appl. Catal. A—General 211 (1) (2001) 53.

[433] K.T. Hsiao, H. Laudorn, S.G. Advani, Experimental investigation of heat dispersion due to impregnation of viscous fluids in heated fibrous porous curing composites processing, J. Heat Transfer—Trans. ASME 123 (1) (2001) 178.

[434] J.C. Jin, C.S. Campbell, Constitutive parameters for liquid-fluidized beds, Int. J. Multiphase Flow 27 (10) (2001) 1803.

[435] K. Khanafer, K. Vafai, Isothermal surface production and regulation for high heat flux applications utilizing porous inserts, Int. J. Heat Mass Transfer 44 (15) (2001) 2933.

[436] S.Y. Kim, J.M. Koo, A.V. Kuznetsov, Effect of anisotropy in permeability and effective thermal conductivity on thermal performance of an aluminum foam heat sink, Numer. Heat Transfer Part A—Applications 40 (1) (2001) 21.

[437] S. Knez, J. Strazisar, J. Golob, A. Horvat, Agglomeration of zeolite in the fluidized bed, Acta Chim. Slovenica 48 (4) (2001) 487.

[438] A.V. Kuznetsov, D.A. Nield, Effects of heterogeneity in forced convection in a porous medium: triple layer or conjugate problem, Numer. Heat Transfer Part A—Applications 40 (4) (2001) 363.
[439] D. Lathouwers, J. Bellan, Modeling of dense gas–solid reactive mixtures applied to biomass pyrolysis in a fluidized bed, Int. J. Multiphase Flow 27 (12) (2001) 2155.
[440] H. Li, A. Prakash, Survey of heat transfer mechanisms in a slurry bubble column, Can. J. Chem. Eng. 79 (5) (2001) 717.
[441] A. Marafie, K. Vafai, Analysis of non-Darcian effects on temperature differentials in porous media, Int. J. Heat Mass Transfer 44 (23) (2001) 4401.
[442] N.J. Mariani, O.M. Martinez, G.F. Barreto, Evaluation of heat transfer parameters in packed beds with cocurrent downflow of liquid and gas, Chem. Eng. Sci. 56 (21–22) (2001) 5995.
[443] V. Michaud, R. Tornqvist, J.A.E. Manson, Impregnation of compressible fiber mats with a thermoplastic resin. Part II: Experiments, J. Compos. Mater. 35 (13) (2001) 1174.
[444] A.A. Mohamad, G.A. Karim, Flow and heat transfer within segregated beds of solid particles, J. Porous Media 4 (3) (2001) 215.
[445] K. Muralidhar, K. Suzuki, Analysis of flow and heat transfer in a regenerator mesh using a non-Darcy thermally non-equilibrium model, Int. J. Heat Mass Transfer 44 (13) (2001) 2493.
[446] K. Muroyama, S. Okumichi, Y. Goto, Y. Yamamoto, S. Saito, Heat transfer from immersed vertical cylinders in gas–liquid and gas–liquid–solid fluidized beds, Chem. Eng. Technol. 24 (8) (2001) 835.
[447] P. Nagaraju, A.J. Chamkha, H.S. Takhar, B.C. Chandrasekhara, Simultaneous radiative and convective heat transfer in a variable porosity medium, Heat Mass Transfer 37 (2–3) (2001) 243.
[448] A. Narasimhan, J.L. Lage, Forced convection of a fluid with temperature-dependent viscosity flowing through a porous medium channel, Numer. Heat Transfer Part A—Applications 40 (8) (2001) 801.
[449] A. Narasimhan, J.L. Lage, Modified Hazen–Dupuit–Darcy model for forced convection of a fluid with temperature-dependent viscosity, J. Heat Transfer—Trans. ASME 123 (1) (2001) 31.
[450] A. Narasimhan, J.L. Lage, D.A. Nield, New theory for forced convection through porous media by fluids with temperature-dependent viscosity, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1045.
[451] D.A. Nield, A.V. Kuznetsov, Effects of heterogeneity in forced convection in a porous medium: parallel-plate channel, asymmetric property variation, and asymmetric heating, J. Porous Media 4 (2) (2001) 137.
[452] D.A. Nield, A.V. Kuznetsov, The interaction of thermal nonequilibrium and heterogeneous conductivity effects in forced convection in layered porous channels, Int. J. Heat Mass Transfer 44 (22) (2001) 4369.
[453] M. Nijemeisland, A.G. Dixon, Comparison of CFD simulations to experiment for convective heat transfer in a gas–solid fixed bed, Chem. Eng. J. (special issue SI) (2001) 231.
[454] J.M. Paek, B.H. Kang, J.M. Hyun, An experimental study on cool-down of a heterogeneous porous body in throughflow, Int. J. Heat Mass Transfer 44 (3) (2001) 683.
[455] J.C.F. Pereira, M. Costa, I. Malico, Experimental and numerical investigation of a porous counterflow heat exchanger model, J. Enhanc. Heat Transfer 8 (3) (2001) 185.
[456] R. Rachedi, S. Chikh, Enhancement of electronic cooling by insertion of foam materials, Heat Mass Transfer 37 (4–5) (2001) 371.
[457] B.K. Rao, Heat transfer to power-law fluid flows through porous media, J. Porous Media 4 (4) (2001) 339.
[458] S. Sharafat, M. Demetriou, N. Ghoniem, B. Williams, R. Nygren, Enhanced surface heat removal using a porous tungsten heat exchanger, Fusion Technol. (art 2) (2001) 863.
[459] K.J. Woo, J.S. Kim, Y. Kang, S.D. Kim, Effects of chaotic temperature fluctuations on the heat transfer coefficient in liquid–liquid–solid fluidized beds, Chem. Eng. Technol. 24 (8) (2001) 829.
[460] J. Yamada, Y. Kurosaki, T. Nagai, Radiation heat transfer between fluidizing particles and a heat transfer surface in a fluidized bed, J. Heat Transfer—Trans. ASME 123 (3) (2001) 458.
[461] B.L. Zhang, Y. Zhao, Simulations of flow through fluid/porous layers by a characteristic-based method on unstructured grids, Int. J. Numer. Meth. Eng. 50 (11) (2001) 2443.
[462] H.Y. Zhang, X.Y. Huang, Heat transfer studies of a porous heat sink characterized by straight circular ducts, Int. J. Heat Mass Transfer 44 (8) (2001) 1593.
[463] H.Y. Zhang, X.Y. Huang, A two-equation analysis of convection heat transfer in porous media, Transport Porous Media 44 (2) (2001) 305.
[464] C.B. Zhao, G. Lin, B.E. Hobbs, H.B. Muhlhaus, A. Ord, Y.J. Wang, Finite element modelling of heat transfer through permeable cracks in hydrothermal systems with upward throughflow, Eng. Comput. (Swansea, Wales) 18 (7–8) (2001) 996.
[465] T.S. Zhao, Y.J. Song, Forced convection in a porous medium heated by a permeable wall perpendicular to flow direction: analyses and measurements, Int. J. Heat Mass Transfer 44 (5) (2001) 1031.
[466] N. Banu, D.A.S. Rees, Effect of a traveling thermal wave on weakly nonlinear convection in a porous layer heated from below, J. Porous Media 4 (3) (2001) 225.
[467] A.C. Baytas, A. Liaqat, T. Grosan, I. Pop, Conjugate natural convection in a square porous cavity, Heat Mass Transfer 37 (4–5) (2001) 467.
[468] A.C. Baytas, I. Pop, Natural convection in a trapezoidal enclosure filled with a porous medium, Int. J. Eng. Sci. 39 (2) (2001) 125.
[469] L.B. Benano-Melly, J.P. Caltagirone, B. Faissat, F. Montel, P. Costeseque, Modeling Soret coefficient measurement experiments in porous media considering thermal and solutal convection, Int. J. Heat Mass Transfer 44 (7) (2001) 1285.
[470] R. Bennacer, H. Beji, F. Oueslati, A. Belghith, Multiple natural convection solution in porous media under

cross temperature and concentration gradients, Numer. Heat Transfer Part A—Applications 39 (6) (2001) 553.
[471] R. Bennacer, A. Tobbal, H. Beji, P. Vasseur, Double diffusive convection in a vertical enclosure filled with anisotropic porous media, Int. J. Therm. Sci. 40 (1) (2001) 30.
[472] E. Bilgen, M. Mbaye, Benard cells in fluid-saturated porous enclosures with lateral cooling, Int. J. Heat Fluid Flow 22 (5) (2001) 561.
[473] A.J. Chamkha, H. Al-Naser, Double-diffusive convection in an inclined porous enclosure with opposing temperature and concentration gradients, Int. J. Therm. Sci. 40 (3) (2001) 227.
[474] F. Joly, P. Vasseur, G. Labrosse, Soret instability in a vertical Brinkman porous enclosure, Numer. Heat Transfer Part A—Applications 39 (4) (2001) 339.
[475] T.C. Jue, Analysis of Benard convection in rectangular cavities filled with a porous medium, Acta Mech. 146 (1–2) (2001) 21.
[476] L. Kalla, M. Mamou, P. Vasseur, L. Robillard, Multiple solutions for double diffusive convection in a shallow porous cavity with vertical fluxes of heat and mass, Int. J. Heat Mass Transfer 44 (23) (2001) 4493.
[477] P.N. Kaloni, Z.C. Qiao, Non-linear convection in a porous medium with inclined temperature gradient and variable gravity effects, Int. J. Heat Mass Transfer 44 (8) (2001) 1585.
[478] G.B. Kim, J.M. Hyun, H.S. Kwak, Buoyant convection in a square cavity partially filled with a heat-generating porous medium, Numer. Heat Transfer Part A—Applications 40 (6) (2001) 601.
[479] M.S. Malashetty, J.C. Umavathi, J.P. Kumar, Convective flow and heat transfer in an inclined composite porous medium, J. Porous Media 4 (1) (2001) 15.
[480] F. Marcondes, J.M. de Medeiros, J.M. Gurgel, Numerical analysis of natural convection in cavities with variable porosity, Numer. Heat Transfer Part A—Applications 40 (4) (2001) 403.
[481] A.A. Mohamad, R. Bennacer, Natural convection in a confined saturated porous medium with horizontal temperature and vertical solutal gradients, Int. J. Therm. Sci. 40 (1) (2001) 82.
[482] M. Nejad, M.Z. Saghir, M.R. Islam, Role of thermal diffusion on heat and mass transfer in porous media, Int. J. Comput. Fluid Dyn. 15 (2) (2001) 157.
[483] D.A.S. Rees, A. Postelnicu, The onset of convection in an inclined anisotropic porous layer, Int. J. Heat Mass Transfer 44 (21) (2001) 4127.
[484] Sunil, Thermosolutal instability of a compressible finite Larmor radius, Hall plasma in a porous medium, J. Porous Media 4 (1) (2001) 55.
[485] J.J. Valencia-Lopez, J.A. Ochoa-Tapia, A study of buoyancy-driven flow in a confined fluid overlying a porous layer, Int. J. Heat Mass Transfer 44 (24) (2001) 4725.
[486] R. Younsi, A. Harkati, D. Kalache, Heat and mass transfer in composite fluid-porous layer: effect of permeability, Arab. J. Sci. Eng. 26 (2B) (2001) 145.
[487] P.H. Zhao, C.F. Chen, Stability analysis of double-diffusive convection in superposed fluid and porous layers using a one-equation model, Int. J. Heat Mass Transfer 44 (24) (2001) 4625.
[488] W. Zheng, L. Robillard, P. Vasseur, Convection in a square cavity filled with an anisotropic medium saturated with water near 4 °C, Int. J. Heat Mass Transfer 44 (18) (2001) 3463–3470.
[489] A. Al-Khlaifat, H. Arastoopour, Simulation of two-phase flow through anisotropic porous media, J. Porous Media 4 (4) (2001) 275.
[490] S. Bekri, O. Vizika, J.F. Thovert, P.M. Adler, Binary two-phase flow with phase change in porous media, Int. J. Multiphase Flow 27 (3) (2001) 477.
[491] A. Belghit, S. El Issami, Hydrogen production by steam gasification of coal in gas–solid moving bed using nuclear heat, Energy Convers. Manage. 42 (1) (2001) 81.
[492] R. Bruttini, O.K. Crosser, A.I. Liapis, Energy analysis for the freezing stage of the freeze drying process, Drying Technol. 19 (9) (2001) 2303.
[493] I. Cerri, G. Saracco, V. Specchia, D. Trimis, Improved-performance knitted fibre mats as supports for premixed natural gas catalytic combustion, Chem. Eng. J. (special issue SI) (2001) 73.
[494] H. Feng, J. Tang, R.P. Cavalieri, O.A. Plumb, Heat and mass transport in microwave drying of porous materials in a spouted bed, AICHE J. 47 (7) (2001) 1499.
[495] P. Furmanski, J.M. Floryan, A method of control of transfer processes, Int. J. Heat Mass Transfer 44 (1) (2001) 215.
[496] L.M.L. Helsen, E.V.M. Van den Buick, Study of a new macro-particle model for the low-temperature pyrolysis of dried wood chips, Heat Mass Transfer 38 (1–2) (2001) 165.
[497] S. Jugjai, Experimental study on cyclic flow reversal combustion in a porous medium, Combust. Sci. Technol. 163 (2001) 245.
[498] D.L. Kane, K.M. Hinkel, D.J. Goering, L.D. Hinzman, S.I. Outcalt, Non-conductive heat transfer associated with frozen soils, Global Planet. Change 29 (3–4) (2001) 275.
[499] A.K. Keshari, B. Datta, A combined use of direct search algorithms and exterior penalty function method for groundwater pollution management, J. Porous Media 4 (3) (2001) 259.
[500] A.R.A. Khaled, A.J. Chamkha, Variable porosity and thermal dispersion effects on coupled heat and mass transfer by natural convection from a surface embedded in a non-metallic porous medium, Int. J. Numer. Meth. Heat Fluid Flow 11 (5–6) (2001) 413.
[501] S.J. Kowalski, Thermomechanical approach to shrinking and cracking in drying, Drying Technol. 19 (5) (2001) 731.
[502] Y.M. Laevsky, V.S. Babkin, On the theory of a travelling hybrid wave, Combust. Sci. Technol. 164 (2001) 129.
[503] X.K. Lan, J.M. Khodadadi, Fluid flow, heat transfer and solidification in the mold of continuous casters during ladle change, Int. J. Heat Mass Transfer 44 (5) (2001) 953.
[504] X.K. Lan, J.M. Khodadadi, Liquid steel flow, heat transfer and solidification in mold of continuous casters

during grade transition, Int. J. Heat Mass Transfer 44 (18) (2001) 3431.
[505] A. Lekhal, B.J. Glasser, J.G. Khinast, Impact of drying on the catalyst profile in supported impregnation catalysts, Chem. Eng. Sci. 56 (15) (2001) 4473.
[506] V.V. Levdansky, H.Y. Kim, H.C. Kim, J. Smolik, P. Moravec, Effect of electromagnetic fields on transfer processes in heterogeneous systems, Int. J. Heat Mass Transfer 44 (5) (2001) 1065.
[507] M. Levent, Water–gas shift reaction over porous catalyst: temperature and reactant concentration distribution, Int. J. Hydrogen Energy 26 (6) (2001) 551.
[508] Y. Liu, I.T. Cameron, S.K. Bhatia, A wavelet-based adaptive technique for adsorption problems involving steep gradients, Comput. Chem. Eng. 25 (11–12) (2001) 1611.
[509] T.J. Lu, J.H. Du, S.Y. Lei, B.X. Wang, Heat and mass transfer in unsaturated porous media with solid–liquid change, Heat Mass Transfer 37 (2–3) (2001) 237.
[510] T. Lucas, J.M. Chourot, P. Bohuon, D. Flick, Freezing of a porous medium in contact with a concentrated aqueous freezant: numerical modelling of coupled heat and mass transport, Int. J. Heat Mass Transfer 44 (11) (2001) 2093.
[511] S.B. Margolis, M.R. Baer, A singular-perturbation analysis of the burning-rate eigenvalue for a two-temperature model of deflagrations in confined porous energetic materials, SIAM J. Appl. Math. 62 (2) (2001) 627.
[512] A.N. Modestov, P.V. Poplaukhin, N.Z. Lyakhov, Dehydration kinetics of lithium sulfate monohydrate single crystals, J. Therm. Anal. 65 (1) (2001) 121.
[513] J. Mugge, H. Bosch, T. Reith, Measuring and modelling gas adsorption kinetics in single porous particles, Chem. Eng. Sci. 56 (18) (2001) 5351.
[514] I. Muraoka, F.M. Ramos, V.V. Vlassov, Analysis of the operational characteristics and limits of a loop heat pipe with porous element in the condenser, Int. J. Heat Mass Transfer 44 (12) (2001) 2287.
[515] K. Murugesan, H.N. Suresh, K.N. Seetharamu, P.A.A. Narayana, T. Sundararajan, A theoretical model of brick drying as a conjugate problem, Int. J. Heat Mass Transfer 44 (21) (2001) 4075.
[516] D.A. Neeper, A model of oscillatory transport in granular soils, with application to barometric pumping and earth tides, J. Contam. Hydrol. 48 (3–4) (2001) 237.
[517] J.L. Niu, L.Z. Zhang, Membrane-based enthalpy exchanger: material considerations and clarification of moisture resistance, J. Membr. Sci. 189 (2) (2001) 179.
[518] W. Obeid, A. Alliche, G. Mounajed, Identification of the physical parameters used in the thermo-hygro-mechanical model (application to the case of cement mortar), Transport Porous Media 45 (2) (2001) 215.
[519] A. Ozaki, T. Watanabe, T. Hayashi, Y. Ryu, Systematic analysis on combined heat and water transfer through porous materials based on thermodynamic energy, Energy Build. (special issue SI) (2001) 341.
[520] P. Perre, B.K. May, A numerical drying model that accounts for the coupling between transfers and solid mechanics. Case of highly deformable products, Drying Technol. 19 (8) (2001) 1629.
[521] P. Perre, I. Turner, Determination of the material property variations across the growth ring of softwood for use in a heterogeneous drying model, Part 1. Capillary pressure, tracheid model and absolute permeability, Holzforschung 55 (3) (2001) 318.
[522] O. Pickenacker, D. Trimis, Experimental study of a staged methane/air burner based on combustion in a porous inert medium, J. Porous Media 4 (3) (2001) 197.
[523] Y. Qu, X.F. Peng, T. Liu, Flow and heat transfer characteristics in the porous wick condenser of CPL, Sci. China E—Technol. Sci. 44 (5) (2001) 499.
[524] L.A.O. Rocha, M. Neagu, A. Bejan, R.S. Cherry, Convection with phase change during gas formation from methane hydrates via depressurization of porous layers, J. Porous Media 4 (4) (2001) 283.
[525] B.A. Schrefler, Computer modelling in environmental geomechanics, Comput. Struct. 79 (22–25) (2001) 2209.
[526] M. Schuessler, O. Lamla, T. Stefanovski, C. Klein, D. zur Megede, Autothermal reforming of methanol in an isothermal reactor—concept and realisation, Chem. Eng. Technol. 24 (11) (2001) 1141.
[527] J. Seyed-Yagoobi, A.N. Husain, Experimental and theoretical study of heating/drying of moist paper sheet with a gas-fired infrared emitter, J. Heat Transfer—Trans. ASME 123 (4) (2001) 711.
[528] Y.V. Skorov, N.I. Komle, H.U. Keller, G. Kargl, W.J. Markiewicz, A model of heat and mass transfer in a porous cometary nucleus based on a kinetic treatment of mass flow, Icarus 153 (1) (2001) 180.
[529] H.N. Suresh, P.A.A. Narayana, K.N. Seetharamu, Conjugate mixed convection heat and mass transfer in brick drying, Heat Mass Transfer 37 (2–3) (2001) 205.
[530] R.T. Tenchev, L.Y. Li, J.A. Purkiss, Finite element analysis of coupled heat and moisture transfer in concrete subjected to fire, Numer. Heat Transfer Part A—Applications 39 (7) (2001) 685.
[531] G. Thouvenin, A. Giraud, F. Homand, Linear coupled analysis of desiccation shrinkage in a double-layer partially saturated medium: semi-explicit solutions, Int. J. Numer. Anal. Meth. Geomech. 25 (10) (2001) 1027.
[532] I.W. Turner, P. Perre, The use of implicit flux limiting schemes in the simulation of the drying process: a new maximum flow sensor applied to phase mobilities, Appl. Math. Model. 25 (6) (2001) 513.
[533] F.Y. Wang, S.K. Bhatia, A generalised dynamic model for char particle gasification with structure evolution and peripheral fragmentation, Chem. Eng. Sci. 56 (12) (2001) 3683.
[534] L.J. Wang, S.H. Ge, C.H. Liu, Z.H. Li, A novel porous membrane reactor for a controllable butene oxidative reaction, J. Porous Media 4 (3) (2001) 253.
[535] S. Youcef-Ali, H. Messaoudi, J.Y. Desmons, A. Abene, M. Le Ray, Determination of the average coefficient of internal moisture transfer during the drying of a thin bed of potato slices, J. Food Eng. 48 (2) (2001) 95.
[536] A. Zeisberger, Boiling in particle beds in a two dimensional, Heat Mass Transfer 37 (6) (2001) 577.
[537] C.B. Zhao, B.E. Hobbs, J.L. Walshe, H.B. Muhlhaus, A. Ord, Finite element modeling of fluid-rock interaction problems in pore-fluid saturated hydrothermal/

sedimentary basins, Comput. Meth. Appl. Mech. Eng. 190 (18) (2001).

[538] G. Aguilar, W. Verkruysse, B. Majaron, L.O. Svaasand, E.J. Lavernia, J.S. Nelson, Measurement of heat flux and heat transfer coefficient during continuous cryogen spray cooling for laser dermatologic surgery, IEEE J. Sel. Top. Quantum Electron. 7 (6) (2001) 1013.

[539] R.J. Boyle, C.M. Spuckler, B.L. Lucci, W.P. Camperchioli, Infrared low-temperature turbine vane rough surface heat transfer measurements, J. Turbomachine.—Trans. ASME 123 (1) (2001) 168.

[540] M.G. Davies, Error analysis of wall heat flow using transfer coefficients, Build. Environ. 36 (2) (2001) 189.

[541] G. De Domenico, D.G. Lister, G. Maschio, A. Stassi, On-line calibration and determination of the heat of reaction for laboratory scale heat transfer calorimeters, J. Therm. Anal. Calorim. 66 (3) (2001) 815.

[542] L. Ghisalberti, A. Kondjoyan, A thermographic method to map the local heat transfer coefficient on the complete surface of a circular cylinder in an airflow, Int. J. Therm. Sci. 40 (8) (2001) 738.

[543] C.T. Kidd, J.C. Adams, Fast-response heat-flux sensor for measurement commonality in hypersonic wind tunnels, J. Spacecraft Rockets 38 (5) (2001) 719.

[544] A.V. Murthy, B.K. Tsai, R.D. Saunders, Transfer calibration validation tests on a heat flux sensor in the 51 mm high-temperature blackbody, J. Res. National Inst. Stand. Technol. 106 (5) (2001) 823.

[545] S.H. Oh, K.C. Lee, J. Chun, M. Kim, S.S. Lee, Micro heat flux sensor using copper electroplating in SU-8 microstructures, J. Micromech. Microeng. 11 (3) (2001) 221.

[546] A. Cardoso, A.K. Srivastava, Improvements in wafer temperature measurements, J. Vac. Sci. Technol. B 19 (2) (2001) 397.

[547] T.L. Chan, Evaluation of viewing-angle effect on determination of local heat transfer coefficients on a curved surface using transient and heated-coating liquid–crystal methods, Exp. Fluids 31 (4) (2001) 447.

[548] T.L. Chan, S. Ashforth-Frost, K. Jambunathan, Calibrating for viewing angle effect during heat transfer measurements on a curved surface, Int. J. Heat Mass Transfer 44 (12) (2001) 2209.

[549] P.H. Chen, P.P. Ding, D. Ai, An improved data reduction method for transient liquid crystal thermography on film cooling measurements, Int. J. Heat Mass Transfer 44 (7) (2001) 1379.

[550] C.J. Elkins, J. Fessler, J.K. Eaton, A novel mini calibrator for thermochromic liquid crystals, J. Heat Transfer—Trans. ASME 123 (3) (2001) 604.

[551] M. Fujii, X. Zhang, Noncontact measurement of internal temperature distribution in a solid material using ultrasonic computed tomography, Exp. Therm. Fluid Sci. 24 (3–4) (2001) 107.

[552] S. Gulbrandsen-Dahl, J.K. Solberg, O. Grong, Digital photocalorimetric measurements of cooling rates in chill block melt spinning of Mm(NiCoMnAl)(5) hydride forming alloy, Mater. Sci. Technol. 17 (12) (2001) 1556.

[553] P.M. Lutjen, D. Mishra, V. Prasad, Three-dimensional visualization and measurement of temperature field using liquid crystal scanning thermography, J. Heat Transfer—Trans. ASME 123 (5) (2001) 1006.

[554] D. Ross, M. Gaitan, L.E. Locascio, Temperature measurement in microfluidic systems using a temperature-dependent fluorescent dye, Anal. Chem. 73 (17) (2001) 4117.

[555] A.E. Segall, Solutions for the correction of temperature measurements based on beaded thermocouples, Int. J. Heat Mass Transfer 44 (15) (2001) 2801.

[556] C.L. Shepard, B.D. Cannon, M.A. Khaleel, Determination of temperature in glass with a fluorescence method, Int. J. Heat Mass Transfer 44 (21) (2001) 4027.

[557] C.R. Smith, D.R. Sabatino, T.J. Praisner, Temperature sensing with thermochromic liquid crystals, Exp. Fluids 30 (2) (2001) 190.

[558] H.R. Tschudi, G. Morian, Pyrometric temperature measurements in solar furnaces, J. Sol. Energy Eng.—Trans. ASME 123 (2) (2001) 164.

[559] F. Bakhtar, H. Mashmoushy, O.C. Jadayel, Calibration characteristics of a three-hole probe and a static tube in wet steam, Int. J. Heat Fluid Flow 22 (5) (2001) 537.

[560] S.C. Dong, H. Meng, Chebyshev spectral method and Chebyshev noise processing procedure for vorticity calculation in PIV post-processing, Exp. Therm. Fluid Sci. 24 (1–2) (2001) 47.

[561] P.G. Fairhurst, M. Barigou, P.J. Fryer, J.P. Pain, D.J. Parker, Using positron emission particle tracking (PEPT) to study nearly neutrally buoyant particles in high solid fraction pipe, Int. J. Multiphase Flow 27 (11) (2001) 1881.

[562] Y. Guo, D.H. Wood, Instantaneous velocity and pressure measurements in turbulent mixing layers, Exp. Therm. Fluid Sci. 24 (3–4) (2001) 139.

[563] C. Henselowsky, H.C. Kuhlmann, H.J. Rath, Heat transfer from hot wires at small forced-flow velocities, Z. Angew. Math. Mech. (3) (2001) S497.

[564] T.J. Praisner, D.R. Sabatino, C.R. Smith, Simultaneously combined liquid crystal surface heat transfer and PIV flow-field measurements, Exp. Fluids 30 (1) (2001) 1.

[565] Y. Sakai, T. Watanabe, S. Kamohara, T. Kushida, I. Nakamura, Simultaneous measurements of concentration and velocity in a CO_2 jet issuing into a grid turbulence by two-sensor hot-wire probe, Int. J. Heat Fluid Flow 22 (3) (2001) 227.

[566] Sutardi, C.Y. Ching, Effect of tube diameter on Preston tube calibration curves for the measurement of wall sheer stress, Exp. Therm. Fluid Sci. 24 (3–4) (2001) 93.

[567] S.Y. Wu, Q. Lin, Y. Yuen, Y.C. Tai, MEMS flow sensors for nano-fluidic applications, Sens. Actuators A—Physical 89 (1–2) (2001) 152.

[568] S.H. Yao, V.K. Horvath, P. Tong, B.J. Ackerson, W.I. Goldburg, Measurements of the instantaneous velocity difference and the local velocity with a fiber-optic coupler, J. Opt. Soc. Am. A—Opt. Image Sci. 18 (3) (2001) 696.

[569] M. Zacksenhouse, G. Abramovich, G. Hetsroni, Automatic spatial characterization of low-speed streaks from thermal images, Exp. Fluids 31 (2) (2001) 229.

[570] K.B. Zitoun, S.K. Sastry, Y. Guezennec, Investigation of three dimensional interstitial velocity, solids motion,

and orientation in solid–liquid flow using particle tracking velocimetry, Int. J. Multiphase Flow 27 (8) (2001) 1397.
[571] A.P.F. Albers, T.A.G. Restivo, L. Pagano, J.B. Baldo, Effect of testing conditions on the laser flash thermal diffusivity measurements of ceramics, Thermochim. Acta 370 (1) (2001).
[572] C. Aviles-Ramos, A. Haji-Sheikh, J.V. Beck, K.J. Dowding, Estimation of thermophysical properties by the spectral method—development and evaluation, J. Heat Transfer—Trans. ASME 123 (1) (2001) 24.
[573] J. Sun, J.P. Longtin, T.F. Irvine, Laser-based thermal pulse measurement of liquid thermophysical properties, Int. J. Heat Mass Transfer 44 (3) (2001) 645.
[574] X.W. Wang, H.P. Hu, X.F. Xu, Photo-acoustic measurement of thermal conductivity of thin films and bulk materials, J. Heat Transfer—Trans. ASME 123 (1) (2001) 138.
[575] I.S. Altman, D. Lee, J. Song, M. Choi, Experimental estimate of energy accommodation coefficient at high temperatures, Phys. Rev. E (art 1) (2001) 2202.
[576] D. Ambrosini, D. Paoletti, G.S. Spagnolo, Sandwich holography for simultaneous temperature visualization and heat-transfer coefficient measurement, Opt. Eng. 40 (7) (2001) 1274.
[577] Z. Jiang, C.T. Imrie, J.M. Hutchinson, Temperature modulated differential scanning calorimetry—Part IV. Effect of heat transfer on the measurement of heat capacity using quasi-isothermal ADSC, J. Therm. Anal. 64 (1) (2001) 85.
[578] M.M. Kaila, Theoretical analysis of responsivity of a high temperature superconductor (HTSC)—hot electron far infrared bolometer (HEFIB), J. Supercond. 14 (5) (2001) 569.
[579] J. Kaluza, A. Neumann, Comparative measurements of different solar flux gauge types, J. Sol. Energy Eng.—Trans. ASME 123 (3) (2001) 251.
[580] S.J. Kim, S.P. Jang, Experimental and numerical analysis of heat transfer phenomena in a sensor tube of a mass flow controller, Int. J. Heat Mass Transfer 44 (9) (2001) 1711.
[581] H.V. Kok, T. van der Hagen, R.F. Mudde, Subchannel void-fraction measurements in a 6×6 rod bundle using a simple gamma-transmission method, Int. J. Multiphase Flow 27 (1) (2001) 147.
[582] S. Maruyama, E. Nino, G. Ruocco, Analysis of a thermoelectrical device for active heat transfer control, Int. J. Therm. Sci. 40 (10) (2001) 911.
[583] S. Maruyama, K. Takahashi, A. Komiya, M. Behnia, Measurement of transient double diffusive convection and crystal growth using real-time phase-shifting interferometer, JSME Int. J. B—Fluids Therm. Eng. 44 (4) (2001) 561.
[584] A. Nakano, M. Shiraishi, M. Murakami, Application of laser holography interferometer to heat transport phenomena near the critical point of nitrogen, Cryogenics 41 (5–6) (2001) 429.
[585] C. Salvi, J.P. Garandet, A novel resistance measurement technique in the field of directional solidification, Rev. Sci. Instr. 72 (1) (2001) 255.
[586] H. Wakabayashi, T. Makino, A new spectrophotometer system for measuring thermal radiation phenomena in a 0.30–11 μm wavelength region, Meas. Sci. Technol. 12 (12) (2001) 2113.
[587] M.G. Wolfinger, J. Rath, G. Krammer, F. Barontini, V. Cozzani, Influence of the emissivity of the sample on differential scanning calorimetry measurements, Thermochim. Acta 372 (1–2) (2001) 11.
[588] S. Aumaitre, Radiative convection with a fixed heat flux, Physica D 158 (1–4) (2001) 164.
[589] L. Bernaz, J.M. Bonnet, J.M. Seiler, Investigation of natural convection heat transfer to the cooled top boundary of a heated pool, Nucl. Eng. Des. 204 (1–3) (2001) 413.
[590] U. Burr, U. Muller, Rayleigh–Benard convection in liquid metal layers under the influence of a vertical magnetic field, Phys. Fluids 13 (11) (2001) 3247.
[591] X. Chavanne, F. Chilla, B. Chabaud, B. Castaing, B. Hebral, Turbulent Rayleigh–Benard convection in gaseous and liquid He, Phys. Fluids 13 (5) (2001) 1300.
[592] H. Demir, Thermal convection of viscoelastic fluid with Biot boundary conduction, Math. Comput. Simul. 56 (3) (2001) 277.
[593] K. Hanjalic, S. Kenjeres, 'T-RANS' simulation of deterministic eddy structure in flows driven by thermal buoyancy and Lorentz force, Flow Turbulence Combust. 66 (4) (2001) 427.
[594] K. Kamakura, H. Ozoe, Numerical analyses of salt-finger phenomena near the interface between two liquid layers in a cubic enclosure, Numer. Heat Transfer Part A—Applications 40 (8) (2001) 861.
[595] A.B. Kogan, H. Meyer, Heat transfer and convection onset in a compressible fluid: He-3 near the critical point, Phys. Rev. E (art 2) (2001) 6310.
[596] J.T. Lir, T.F. Lin, Visualization of roll patterns in Rayleigh–Benard convection of air in a rectangular shallow cavity, Int. J. Heat Mass Transfer 44 (15) (2001) 2889.
[597] L. Czechowski, J.M. Floryan, Marangoni instability in a finite container-transition between short and long wavelengths modes, J. Heat Transfer—Trans. ASME 123 (1) (2001) 96.
[598] M. Lappa, R. Savino, R. Monti, Three-dimensional numerical simulation of Marangoni instabilities in non-cylindrical liquid bridges in microgravity, Int. J. Heat Mass Transfer 44 (10) (2001) 1983.
[599] Z.M. Tang, W.R. Hu, N. Imaishi, Two bifurcation transitions of the floating half zone convection in a fat liquid bridge of larger Pr, Int. J. Heat Mass Transfer 44 (7) (2001) 1299.
[600] S. Arcidiacono, M. Ciofalo, Low-Prandtl number natural convection in volumetrically heated rectangular enclosures III. Shallow cavity, $AR = 0.25$, Int. J. Heat Mass Transfer 44 (16) (2001) 3053.
[601] S. Arcidiacono, I. Di Piazza, M. Ciofalo, Low-Prandtl number natural convection in volumetrically heated rectangular enclosures—II. Square cavity, $AR = 1$, Int. J. Heat Mass Transfer 44 (3) (2001) 537.
[602] J.H. Bae, J.M. Hyun, H.S. Kwak, Buoyant convection in a cavity with a baffle under time-periodic wall

temperature, Numer. Heat Transfer Part A—Applications 39 (7) (2001) 723.

[603] K.H. Chung, H.S. Kwak, J.M. Hyun, Finite-wall effect on buoyant convection in an enclosure with pulsating exterior surface temperature, Int. J. Heat Mass Transfer 44 (4) (2001) 721.

[604] R. Delgado-Buscalioni, E.C. del Arco, Flow and heat transfer regimes in inclined differentially heated cavities, Int. J. Heat Mass Transfer 44 (10) (2001) 1947.

[605] H.S. Dol, K. Hanjalic, Computational study of turbulent natural convection in a side-heated near-cubic enclosure at a high Rayleigh number, Int. J. Heat Mass Transfer 44 (12) (2001) 2323.

[606] R.L. Frederick, F. Quiroz, On the transition from conduction to convection regime in a cubical enclosure with a partially heated wall, Int. J. Heat Mass Transfer 44 (9) (2001) 1699.

[607] C.J. Ho, F.J. Tu, Transition to oscillatory natural convection of water near its density maximum in a tall enclosure—assessment of three-dimensional effects, Int. J. Numer. Meth. Heat Fluid Flow 11 (7) (2001) 626.

[608] A. Horvat, I. Kljenak, J. Marn, On incompressible buoyancy flow benchmarking, Numer. Heat Transfer Part B—Fundamentals 39 (1) (2001) 61.

[609] A.J.N. Khalifa, A.F. Khudheyer, Natural convection in partitioned enclosures: experimental study on 14 different configurations, Energy Convers. Manage. 42 (6) (2001) 653.

[610] K.H. Kim, J.M. Hyun, H.S. Kwak, Buoyant convection in a side-heated cavity under gravity and oscillations, Int. J. Heat Mass Transfer 44 (4) (2001) 857.

[611] A. Liaqat, A.C. Baytas, Conjugate natural convection in a square enclosure containing volumetric sources, Int. J. Heat Mass Transfer 44 (17) (2001) 3273.

[612] W.X. Lin, S.W. Armfield, Natural convection cooling of rectangular and cylindrical containers, Int. J. Heat Fluid Flow 22 (1) (2001) 72.

[613] A.A. Merrikh, A.A. Mohamad, Blockage effects in natural convection in differentially heated enclosures, J. Enhanc. Heat Transfer 8 (1) (2001) 55.

[614] S.H. Peng, L. Davidson, Large eddy simulation for turbulent buoyant flow in a confined cavity, Int. J. Heat Fluid Flow 22 (3) (2001) 323.

[615] M. Prud'homme, T.H. Nguyen, Solution of inverse free convection problems by conjugate gradient method: effects of Rayleigh number, Int. J. Heat Mass Transfer 44 (11) (2001) 2011.

[616] N. Ramesh, S.P. Venkateshan, Experimental study of natural convection in a square enclosure using differential interferometer, Int. J. Heat Mass Transfer 44 (6) (2001) 1107.

[617] Y. Shu, B.Q. Li, H.C. de Groh, Numerical study of g-jitter induced double-diffusive convection, Numer. Heat Transfer Part A—Applications 39 (3) (2001) 245.

[618] S.Z. Shuja, M.O. Iqbal, B.S. Yilbas, Natural convection in a square cavity due to a protruding body—aspect ratio consideration, Heat Mass Transfer 37 (4–5) (2001) 361.

[619] C.Y. Soong, P.Y. Tzeng, C.D. Hsieh, Numerical study of bottom-wall temperature modulation effects on thermal instability and oscillatory cellular convection in a rectangular enclosure, Int. J. Heat Mass Transfer 44 (20) (2001) 3855.

[620] J. Vierendeels, B. Merci, E. Dick, Numerical study of natural convective heat transfer with large temperature differences, Int. J. Numer. Meth. Heat Fluid Flow 11 (4) (2001) 329.

[621] S. Wakitani, Numerical study of three-dimensional oscillatory natural convection at low Prandtl number in rectangular enclosures, J. Heat Transfer—Trans. ASME 123 (1) (2001) 77.

[622] Y. Yamaguchi, Y. Asako, Effect of partition wall on natural convection heat transfer in a vertical air layer, J. Heat Transfer—Trans. ASME 123 (3) (2001) 441.

[623] A. Andreozzi, O. Manca, Thermal and fluid dynamic behavior of symmetrically heated vertical channels with auxiliary plate, Int. J. Heat Fluid Flow 22 (4) (2001) 424.

[624] A. Auletta, O. Manca, B. Morrone, V. Naso, Heat transfer enhancement by the chimney effect in a vertical isoflux channel, Int. J. Heat Mass Transfer 44 (22) (2001) 4345.

[625] K.T.R. Chang, K.P. Chen, Linear stability of mixed convection flow of two immiscible fluids in a vertical annulus, J. Heat Transfer—Trans. ASME 123 (3) (2001) 434.

[626] B. Morrone, Natural convection between parallel plates with conjugate conductive effects, Numer. Heat Transfer Part A—Applications 40 (8) (2001) 873.

[627] J. Sarr, M. Sall, M.M. Kane, B. Ba, M. Daguenet, Numerical natural convection in a sector-shaped enclosure, Int. J. Numer. Meth. Heat Fluid Flow 11 (4) (2001) 342.

[628] C. Shu, H. Xue, Y.D. Zhu, Numerical study of natural convection in an eccentric annulus between a square outer cylinder and a circular inner cylinder using DQ method, Int. J. Heat Mass Transfer 44 (17) (2001) 3321.

[629] H. Abbassi, S. Turki, S. Ben Nasrallah, Mixed convection in a plane channel with a built-in triangular prism, Numer. Heat Transfer Part A—Applications 39 (3) (2001) 307.

[630] J.L. Afonso, M.J. Clifton, Coupling between transfer phenomena in continuous-flow electrophoresis: effect on the steadiness of the carrier flow, Chem. Eng. Sci. 56 (10) (2001) 3053.

[631] L. Agrawal, J.C. Mandal, A.G. Marathe, Computations of laminar and turbulent mixed convection in a driven cavity using pseudo-compressibility approach, Comput. Fluids 30 (5) (2001) 607.

[632] A. Barletta, Analysis of flow reversal for laminar mixed convection in a vertical rectangular duct with one or more isothermal walls, Int. J. Heat Mass Transfer 44 (18) (2001) 3481.

[633] M.A. Habib, A.A.A. Negm, Laminar mixed convection in horizontal concentric annuli with non-uniform circumferential heating, Heat Mass Transfer 37 (4–5) (2001) 427.

[634] N. Islam, U.N. Gaitonde, G.K. Sharma, Mixed convection heat transfer in the entrance region of horizontal annuli, Int. J. Heat Mass Transfer 44 (11) (2001) 2107.

[635] K. Nagata, S. Komori, The difference in turbulent diffusion between active and passive scalers in stable thermal stratification, J. Fluid Mech. 430 (2001) 361.
[636] M. Ouzzane, N. Galanis, Numerical analysis of mixed convection in inclined tubes with external longitudinal fins, Sol. Energy 71 (3) (2001) 199.
[637] G. Rosengarten, G.L. Morrison, M. Behnia, Mixed convection in a narrow rectangular cavity with bottom inlet and outlet, Int. J. Heat Fluid Flow 22 (2) (2001) 168.
[638] C.W. Lan, C.H. Wang, Three-dimensional bifurcations of a two-phase Rayleigh–Benard problem in a cylinder, Int. J. Heat Mass Transfer 44 (10) (2001) 1823.
[639] F. Moukalled, S. Acharya, Natural convection in a trapezoidal enclosure with offset baffles, J. Thermophys. Heat Transfer 15 (2) (2001) 212.
[640] D.H. Chen, S.M. Lo, W.Z. Lu, K.K. Yuen, Z. Fang, A numerical study of the effect of window configuration on the external heat and smoke spread in building fire, Numer. Heat Transfer Part A—Applications 40 (8) (2001) 821.
[641] V. Dubovsky, G. Ziskind, S. Druckman, E. Moshka, Y. Weiss, R. Letan, Natural convection inside ventilated enclosure heated by downward-facing plate: experiments and numerical simulations, Int. J. Heat Mass Transfer 44 (16) (2001) 3155.
[642] H. Ingason, Plume flow in high rack storages, Fire Safety J. 36 (5) (2001) 437.
[643] S. Klopovic, O.F. Turan, A comprehensive study of externally venting flames—Part II: Plume envelope and centre-line temperature comparisons, secondary fires, wind effects and smoke management system, Fire Safety J. 36 (2) (2001) 135.
[644] U. Krause, M. Schmidt, The influence of initial conditions on the propagation of smouldering fires in dust accumulations, J. Loss Prevent. Process Ind. 14 (6) (2001) 527.
[645] V. Novozhilov, Flashover control under fire suppression conditions, Fire Safety J. 36 (7) (2001) 641.
[646] B. Porterie, J.C. Loraud, The prediction of some compartment fires. Part 2: Numerical results, Numer. Heat Transfer Part A—Applications 39 (2) (2001) 155.
[647] A. Raji, M. Hasnaoui, Combined mixed convection and radiation in ventilated cavities, Eng. Comput. (Swansea, Wales) 18 (7–8) (2001) 922.
[648] N. Ramesh, W. Merzkirch, Combined convective and radiative heat transfer in side-vented open cavities, Int. J. Heat Fluid Flow 22 (2) (2001) 180.
[649] E.D. Reinhardt, R.E. Keane, J.K. Brown, Modeling fire effects, Int. J. Wildland Fire 10 (3–4) (2001) 373.
[650] Q. Tan, Y. Jaluria, Mass flow through a horizontal vent in an enclosure due to pressure and density differences, Int. J. Heat Mass Transfer 44 (8) (2001) 1543.
[651] V.S. Arpaci, S.H. Kao, Foundations of buoyancy driven heat transfer correlations, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1181.
[652] O. Aydin, L. Guessous, Fundamental correlations for laminar and turbulent free convection from a uniformly heated vertical plate, Int. J. Heat Mass Transfer 44 (24) (2001) 4605.
[653] A.J. Chamkha, H.S. Takhar, V.M. Soundalgekar, Radiation effects on free convection flow past a semi-infinite vertical plate with mass transfer, Chem. Eng. J. 84 (3) (2001) 335.
[654] I. Cuniasse-Languans, A. Trombe, J. Dumoulin, M. Begue, Efficiency of an inverse method to determine natural-convection heat transfer, Numer. Heat Transfer Part B—Fundamentals 39 (6) (2001) 603.
[655] M.F. El-Amin, Magnetohydrodynamic free convection and mass transfer flow in micropolar fluid with constant suction, J. Magn. Magn. Mater. 234 (3) (2001) 567.
[656] S. Erbas, M.C. Ece, An analysis of free convection to power-law fluids from a vertical plate of variable surface temperature, Trans. Can. Soc. Mech. Eng. 25 (1) (2001) 1.
[657] M.A. Hossain, S. Hussain, D.A.S. Rees, Influence of fluctuating surface temperature and concentration on natural convection flow from a vertical flat plate, Z. Angew. Math. Mech. 81 (10) (2001) 699.
[658] E. Lacona, J. Taine, Holographic interferometry applied to coupled free convection and radiative transfer in a cavity containing a vertical plate between 290 and 650 K, Int. J. Heat Mass Transfer 44 (19) (2001) 3755.
[659] W.M. Lewandowski, E. Radziemska, Heat transfer by free convection from an isothermal vertical round plate in unlimited space, Appl. Energy 68 (2) (2001) 187.
[660] J. Li, D.B. Ingham, I. Pop, Natural convection from a vertical flat plate with a surface temperature oscillation, Int. J. Heat Mass Transfer 44 (12) (2001) 2311.
[661] A. Pantokratoras, Laminar free-convective heat transfer from a vertical isothermal plate to water at low temperatures with variable physical properties, Int. J. Heat Fluid Flow 22 (6) (2001) 666.
[662] A. Pantokratoras, Laminar-free-convective heat transfer from a vertical isothermal plate to water at 4 °C with variable physical properties, Chem. Eng. Sci. 56 (6) (2001) 2229.
[663] S.U. Rahman, Natural convection along vertical wavy surfaces: an experimental study, Chem. Eng. J. 84 (3) (2001) 587.
[664] C. Sabbah, R. Pasquetti, R. Peyret, V. Levitsky, Y.D. Chashechkin, Numerical and laboratory experiments of sidewall heating thermohaline convection, Int. J. Heat Mass Transfer 44 (14) (2001) 2681.
[665] S.S. Tak, R.K. Gehlot, Viscous heating in free convection along a plate in presence of magnetic field, Ind. J. Eng. Mater. Sci. 8 (6) (2001) 347.
[666] R. Tsai, Aerosol particle transport in a natural convection flow onto a vertical flat plate, Int. J. Heat Mass Transfer 44 (4) (2001) 867.
[667] A.J. Chamkha, A.R.A. Khaled, Similarity solutions for hydromagnetic simultaneous heat and mass transfer by natural convection from an inclined plate with internal heat generation or absorption, Heat Mass Transfer 37 (2–3) (2001) 117.
[668] P. Jeschke, H. Beer, Longitudinal vortices in a laminar natural convection boundary layer flow on an inclined flat plate and their influence on heat transfer, J. Fluid Mech. 432 (2001) 313.
[669] K. Kitamura, X.A. Chen, F. Kimura, Turbulent transition mechanisms of natural convection over

upward-facing horizontal plates, JSME Int. J. B—Fluids Therm. Eng. 44 (1) (2001) 90.
[670] C.J. Kobus, G.L. Wedekind, An experimental investigation into natural convection heat transfer from horizontal isothermal circular disks, Int. J. Heat Mass Transfer 44 (17) (2001) 3381.
[671] M.H. Lin, Numerical study of formation of longitudinal vortices in natural convection flow over horizontal and inclined surfaces, Int. J. Heat Mass Transfer 44 (9) (2001) 1759.
[672] E. Radziemska, W.M. Lewandowski, Heat transfer by natural convection from an isothermal downward-facing round plate in unlimited space, Appl. Energy 68 (4) (2001) 347.
[673] V.V. Vlassov, G.A. Dreitser, Experimental investigation of natural convective heat transfer from a round plate of complex configuration, Int. J. Heat Mass Transfer 44 (13) (2001) 2511.
[674] P.D. Weidman, Thermal convection over flat plates possessing an irregular leading edge, Int. J. Heat Mass Transfer 44 (24) (2001) 4711.
[675] D.M. Christopher, B.X. Wang, Prandtl number effects for Marangoni convection over a flat surface, Int. J. Therm. Sci. 40 (6) (2001) 564.
[676] D.M. Christopher, B.X. Wang, Similarity simulation for Marangoni convection around vapor bubble during nucleation and growth, Int. J. Heat Mass Transfer 44 (4) (2001) 799.
[677] A. Hossain, S. Munir, I. Pop, Natural convection flow of a viscous fluid with viscosity inversely proportional to linear function of temperature from a vertical wavy cone, Int. J. Therm. Sci. 40 (4) (2001) 366.
[678] A. Hossain, S. Munir, I. Pop, Natural convection with variable viscosity and thermal conductivity from a vertical wavy cone, Int. J. Therm. Sci. 40 (5) (2001) 437.
[679] M.A. Hossain, M.S. Munir, Natural convection flow of a viscous fluid about a truncated cone with temperature-dependent viscosity and thermal conductivity, Int. J. Numer. Meth. Heat Fluid Flow 11 (5–6) (2001) 403.
[680] M.A. Hossain, S.C. Paul, Free convection from a vertical permeable circular cone with non-uniform surface temperature, Acta Mech. 151 (1) (2001).
[681] D.A.S. Rees, I. Pop, g-Jitter induced free convection near a stagnation point, Heat Mass Transfer 37 (4) (2001).
[682] M.S. Sadeghipour, Y.P. Razi, Natural convection from a confined horizontal cylinder: the optimum distance between the confining walls, Int. J. Heat Mass Transfer 44 (2) (2001) 367.
[683] O. Auban, F. Lemoine, P. Vallette, J.R. Fontaine, Simulation by solutal convection of a thermal plume in a confined stratified environment: application to displacement ventilation, Int. J. Heat Mass Transfer 44 (24) (2001) 4679.
[684] M. Epstein, J.P. Burelbach, Vertical mixing above a steady circular source of buoyancy, Int. J. Heat Mass Transfer 44 (3) (2001) 525.
[685] X. Jiang, K.H. Luo, Direct numerical simulation of the near field dynamics of a rectangular reactive plume, Int. J. Heat Fluid Flow 22 (6) (2001) 633.
[686] M.P. Milazzo, L.P. Keszthelyi, A.S. McEwen, Observations and initial modeling of lava–SO_2 interactions at Prometheus, Io, J. Geophys. Res.—Planets 106 (E12) (2001) 33121.
[687] D. Morvan, B. Porterie, J.C. Loraud, M. Larini, A numerical investigation of cross wind effects on a turbulent buoyant diffusion flame, Combust. Sci. Technol. 164 (2001) 1.
[688] K. Noto, Y. Meguro, T. Nakajima, Thermal plume turbulent enhancement, reverse transition, and relaminerization in stably stratified enclosure, J. Thermophys. Heat Transfer 15 (1) (2001) 55.
[689] A. Pantokratoras, Effect of ambient temperature on vertical turbulent buoyant water jets, Int. J. Heat Mass Transfer 44 (10) (2001) 1889.
[690] J. Rensen, V. Roig, Experimental study of the unsteady structure of a confined bubble plume, Int. J. Multiphase Flow 27 (8) (2001) 1431.
[691] J. Worthy, V. Sanderson, P. Rubini, Comparison of modified κ–ϵ turbulence models for buoyant plumes, Numer. Heat Transfer Part B—Fundamentals 39 (2) (2001) 151.
[692] P. Ganesan, P. Loganathan, Effects of mass transfer and flow past a moving vertical cylinder with constant heat flux, Acta Mech. 150 (3–4) (2001) 179.
[693] P. Ganesan, P. Loganathan, Transient free convection flow past an impulsively started isothermal vertical cylinder with mass flux, Forsch. Ingenieurwes.—Eng. Res. 66 (6) (2001) 235.
[694] P. Ganesan, P. Loganathan, Unsteady natural convective flow past a moving vertical cylinder with heat and mass transfer, Heat Mass Transfer 37 (1) (2001) 59.
[695] Y. Hattori, T. Tsuji, Y. Nagano, N. Tanaka, Effects of freestream on turbulent combined-convection boundary layer along a vertical heated plate, Int. J. Heat Fluid Flow 22 (3) (2001) 315.
[696] F.S. Ibrahim, I.A. Hassanien, Local nonsimilarity solutions for mixed convection boundary layer flow of a micropolar fluid on horizontal flat plates with variable surface temperature, Appl. Math. Comput. 122 (2) (2001) 133.
[697] R. Muthucumaraswamy, P. Ganesan, V.M. Soundalgekar, Heat and mass transfer effects on flow past an impulsively started vertical plate, Acta Mech. 146 (1–2) (2001) 1.
[698] R. Muthucumaraswamy, P. Ganesan, V.M. Soundalgekar, On flow and heat transfer of a viscous incompressible fluid past an impulsively started vertical isothermal plate, Int. J. Therm. Sci. 40 (3) (2001) 297.
[699] H.S. Takhar, A.J. Chamkha, G. Nath, Natural convection flow from a continuously moving vertical surface immersed in a thermally stratified medium, Heat Mass Transfer 38 (1–2) (2001) 17.
[700] G. Ziskind, B. Zhao, D. Katoshevski, E. Bar-Ziv, Experimental study of the forces associated with mixed convection from a heated sphere at small Reynolds and Grashof numbers. Part I: Cross-flow, Int. J. Heat Mass Transfer 44 (23) (2001) 4381.
[701] M.H. Chang, J.H. Lin, C.K. Chen, The inverse estimation of local heat transfer coefficient in a vertical plate fin with its base subjected to periodically oscillated

temperature, Numer. Heat Transfer Part A—Applications 40 (3) (2001) 253.
[702] A. Guvenc, H. Yuncu, An experimental investigation on performance of fins on a horizontal base in free convection heat transfer, Heat Mass Transfer 37 (4–5) (2001) 409.
[703] K.M. Moon, T.H. Song, Numerical simulation of the stability of flowing glass steadily cooled by radiation, Phys. Chem. Glasses 42 (4–5) (2001) 292.
[704] H.M. Park, W.J. Lee, Feedback control of natural convection, Comput. Meth. Appl. Mech. Eng. 191 (8–10) (2001) 1013.
[705] B.P. Axcell, C. Thianpong, Convection to rotating disks with rough surfaces in the presence of an axial flow, Exp. Therm. Fluid Sci. 25 (1–2) (2001) 3.
[706] M. Djaoui, A. Dyment, R. Debuchy, Heat transfer in a rotor–stator system with a radial inflow, Eur. J. Mech. B—Fluids 20 (3) (2001) 371.
[707] M.G. Dunn, Convective heat transfer and aerodynamics in axial flow turbines, J. Turbomachine.—Trans. ASME 123 (4) (2001) 637.
[708] M.A. Hossain, A. Hossain, M. Wilson, Unsteady flow of viscous incompressible fluid with temperature-dependent viscosity due to a rotating disc in presence of transverse magnetic field and heat transfer, Int. J. Therm. Sci. 40 (1) (2001) 11.
[709] S.A. Kaluzhina, I.V. Kobanenko, Mechanism of local activation of copper in the presence of chloride and sulfate ions at elevated temperature and heat transfer, Prot. Met. 37 (3) (2001) 237.
[710] R.B. Lehoucq, A.G. Salinger, Large-scale eigenvalue calculations for stability analysis of steady flows on massively parallel computers, Int. J. Numer. Meth. Fluids 36 (3) (2001) 309.
[711] R.P. Pawlowski, A.G. Salinger, L.A. Romero, J.N. Shadid, Computational design and analysis of MOVPE reactors, J. Phys. IV 11 (PR3) (2001) 197.
[712] P. Sandilya, G. Biswas, D.P. Rao, A. Sharma, Numerical simulation of the gas flow and mass transfer between two coaxially rotating disks, Numer. Heat Transfer Part A—Applications 39 (3) (2001) 285.
[713] I.V. Shevchuk, Effect of the wall temperature on laminar heat transfer in a rotating disk: an approximate analytical solution, High Temp.—USSR 39 (4) (2001) 637.
[714] R. Usha, R. Ravindran, Numerical study of film cooling on a rotating disk, Int. J. Non-Lin. Mech. 36 (1) (2001) 147.
[715] S. Acharya, V. Eliades, D.E. Nikitopoulos, Heat transfer enhancements in rotating two-pass coolant channels with profiled ribs: Part 1—Average results, J. Turbomachine.—Trans. ASME 123 (1) (2001) 97.
[716] V. Eliades, D.E. Nikitopoulos, S. Acharya, Mass-transfer distribution in rotating, two-pass, ribbed channels with vortex generators, J. Thermophys. Heat Transfer 15 (3) (2001) 266.
[717] G.J. Hwang, S.C. Tzeng, C.P. Mao, C.Y. Soong, Heat transfer in a radially rotating four-pass serpentine channel with staggered half-V rib turbulators, J. Heat Transfer—Trans. ASME 123 (1) (2001) 39.
[718] H. Iacovides, D.C. Jackson, G. Kelemenis, B.E. Launder, Y.M. Yuan, Flow and heat transfer in a rotating U-bend with 45° ribs, Int. J. Heat Fluid Flow 22 (3) (2001) 308.
[719] Y.J. Jang, H.C. Chen, J.C. Han, Flow and heat transfer in a rotating square channel with 45° angled ribs by Reynolds stress turbulence model, J. Turbomachine.—Trans. ASME 123 (1) (2001) 124.
[720] U. Lei, A.C.Y. Yang, Convective heat transfer of the flow through a rotating circular straight pipe, Chin. J. Mech. A (English Edition) 17 (2) (2001) 79.
[721] Y.L. Lin, T.I.P. Shih, M.A. Stephens, M.K. Chyu, A numerical study of flow and heat transfer in a smooth and ribbed U-duct with and without rotation, J. Heat Transfer—Trans. ASME 123 (2) (2001) 219.
[722] T.M. Liou, C.C. Chen, M.Y. Chen, TLCT and LDV measurements of heat transfer and fluid flow in a rotating sharp turning duct, Int. J. Heat Mass Transfer 44 (9) (2001) 1777.
[723] A. Murata, S. Mochizuki, Large eddy simulation of turbulent heat transfer in an orthogonally rotating square duct with angled rib turbulators, J. Heat Transfer—Trans. ASME 123 (5) (2001) 858.
[724] D.E. Nikitopoulos, V. Eliades, S. Acharya, Heat transfer enhancements in rotating two-pass coolant channels with profiled ribs: Part 2—Detailed measurements, J. Turbomachine.—Trans. ASME 123 (1) (2001) 107.
[725] B. Song, R.S. Amano, G.R. Liu, On computations of complex turbulent flow by using nonlinear k–ω model, Numer. Heat Transfer Part B—Fundamentals 39 (5) (2001) 421.
[726] F.T. Willett, A.E. Bergles, Heat transfer in rotating narrow rectangular ducts with heated sides oriented at 60° to the r–z plane, J. Turbomachine.—Trans. ASME 123 (2) (2001) 288.
[727] J.S. Zhang, B.Z. Zhang, J.W. Ju, Fluid flow in a rotating curved rectangular duct, Int. J. Heat Fluid Flow 22 (6) (2001) 583.
[728] J. Anagnostopoulos, G. Bergeles, B. Epple, P. Stegelitz, Numerical simulation of grinding and drying performance of a fluid-energy lignite mill, J. Fluids Eng.—Trans. ASME 123 (2) (2001) 303.
[729] J.M. Aurnou, P.L. Olson, Experiments on Rayleigh–Bernard convection, magnetoconvection and rotating magnetoconvection in liquid gallium, J. Fluid Mech. 430 (2001) 283.
[730] H.F. Baig, A. Masood, Natural convection in a two-dimensional differentially heated square enclosure undergoing rotation, Numer. Heat Transfer Part A—Applications 40 (2) (2001) 181.
[731] Y.J. Dai, R.Z. Wang, H.F. Zhang, Parameter analysis to improve rotary desiccant dehumidification using a mathematical modes, Int. J. Therm. Sci. 40 (4) (2001) 400.
[732] Y.L. Ding, R.N. Forster, J.P.K. Seville, D.J. Parker, Scaling relationships for rotating drums, Chem. Eng. Sci. 56 (12) (2001) 3737.
[733] V.E. Distanov, A.G. Kirdyashkin, The influence of accelerated crucible rotation mode on the melt temper-

ature field in the Stockbarger technique, J. Cryst. Growth 222 (3) (2001) 607.
[734] S. Enger, O. Grabner, G. Muller, M. Breuer, F. Durst, Comparison of measurements and numerical simulations of melt convection in Czochralski crystal growth of silicon, J. Cryst. Growth 230 (1–2) (2001) 135.
[735] A.I. Feonychev, I.S. Kalachinskaya, The impact of variable accelerations on crystal growth onboard spacecraft by the floating zone method, Cosmic Res. 39 (4) (2001) 374.
[736] M.T. Hardin, T. Howes, D.A. Mitchell, Residence time distributions of gas flowing through rotating drum bioreactors, Biotechnol. Bioeng. 74 (2) (2001) 145.
[737] R. Hermann, J. Priede, G. Behr, G. Gerbeth, L. Schultz, Influence of growth parameters and melt convection on the solid–liquid interface during RF-floating zone crystal growth of intermetallic compounds, J. Cryst. Growth 223 (4) (2001) 577.
[738] P. Hintz, D. Schwabe, H. Wilke, Convection in a Czochralski crucible—Part 1: Non-rotating crystal, J. Cryst. Growth 222 (1–2) (2001) 343.
[739] H. Karabay, M. Wilson, J.M. Owen, Predictions of effect of swirl on flow and heat transfer in a rotating cavity, Int. J. Heat Fluid Flow 22 (2) (2001) 143.
[740] A.E. Kokh, V.N. Popov, P.W. Mokrushnikov, Numerical modeling of contact-free control over crystal growth heat-mass transfer processes through heat field rotation, J. Cryst. Growth 230 (1–2) (2001) 155.
[741] C.W. Lan, Effects of centrifugal acceleration on the flows and segregation in vertical Bridgman crystal growth with steady ampoule rotation, J. Cryst. Growth 229 (1) (2001) 595.
[742] C.W. Lan, C.Y. Tu, Three-dimensional analysis of heat flow, segregation, and interface shape of gradient-freeze crystal growth in a centrifuge, J. Cryst. Growth 226 (2) (2001).
[743] C.H. Lee, J.M. Hyun, H.S. Kwak, Flow of a fluid near its density maximum in a differentially rotating cylinder, Int. J. Heat Fluid Flow 22 (4) (2001) 433.
[744] J.S. Lee, C.J. Kim, Heat transfer and internal flow characteristics of a coil-inserted rotating heat pipe, Int. J. Heat Mass Transfer 44 (18) (2001) 3543.
[745] C. Mackie, C.A. Hall, J.A. Perkins, Solidification of circular Couette flow with viscous dissipation, Int. J. Heat Fluid Flow 22 (4) (2001) 473.
[746] J. Mang, M. Ungarish, U. Schaflinger, Gravitational–centrifugal separation in an axisymmetric source-sink flow with a free surface, Int. J. Multiphase Flow 27 (2) (2001) 197.
[747] Y. Morinishi, K. Nakabayashi, S.Q. Ren, A new DNS algorithm for rotating homogeneous decaying turbulence, Int. J. Heat Fluid Flow 22 (1) (2001) 30.
[748] G. Ratnieks, A. Muiznieks, A. Muhlbauer, G. Raming, Numerical 3D study of FZ growth: dependence on growth parameters and melt instability, J. Cryst. Growth 230 (1–2) (2001) 48.
[749] Y.P. Segonne, C.L. Briens, J.M. Chabagno, J. Bousquet, Assessment of agitation and detection of deposits in mechanical solids mixers, Powder Technol. 116 (1) (2001) 69.
[750] E. Serre, S. Hugues, E.C. del Arco, A. Randriamampianina, P. Bontoux, Axisymmetric and three-dimensional instabilities in an Ekman boundary layer flow, Int. J. Heat Fluid Flow 22 (1) (2001) 82.
[751] F. Sharipov, L.M.G. Cumin, G.M. Kremer, Transport phenomena in rotating rarefied gases, Phys. Fluids 13 (1) (2001) 335.
[752] W. Shyy, M.P. Ebert, Heat transfer and fluid flow in rotating sealed cavities, Adv. Heat Transfer 35 (35) (2001) 173.
[753] Y. Sommerer, G. Lauriat, Numerical study of steady forced convection in a grooved annulus using a design of experiments, J. Heat Transfer—Trans. ASME 123 (5) (2001) 837.
[754] E.H. Stitt, S.D. Jackson, D.G. Shipley, F. King, Modelling propane dehydrogenation in a rotating monolith reactor, Catal. Today 69 (1–4) (2001) 217.
[755] J. Tattiyakul, M.A. Rao, A.K. Datta, Simulation of heat transfer to a canned corn starch dispersion subjected to axial rotation, Chem. Eng. Process. 40 (4) (2001) 391.
[756] M. Venkatachalappa, M. Sankar, A.A. Natarajan, Natural convection in an annulus between two rotating vertical cylinders, Acta Mech. 147 (1–4) (2001) 173.
[757] D. Vizman, O. Grabner, G. Muller, Three-dimensional numerical simulation of thermal convection in an industrial Czochralski melt: comparison to experimental results, J. Cryst. Growth 233 (4) (2001) 687.
[758] J.L White, E.K. Kim, J.M. Keum, H.C. Jung, D.S. Bang, Modeling heat transfer in screw extrusion with special application to modular self-wiping co-rotating twin-screw extrusion, Polym. Eng. Sci. 41 (8) (2001) 1448.
[759] C.P. Yin, Y.T. Ker, T.H. Huang, T.F. Lin, Fluctuating characteristics and rotation induced stabilization of thermal buoyancy driven water flow in a vertical rotating cylinder, Int. J. Heat Mass Transfer 44 (5) (2001) 919.
[760] W.M. Zhu, Y. Jaluria, Residence time and conversion in the extrusion of chemically reactive materials, Polym. Eng. Sci. 41 (7) (2001) 1280.
[761] W.M. Zhu, Y. Jaluria, Transport processes and feasible operating domain in a twin-screw polymer extruder, Polym. Eng. Sci. 41 (1) (2001) 107.
[762] M.F. Carfora, Effectiveness of the operator splitting for solving the atmospherical shallow water equations, Int. J. Numer. Meth. Heat Fluid Flow 11 (2–3) (2001) 213.
[763] P.E. Dijk, A.M.C. Janse, J.A.M. Kuipers, W.P.M. van Swaaij, Hydrodynamics of liquid flow in a rotating cone, Int. J. Numer. Meth. Heat Fluid Flow 11 (5–6) (2001) 386.
[764] Y.L. Ding, R.N. Forster, J.P.K. Seville, D.J. Parker, Some aspects of heat transfer in rolling mode rotating drums operated at low to medium temperatures, Powder Technol. 121 (2–3) (2001) 168.
[765] S. Kiwan, M.A. Al-Nimr, Temperatures of circular rods due to rotational and oscillatory axial sliding motion, Int. J. Therm. Sci. 40 (4) (2001) 392.
[766] G. Aguilar, B. Majaron, K. Pope, L.O. Svaasand, E.J. Lavernia, J.S. Nelson, Influence of nozzle-to-skin

distance in cryogen spray cooling for dermatologic laser surgery, Lasers Surg. Med. 28 (2) (2001) 113.
[767] D. Ai, P.P. Ding, P.H. Chen, The selection criterion of injection temperature pair for transient liquid crystal thermography on film cooling measurements, Int. J. Heat Mass Transfer 44 (7) (2001) 1389.
[768] A. Azzi, M. Abidat, B.A. Jubran, Film cooling predictions of simple and compound angle injection from one and two staggered rows, Numer. Heat Transfer Part A—Applications 40 (3) (2001) 273.
[769] S. Baldauf, A. Schulz, S. Wittig, High-resolution measurements of local heat transfer coefficients from discrete hole film cooling, J. Turbomachine.—Trans. ASME 123 (4) (2001) 749.
[770] H.H. Cho, S.G. Kang, D.H. Rhee, Heat/mass transfer measurement within a film cooling hole of square and rectangular cross section, J. Turbomachine.—Trans. ASME 123 (4) (2001) 806.
[771] H.H Cho, D.H. Rhee, Local heat/mass transfer measurement on the effusion plate in impingement/effusion cooling systems, J. Turbomachine.—Trans. ASME 123 (3) (2001) 601.
[772] H.H. Cho, D.H. Rhee, B.G. Kim, Enhancement of film cooling performance using a shaped film cooling hole with compound angle injection, JSME Int. J. B—Fluids Therm. Eng. 44 (1) (2001) 99.
[773] M.I. Ethridge, J.M. Cutbirth, D.G. Bogard, Scaling of performance for varying density ratio coolants on an airfoil with strong curvature and pressure gradient effects, J. Turbomachine.—Trans. ASME 123 (2) (2001) 231.
[774] R.J. Goldstein, P. Jin, Film cooling downstream at a row of discrete holes with compound angle, J. Turbomachine.—Trans. ASME 123 (2) (2001) 222.
[775] E. Kaiser, Measurement and visualization of impingement cooling in narrow channels, Exp. Fluids 30 (6) (2001) 603.
[776] F. Kost, M. Nicklas, Film-cooled turbine endwall in a transonic flow field: Part I—Aerodynamic measurements, J. Turbomachine.—Trans. ASME 123 (4) (2001) 709.
[777] D. Lakehal, G.S. Theodoridis, W. Rodi, Three-dimensional flow and heat transfer calculations of film cooling at the leading edge of a symmetrical turbine blade model, Int. J. Heat Fluid Flow 22 (2) (2001) 113.
[778] P.M. Ligrani, C.M. Bell, Film cooling subject to bulk flow pulsations: effects of density ratio, hole length-to-diameter ratio, and pulsation frequency, Int. J. Heat Mass Transfer 44 (10) (2001) 2005.
[779] Y.L. Lin, T.I.P. Shih, Film cooling of a cylindrical leading edge with injection through rows of compound-angle holes, J. Heat Transfer—Trans. ASME 123 (4) (2001) 645.
[780] E. Lutum, J. von Wolfersdorf, K. Semmler, J. Dittmar, B. Weigand, An experimental investigation of film cooling on a convex surface subjected to favourable pressure gradient flow, Int. J. Heat Mass Transfer 44 (5) (2001) 939.
[781] E. Lutum, J. von Wolfersdorf, K. Semmler, S. Naik, B. Weigand, Film cooling on a convex surface: influence of external pressure gradient and Mach number on film cooling performance, Heat Mass Transfer 38 (1–2) (2001) 7.
[782] L. Mathelin, F. Bataille, A. Lallemand, Blowing models for cooling surfaces, Int. J. Therm. Sci. 40 (11) (2001) 969.
[783] H. Nasir, S.V. Ekkad, S. Acharya, Effect of compound angle injection on flat surface film cooling with large streamwise injection angle, Exp. Therm. Fluid Sci. 25 (1–2) (2001) 23.
[784] M. Nicklas, Film-cooled turbine endwall in a transonic flow field: Part II—Heat transfer and film-cooling effectiveness, J. Turbomachine.—Trans. ASME 123 (4) (2001) 720.
[785] S. Ou, R.B. Rivir, Leading edge film cooling heat transfer with high free stream turbulence using a transient liquid crystal image method, Int. J. Heat Fluid Flow 22 (6) (2001) 614.
[786] D.A. Rowbury, M.L.G. Oldfield, G.D. Lock, Large-scale testing to validate the influence of external crossflow on the discharge coefficients of film cooling holes, J. Turbomachine.—Trans. ASME 123 (3) (2001) 593.
[787] S. Sarkar, K. Das, D. Basu, Film cooling on a turbine guide vane: a numerical analysis with a multigrid technique, Proc. Inst. Mech. Eng. Part A—J. Power Energy 215 (A1) (2001) 39.
[788] J. Stricker, Y. Goldman, G. Borodyanski, Thermochemical protection of high temperature materials, J. Enhanc. Heat Transfer 8 (4) (2001) 231.
[789] M.E. Taslim, Y. Pan, S.D. Spring, An experimental study of impingement on roughened airfoil leading-edge walls with film holes, J. Turbomachine.—Trans. ASME 123 (4) (2001) 766.
[790] M.E. Taslim, L. Setayeshgar, An experimental evaluation of advanced leading edge impingement cooling concepts, J. Turbomachine.—Trans. ASME 123 (1) (2001) 147.
[791] S. Teng, J.C. Han, P.E. Poinsatte, Effect of film-hole shape on turbine-blade film-cooling performance, J. Thermophys. Heat Transfer 15 (3) (2001) 257.
[792] S. Teng, J.C. Han, P.E. Poinsatte, Effect of film-hole shape on turbine-blade heat-transfer coefficient distribution, J. Thermophys. Heat Transfer 15 (3) (2001) 249.
[793] G.S. Theodoridis, D. Lakehal, W. Rodi, Three-dimensional calculations of the flow field around a turbine blade with film cooling injection near the leading edge, Flow Turbulence Combust. 66 (1) (2001) 57.
[794] A. Abdon, B. Sunden, Numerical investigation of impingement heat transfer using linear and nonlinear two-equation turbulence models, Numer. Heat Transfer Part A—Applications 40 (6) (2001) 563.
[795] Z. Adamczyk, B. Siwek, P. Warszynski, E. Musial, Kinetics of particle deposition in the radial impinging-jet cell, J. Colloid Interf. Sci. 242 (1) (2001) 14.
[796] P. Astin, G. Wilks, Heat transfer in the assimilation of a pre-heated jet into non-uniform streams, Heat Mass Transfer 38 (1–2) (2001) 75.
[797] R. Chalupa, M.Y. Chen, V. Modi, A.C. West, High Schmidt mass transfer in a turbulent impinging slot-jet flow, Int. J. Heat Mass Transfer 44 (20) (2001) 3775.

[798] A. Chatterjee, L.J. Deviprasath, Heat transfer in confined laminar axisymmetric impinging jets at small nozzle-plate distances: The role of upstream vorticity diffusion, Numer. Heat Transfer Part A—Applications 39 (8) (2001) 777.
[799] H. Chattopadhyay, S.K. Saha, Numerical investigations of heat transfer over a moving surface due to impinging knife-jets, Numer. Heat Transfer Part A—Applications 39 (5) (2001) 531.
[800] C. Cornaro, A.S. Fleischer, M. Rounds, R.J. Goldstein, Jet impingement cooling of a convex semi-cylindrical surface, Int. J. Therm. Sci. 40 (10) (2001) 890.
[801] T. Cziesla, G. Biswas, H. Chattopadhyay, N.K. Mitra, Large-eddy simulation of flow and heat transfer in an impinging slot jet, Int. J. Heat Fluid Flow 22 (5) (2001) 500.
[802] M. Favre-Marinet, E.B.C. Schettini, The density field of coaxial jets with large velocity ratio and large density differences, Int. J. Heat Mass Transfer 44 (10) (2001) 1913.
[803] A.S. Fleischer, K. Kramer, R.J. Goldstein, Dynamics of the vortex structure of a jet impinging on a convex surface, Exp. Therm. Fluid Sci. 24 (3–4) (2001) 169.
[804] W.S. Fu, K.N. Wang, An investigation of a block moving back and forth on a heat plate under a slot jet. Part II (the effects of block moving distance and vacant distance), Int. J. Heat Mass Transfer 44 (24) (2001) 4649.
[805] W.S. Fu, K.N. Wang, W.W. Ke, An investigation of a block moving back and forth on a heat plate under a slot jet, Int. J. Heat Mass Transfer 44 (14) (2001) 2621.
[806] S.V. Garimella, V.P. Schroeder, Local heat transfer distributions in confined multiple air jet impingement, J. Electron. Packag. 123 (3) (2001) 165.
[807] K.M.B. Gustafsson, T.G. Johansson, An experimental study of surface temperature distribution on effusion-cooled plates, J. Eng. Gas Turbines Power—Trans. ASME 123 (2) (2001) 308.
[808] U. Heck, U. Fritsching, K. Bauckhage, Fluid flow and heat transfer in gas jet quenching of a cylinder, Int. J. Numer. Meth. Heat Fluid Flow 11 (1) (2001) 36.
[809] S.S. Hsieh, J.T. Huang, H.H. Tsai, Heat transfer of confined circular jet impingement, Chin. J. Mech. A (English Edition) 17 (1) (2001) 29.
[810] J.J. Hwang, C.S. Cheng, Impingement cooling in triangular ducts using an array of side-entry wall jets, Int. J. Heat Mass Transfer 44 (5) (2001) 1053.
[811] S.D. Hwang, C.H. Lee, H.H. Cho, Heat transfer and flow structures in axisymmetric impinging jet controlled by vortex pairing, Int. J. Heat Fluid Flow 22 (3) (2001) 293.
[812] K. Ichimiya, S. Takema, S. Morimoto, T. Kunugi, N. Akino, Movement of impingement heat transfer by a single circular jet with a confined wall, Int. J. Heat Mass Transfer 44 (16) (2001) 3095.
[813] R.G. Jia, M. Rokni, B. Sunden, Impingement cooling in a rib-roughened channel with cross-flow, Int. J. Numer. Meth. Heat Fluid Flow 11 (7) (2001) 642.
[814] H. Kawahara, T. Nishimura, Two-dimensional simulation in transitional jet diffusion flame with/without a duct, Numer. Heat Transfer Part A—Applications 40 (6) (2001) 639.
[815] S.H. Lee, H.S. Ryou, Development of a new model and heat transfer analysis of impinging diesel sprays on a wall, Atomization Sprays 11 (1) (2001) 85.
[816] C.Y. Li, S.V. Garimella, Prandtl-number effects and generalized correlations for confined and submerged jet impingement, Int. J. Heat Mass Transfer 44 (18) (2001) 3471.
[817] X. Li, J.L. Gaddis, T. Wang, Modeling of heat transfer in a mist/steam impinging jet, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1086.
[818] H.H. Liakos, M.A. Founti, N.C. Markatos, Modeling the characteristic types and heat release of stretched premixed impinging flames, Comput. Mech. 27 (1) (2001) 88.
[819] H.H. Liakos, M.K. Koukou, M.A. Founti, N.C. Markatos, Gaseous fuel assessment in industrial impinging flames with local extinction effects, Chem. Eng. Technol. 24 (12) (2001) 1289.
[820] S. Maurel, C. Solliec, A turbulent plane jet impinging nearby and far from a flat plate, Exp. Fluids 31 (6) (2001) 687.
[821] J.M. Miranda, J. Campos, Impinging jets confined by a conical wall—high Schmidt mass transfer predictions in laminar flow, Int. J. Heat Mass Transfer 44 (7) (2001) 1269.
[822] Y. Mitsutake, M. Monde, Heat transfer during transient cooling of high temperature surface with an impinging jet, Heat Mass Transfer 37 (4) (2001).
[823] K. Nakabe, E. Fornalik, J.F. Eschenbacher, Y. Yamamoto, T. Ohta, K. Suzuki, Interactions of longitudinal vortices generated by twin inclined jets and enhancement of impingement heat transfer, Int. J. Heat Fluid Flow 22 (3) (2001) 287.
[824] T.S. Park, H.J. Sung, Development of a near-wall turbulence model and application to jet impingement heat transfer, Int. J. Heat Fluid Flow 22 (1) (2001) 10.
[825] J.Y. San, M.D. Lai, Optimum jet-to-jet spacing of heat transfer for staggered arrays of impinging air jets, Int. J. Heat Mass Transfer 44 (21) (2001) 3997.
[826] S.Z. Shuja, B.S. Yilbas, A laminar swirling jet impingement on to an adiabatic wall—effect of inlet velocity profiles, Int. J. Numer. Meth. Heat Fluid Flow 11 (2–3) (2001) 237.
[827] S.Z. Shuja, B.S. Yilbas, M.O. Budair, Local entropy generation in an impinging jet: minimum entropy concept evaluating various turbulence models, Comput. Meth. Appl. Mech. Eng. 190 (28) (2001) 3623.
[828] V. Soto, R. Borquez, Impingement jet freezing of biomaterials, Food Control 12 (8) (2001) 515.
[829] S. Torii, Numerical simulation of turbulent jet diffusion flames by means of two-equation heat transfer model, Energy Convers. Manage. 42 (15–17) (2001) 1953.
[830] E. Turgeon, D. Pelletier, Verification and validation of adaptive finite element method for impingement heat transfer, J. Thermophys. Heat Transfer 15 (3) (2001) 284.
[831] H. Urson, M.F. Lightstone, M.J. Thomson, A numerical study of jets in a reacting crossflow, Numer. Heat Transfer Part A—Applications 40 (7) (2001) 689.

[832] M.H. Yu, T.K. Lin, Y.Y. Hsieh, Influence of acoustic forcing on the near field development of a heated plane jet, Exp. Therm. Fluid Sci. 25 (1–2) (2001) 13.
[833] J. Zhe, V. Modi, Near wall measurements for a turbulent impinging slot jet, J. Fluids Eng.—Trans. ASME 123 (1) (2001) 112.
[834] S.W. Chang, L.M. Su, Heat transfer of confined impinging air–water mist jet, JSME Int. J. B—Fluids Therm. Eng. 44 (2) (2001) 274.
[835] W.B. Chen, R.B.H. Tan, A model for steam bubble formation at a submerged nozzle in flowing subcooled water, Int. J. Heat Fluid Flow 22 (5) (2001) 552.
[836] Y.C. Chen, C.F. Ma, Z.X. Yuan, Z.Z. Xia, Z.Y. Guo, Heat transfer enhancement with impinging free surface liquid jets flowing over heated wall coated by a ferrofluid, Int. J. Heat Mass Transfer 44 (2) (2001) 499.
[837] H. Fujimoto, T. Ogino, N. Hatta, H. Takuda, Numerical simulation of successive collision of two liquid droplets with a solid wall, ISIJ Int. 41 (5) (2001) 454.
[838] S. Kishimoto, J.X. Zheng, T. Ochi, T. Yoshimura, N. Ohmura, K. Kataoka, A new estimation method of turbulent flow structures effective for impingement heat transfer augmentation, J. Chem. Eng. Jpn. 34 (9) (2001) 1136.
[839] X. Li, J.L. Gaddis, T. Wang, Mist/steam heat transfer in confined slot jet impingement, J. Turbomachine.—Trans. ASME 123 (1) (2001) 161.
[840] E.K. Longmire, T.L. Norman, D.L. Gefroh, Dynamics of pinch-off in liquid/liquid jets with surface tension, Int. J. Multiphase Flow 27 (10) (2001) 1735.
[841] A.W. Momber, Energy transfer during the mixing of air and solid particles into a high-speed waterjet: an impact-force study, Exp. Therm. Fluid Sci. 25 (1–2) (2001) 31.
[842] J. Bachmann, R. Horton, R.R. van der Ploeg, Isothermal and nonisothermal evaporation from four sandy soils of different water repellency, Soil Sci. Soc. Am. J. 65 (6) (2001) 1599.
[843] S. Bonachela, F. Orgaz, F.J. Villalobos, E. Fereres, Soil evaporation from drip-irrigated olive orchards, Irrigation Sci. 20 (2) (2001) 65.
[844] B. Cuhadaroglu, Numerical analysis of the effects of tangential transpiration on the boundary layer characteristics, Int. J. Numer. Meth. Heat Fluid Flow 11 (8) (2001) 793.
[845] J.C. Gottschalck, R.R. Gillies, T.N. Carlson, The simulation of canopy transpiration under doubled CO_2: the evidence and impact of feedbacks on transpiration in two 1-D soil–vegetation–atmosphere–transfer models, Agric. Forest Meteorol. 106 (1) (2001) 1.
[846] J. Meinert, J. Huhn, E. Serbest, O.J. Haidn, Turbulent boundary layers with foreign gas transpiration, J. Spacecraft Rockets 38 (2) (2001) 191.
[847] A. Roth-Nebelsick, Computer-based analysis of steady-state and transient heat transfer of small-sized leaves by free and mixed convection, Plant Cell Environ. 24 (6) (2001) 631.
[848] W.M. Yan, P.Y. Tzeng, Transport phenomena of developing laminar mixed convection in inclined rectangular ducts with wall transpiration, J. Heat Transfer—Trans. ASME 123 (4) (2001) 810.
[849] M.E. Agnelli, R.H. Mascheroni, Cryomechanical freezing. A model for the heat transfer process, J. Food Eng. 47 (4) (2001) 263.
[850] M. Carin, M. Jaeger, Numerical simulation of the interaction of biological cells with an ice front during freezing, Eur. Phys. J.—Appl. Phys. 16 (3) (2001) 231.
[851] Z.Z. Hua, H.Y. Xu, G.Y. Zhou, J.F. Liu, H.M. Huang, W.X. Ding, Analyses of thermal stress and fracture during cryopreservation of blood vessel, Sci. China E—Technol. Sci. 44 (2) (2001) 158.
[852] Y. Matsumoto, Y. Morinaga, M. Ujihira, K. Oka, K. Tanishita, Improvement in the viability of cryopreserved cells by microencapsulation, JSME Int. J. C—Mech. Syst. Machine Elem. Manuf. 44 (4) (2001) 937.
[853] J. Wolfe, G. Bryant, Cellular cryobiology: thermodynamic and mechanical effects, Int. J. Refrig. (Rev. Int. du Froid) 24 (5) (2001) 438.
[854] L. Bou-Diab, B. Schenker, I. Marison, S. Ampuero, U. von Stockar, Improvement of continuous calibration based on temperature oscillation and application to biochemical reaction calorimetry, Chem. Eng. J. 81 (1–3) (2001) 113.
[855] E. Gingl, H. Tichy, Infrared sensitivity of thermoreceptors, J. Comp. Physiol. A—Sensory Neural Behav. Physiol. 187 (6) (2001) 467.
[856] D. Lorinczy, F. Konczol, L. Farkas, J. Belagyi, C. Schick, Nucleotide-induced changes in muscle fibres studied by DSC and TMDSC, Thermochim. Acta 377 (1–2) (2001) 205.
[857] D. Lorinczy, F. Konczol, L. Farkas, J. Belagyi, C. Schick, Nucleotides induced changes in skeletal muscle myosin by DSC, TMDSC and EPR, J. Therm. Anal. Calorim. 66 (2) (2001) 633.
[858] W.R. Santee, L.A. Blanchard, Thermal properties of handwear at varying altitudes, Aviat. Space Environ. Med. 72 (6) (2001) 576.
[859] J.M. Ward, D.C. Houston, G.D. Ruxton, D.J. McCafferty, P. Cook, Thermal resistance of chicken (*Gallus domesticus*) plumage: a comparison between broiler and free-range birds, Br. Poultry Sci. 42 (5) (2001) 558.
[860] O.I. Craciunescu, S.K. Das, R.L. McCauley, J.R. Macfall, T.V. Samulski, 3D numerical reconstruction of the hyperthermia induced temperature distribution in human sarcomas using DE-MRI measured tissue perfusion: validation against non-invasive MR temperature measurements, Int. J. Hyperthermia 17 (3) (2001) 221.
[861] O.I. Craciunescu, B.W. Raaymakers, A. Kotte, S.K. Das, T.V. Samulski, J.J.W. Lagendijk, Discretizing large traceable vessels and using DE-MRI perfusion maps yields numerical temperature contours that match the MR noninvasive measurements, Med. Phys. 28 (11) (2001) 2289.
[862] Z.S. Deng, J. Liu, Blood perfusion-based model for characterizing the temperature fluctuation in living tissues, Physica A 300 (3–4) (2001) 521.
[863] S.H. Diaz, G. Aguilar, E.J. Lavernia, B.J.F. Wong, Modeling the thermal response of porcine cartilage to laser irradiation, IEEE J. Sel. Top. Quantum Electron. 7 (6) (2001) 944.

[864] N.M. Fried, Y.D. Sinelnikov, B.B. Pant, W.W. Roberts, S.B. Solomon, Noninvasive vasectomy using a focused ultrasound clip: thermal measurements and simulations, IEEE Trans. Biomed. Eng. 48 (12) (2001) 1453.

[865] J. Gantenberg, A. Mumme, V. Zumtobel, J. Werner, Assessment of the temperature distribution during hyperthermia treatment by isolated extremity perfusion, Int. J. Hyperthermia 17 (3) (2001) 189.

[866] S.B. Harris, M.G. Darwin, S.R. Russell, J.M. O'Farrell, M. Fletcher, B. Wowk, Rapid (0.5 °C/min) minimally invasive induction of hypothermia using cold perfluorochemical lung lavage in dogs, Resuscitation 50 (2) (2001) 189.

[867] N.E. Hoffmann, J.C. Bischof, Cryosurgery of normal and tumor tissue in the dorsal skin flap chamber: Part I—Thermal response, J. Biomech. Eng.—Trans. ASME 123 (4) (2001) 301.

[868] T.M. Kuzay, M. Kazmierczak, B.J. Hsieh, X-ray bean/biomaterial thermal interactions in third-generation synchrotron sources, Acta Crystallogr. Section D Biol. Crystall. 57 (1) (2001) 69.

[869] W.L. Lin, T.C. Liang, J.Y. Yen, H.L. Liu, Y.Y. Chen, Optimization of power deposition and a heating strategy for external ultrasound thermal therapy, Med. Phys. 28 (10) (2001) 2172.

[870] T. Matsui, T. Arai, K. Matsumura, T. Ishizuka, K. Hagisawa, B. Takase, S. Sato, M. Suzuki, M. Kikuchi, A. Kurita, Determining the temperature distribution of swine aorta with simulated atheromatous plaque under pulsed laser irradiation: an experimental attempt to detect the vulnerability of atherosclerosis, J. Med. Eng. Technol. 25 (5) (2001) 181.

[871] E.Y.K. Ng, N.M. Sudharsan, Numerical uncertainty and perfusion induced instability in bioheat equation: its importance in thermographic interpretation, J. Med. Eng. Technol. 25 (5) (2001) 222.

[872] J.H. Niu, H.Z. Wang, H.X. Zhang, J.Y. Yan, Y.S. Zhu, Cellular neural network analysis for two-dimensional bioheat transfer equation, Med. Biol. Eng. Comput. 39 (5) (2001) 601.

[873] A. Payne, M. Mattingly, J. Shelkey, E. Scott, R. Roemer, A dynamic two-dimensional phantom for ultrasound hyperthermia controller testing, Int. J. Hyperthermia 17 (2) (2001) 143.

[874] B.W. Raaymakers, M. Van Vulpen, J.J.W. Lagendijk, A.A.C. De Leeuw, J. Crezee, J.J. Battermann, Determination and validation of the actual 3D temperature distribution during interstitial hyperthermia of prostate carcinoma, Phys. Med. Biol. 46 (12) (2001) 3115.

[875] M.D. Sherar, A.S. Gladman, S.R.H. Davidson, J. Trachtenberg, M.R. Gertner, Helical antenna arrays for interstitial microwave thermal therapy for prostate cancer: tissue phantom testing and simulations for treatment, Phys. Med. Biol. 46 (7) (2001) 1905.

[876] P. Trunk, J. Mocnik, G. Pipan, R. Trobec, B. Gersak, Visualization of computer simulated heart temperature during topical cooling, Pflugers Archiv—Eur. J. Physiol. (Suppl 1) (2001) R139.

[877] B.K. Wan, X. Zhu, X.M. Cheng, L.X. Zhang, S.Y. Lin, W. Wang, Parameter optimization of temperature field in RF-capacitive hyperthermia, Progr. Nat. Sci. 11 (9) (2001) 667.

[878] H. Wehner, A. von Ardenne, S. Kaltofen, Whole-body hyperthermia with water-filtered radiation: technical–physical aspects and clinical experiences, Int. J. Hyperthermia 17 (1) (2001) 19.

[879] J. Wren, M. Karlsson, D. Loyd, A hybrid equation for simulation of perfused tissue during thermal treatment, Int. J. Hyperthermia 17 (6) (2001) 483.

[880] A. Al-Haidary, D.E. Spiers, G.E. Rottinghaus, G.B. Garner, M.R. Ellersieck, Thermoregulatory ability of beef heifers following intake of endophyte-infected tall fescue during controlled heat challenge, J. Animal Sci. 79 (7) (2001) 1780.

[881] M.P. Bolton, K. McGuinness, J. Cooley, L. Hayes, A. Howell, Technical note—a compact data logger for ambulatory skin temperature measurement, J. Med. Eng. Technol. 25 (6) (2001) 264.

[882] K.S. Chung, Critical thermal maxima and acclimation rate of the tropical guppy *Poecilla reticulata*, Hydrobiologia 462 (2001) 253.

[883] O.I. Craciunescu, S.T. Clegg, Pulsatile blood flow effects on temperature distribution and heat transfer in rigid vessels, J. Biomech. Eng.—Trans. ASME 123 (5) (2001) 500.

[884] R.W. Dent, Transient comfort phenomena due to sweating, Textile Res. J. 71 (9) (2001) 796.

[885] E.M. Dzialowski, M.P. O'Connor, Thermal time constant estimation in warming and cooling ectotherms, J. Therm. Biol. 26 (3) (2001) 231.

[886] D. Fiala, K.J. Lomas, M. Stohrer, Computer prediction of human thermoregulatory and temperature responses to a wide range of environmental conditions, Int. J. Biometeorol. 45 (3) (2001) 143.

[887] K.G. Gebremedhin, B.X. Wu, A model of evaporative cooling of wet skin surface and fur layer, J. Therm. Biol. 26 (6) (2001) 537.

[888] S.W. Graves, R.C. Habbersett, J.P. Nolan, A dynamic inline sample thermoregulation unit for flow cytometry, Cytometry 43 (1) (2001) 23.

[889] C. Huizenga, Z. Hui, E. Arens, A model of human physiology and comfort for assessing complex thermal environments, Build. Environ. 36 (6) (2001) 691.

[890] N. Kakuta, S. Yokoyama, M. Nakamura, K. Mabuchi, Estimation of radiative heat transfer using a geometric human model, IEEE Trans. Biomed. Eng. 48 (3) (2001) 324.

[891] I.M. Kandjov, Heat and water rate transfer processes in the human respiratory tract at various altitudes, J. Theor. Biol. 208 (3) (2001) 287.

[892] I.M. Kandjov, Thermal stability of the human body under hyperbaric environmental conditions: a theoretical study, Eur. J. Appl. Physiol. Occup. Physiol. 85 (6) (2001) 572.

[893] W.L. Kenney, Decreased cutaneous vasodilation in aged skin: mechanisms, consequences and interventions, J. Therm. Biol. 26 (4–5) (2001) 263.

[894] T. Miyanaga, W. Urabe, Y. Nakano, Simplified human body model for evaluating thermal radiant environment in a radiant cooled space, Build. Environ. 36 (7) (2001) 801.

[895] M. Nakamura, S. Shoji, R. Suzuki, E. Yamada, Investigation on a temperature control system modeled after the function of the skin (On the temperature control system by the operation of flow rate allotment), JSME Int. J. C—Mech. Syst. Machine Elem. Manuf. 44 (4) (2001) 1152.
[896] M.J. Pac, M.A. Bueno, M. Renner, S. El Kasmi, Warm–cool feeling relative to tribological properties of fabrics, Textile Res. J. 71 (9) (2001) 806.
[897] H.W. Pau, U. Sievert, T. Just, W. Wild, Heat radiation during caloric vestibular test: thermographic demonstration in temporal bone experiments, Ann. Otol. Rhinol. Laryngol. 110 (11) (2001) 1041.
[898] N.P. Pedersen, W.W. Blessing, Cutaneous vasoconstriction contributes to hyperthermia induced by 3,4-methylenedioxymethamphetamine (Ecstasy) in conscious rabbits, J. Neurosci. 21 (21) (2001) 8648.
[899] G.D. Ruxton, Heat loss from giant extinct reptiles, Proc. Roy. Soc. Lond. B—Biol. Sci. 268 (1479) (2001) 1921.
[900] G.M. Saidel, C.R. Davies, E.H. Liu, H. Harasaki, Temperature and perfusion responses of muscle and lung tissue during chronic heating in vivo, Med. Biol. Eng. Comput. 39 (1) (2001) 126.
[901] F. Seebacher, G.C. Grigg, Changes in heart rate are important for thermoregulation in the varanid lizard Varanus varius, J. Comp. Physiol. B—Biochem. Syst. Environ. Physiol. 171 (5) (2001) 395.
[902] P. Szmuk, M.F. Rabb, J.E. Baumgartner, J.M. Berry, A.M. Sessler, D.I. Sessler, Body morphology and the speed of cutaneous rewarming, Anesthesiology 95 (1) (2001) 18.
[903] G.M.J. Van Leeuwen, J.W. Hand, J.B. de Kamer, S. Mizushina, Temperature retrieval algorithm for brain temperature monitoring using microwave brightness temperatures, Electron. Lett. 37 (6) (2001) 341.
[904] B.X. Wu, K.G. Gebremedhin, Numerical simulation of flow field around a cow using 3-D body-fitted coordinate system, J. Therm. Biol. 26 (6) (2001) 563.
[905] A.J. Young, J.W. Castellani, Exertion-induced fatigue and thermoregulation in the cold, Comp. Biochem. Physiol. 128 (4) (2001) 769.
[906] L. Zhu, C. Diao, Theoretical simulation of temperature distribution in the brain during mild hypothermia treatment for brain injury, Med. Biol. Eng. Comput. 39 (6) (2001) 681.
[907] N.V. Bulanov, An analysis of the heat flux density under conditions of boiling internal phase of emulsion, High Temp.—USSR 39 (3) (2001) 462.
[908] D.F. Chao, N.L. Zhang, Effects of evaporation and thermocapillary convection on volatile liquid droplets, J. Thermophys. Heat Transfer 15 (4) (2001) 416.
[909] D.R. Crawford, F.E. Fendell, M.A. Jones, Droplet vaporization during transit of a cylinder under transpirational heating, Combust. Sci. Technol. 162 (2001) 113.
[910] Q. Cui, S. Chandra, S. McCahan, The effect of dissolving gases or solids in water droplets boiling on a hot surface, J. Heat Transfer—Trans. ASME 123 (4) (2001) 719.
[911] C. Debbissi, J. Orfi, S. Ben Nasrallah, Evaporation of water by free convection in a vertical channel including effects of wall radiative properties, Int. J. Heat Mass Transfer 44 (4) (2001) 811.
[912] M. Feddaoui, E. Belahmidi, A. Mir, A. Bendou, Numerical study of the evaporative cooling of liquid film in laminar mixed convection tube flows, Int. J. Therm. Sci. 40 (11) (2001) 1011.
[913] D.J.E. Harvie, D.F. Fletcher, A hydrodynamic and thermodynamic simulation of droplet impacts on hot surfaces, Part I: Theoretical model, Int. J. Heat Mass Transfer 44 (14) (2001) 2633.
[914] D.J.E. Harvie, D.F. Fletcher, A hydrodynamic and thermodynamic simulation of droplet impacts on hot surfaces, Part II: Validation and applications, Int. J. Heat Mass Transfer 44 (14) (2001) 2643.
[915] H. Iyota, N. Nishimura, M. Yoshida, T. Nomura, Simulation of superheated steam drying considering initial steam condensation, Drying Technol. 19 (7) (2001) 1425.
[916] O.A. Kabov, E.A. Chinnov, Heat transfer from a local heat source to subcooled liquid film, High Temp.—USSR 39 (5) (2001) 703.
[917] X.K. Kakatsios, R.N. Krikkis, Effect of surface tension and evaporation on phase change of fuel droplets, Heat Transfer Eng. 22 (3) (2001) 33.
[918] S.G. Kandlikar, M.E. Steinke, Contact angles of droplets during spread and recoil after impinging on a heated surface, Chem. Eng. Res. Des. 79 (A4) (2001) 491.
[919] G. Knubben, C.W.M. van der Geld, Drop size distribution evolution after continuous or intermittent injection of butane or propane in a confined air flow, Appl. Therm. Eng. 21 (7) (2001) 787.
[920] C. Lee, K. Lee, J. Senda, H. Fujimoto, A study on the spray-wall interaction model considering degree of superheat in the wall surface, Numer. Heat Transfer Part B—Fundamentals 40 (6) (2001) 495.
[921] J. Lee, J. Kim, K.T. Kiger, Time- and space-resolved heat transfer characteristics of single droplet cooling using microscale heater arrays, Int. J. Heat Fluid Flow 22 (2) (2001) 188.
[922] F. Mashayek, Dynamics of evaporating drops. Part I: Formulation and evaporation model, Int. J. Heat Mass Transfer 44 (8) (2001) 1517.
[923] F. Mashayek, Dynamics of evaporating drops. Part II: Free oscillations, Int. J. Heat Mass Transfer 44 (8) (2001) 1527.
[924] A. Mukhopadhyay, D. Sanyal, A spherical cell model for multi-component droplet combustion in a dilute spray, Int. J. Energy Res. 25 (14) (2001) 1275.
[925] P. Peeters, C.C.M. Luijten, M.E.H. van Dongen, Transitional droplet growth and diffusion coefficients, Int. J. Heat Mass Transfer 44 (1) (2001) 181.
[926] V.G. Rifert, J.V. Putilin, V.L. Podbereznyi, Evaporation heat transfer in liquid films flowing down horizontal smooth and longitudinaly profiled tubes, J. Enhanc. Heat Transfer 8 (2) (2001) 91.
[927] A.K. Satapathy, R.K. Sahoo, Rewetting of an infinite tube with internal heating, Int. J. Numer. Meth. Heat Fluid Flow 11 (2–3) (2001) 200.

[928] M. Shusser, D. Weihs, Stability of rapidly evaporating droplets and liquid shells, Int. J. Multiphase Flow 27 (2) (2001) 299.
[929] G.J. Smallwood, D.R. Snelling, F. Liu, O.L. Gulder, Clouds over soot evaporation: errors in modeling laser-induced incandescence of soot, J. Heat Transfer—Trans. ASME 123 (4) (2001) 814.
[930] J. Smolik, L. Dzumbova, J. Schwarz, M. Kulmala, Evaporation of ventilated water droplet: connection between heat and mass transfer, J. Aerosol Sci. 32 (6) (2001) 739.
[931] R.A. Tatara, P. Payvar, Measurement of spray boiling refrigerant coefficients in an integral-fin tube bundle segment simulating a full bundle, Int. J. Refrig. (Rev. Int. du Froid) 24 (8) (2001) 744.
[932] L.L. Vasiliev, A.S. Zhuravlyov, M.N. Novikov, Heat transfer with propane evaporation from a porous wick of heat pipe, J. Porous Media 4 (2) (2001) 103.
[933] V.V. Wadekar, P.D. Hills, Evaporative heat transfer to solutions containing dissolved solids: effect of vapour–liquid equilibrium and mass transfer, Chem. Eng. Res. Des. 79 (A4) (2001) 477.
[934] J.H. Walther, P. Koumoutsakos, Molecular dynamics simulation of nanodroplet evaporation, J. Heat Transfer—Trans. ASME 123 (4) (2001) 741.
[935] B.X. Wang, J.T. Zhang, X.F. Peng, The effect of interfacial evaporation on heat and mass transfer of falling liquid film, Sci. China E—Technol. Sci. 44 (2) (2001) 123.
[936] J.L. Wang, I. Catton, Enhanced evaporation heat transfer in triangular grooves covered with a thin fine porous layer, Appl. Therm. Eng. 21 (17) (2001) 1721.
[937] J.S. Wu, Y.J. Liu, H.J. Sheen, Effects of ambient turbulence and fuel properties on the evaporation rate of single droplets, Int. J. Heat Mass Transfer 44 (24) (2001) 4593.
[938] W.M. Yan, D. Lin, Natural convection heat and mass transfer in vertical annuli with film evaporation and condensation, Int. J. Heat Mass Transfer 44 (6) (2001) 1143.
[939] J.R. Yang, S.C. Wong, On the discrepancies between theoretical and experimental results for microgravity droplet evaporation, Int. J. Heat Mass Transfer 44 (23) (2001) 4433.
[940] K. Yoshida, Y. Abe, T. Oka, Y.H. Mori, A. Nagashima, Spray cooling under reduced gravity condition, J. Heat Transfer—Trans. ASME 123 (2) (2001) 309.
[941] J.T. Zhang, B.X. Wang, X.F. Peng, J.H. Du, Study on heat transfer for falling liquid film flow with consideration of interfacial evaporation, Chin. J. Chem. Eng. 9 (2) (2001) 145.
[942] I. Akhatov, O. Lindau, A. Topolnikov, R. Mettin, N. Vakhitova, W. Lauterborn, Collapse and rebound of a laser-induced cavitation bubble, Phys. Fluids 13 (10) (2001) 2805.
[943] J. Betz, J. Straub, Numerical and experimental study of the heat transfer and fluid flow by thermocapillary convection around gas bubbles, Heat Mass Transfer 37 (2–3) (2001) 215.
[944] J. Cao, R.N. Christensen, Non-spherical bubble collapse mechanics in binary solutions, Int. J. Heat Mass Transfer 44 (7) (2001) 1411.
[945] L.H. Chai, X.F. Peng, D.J. Lee, Interfacial effects on nucleate boiling heat transfer of binary mixtures, Int. J. Therm. Sci. 40 (2) (2001) 125.
[946] R.C. Duckworth, J.G. Murphy, T.T. Utschig, M.L. Corradini, B.J. Merrill, R.L. Moore, Analysis of liquid cryogen–water experiments with the MELCOR code, Fusion Technol. (art 2) (2001) 976.
[947] I. Golobic, H. Gjerkes, Interactions between laser-activated nucleation sites in pool boiling, Int. J. Heat Mass Transfer 44 (1) (2001) 143.
[948] Y. He, M. Shoji, S. Maruyama, Numerical study of high heat flux pool boiling heat transfer, Int. J. Heat Mass Transfer 44 (12) (2001) 2357.
[949] Y.Y. Jiang, W.C. Wang, D. Wang, B.X. Wang, Boiling heat transfer on machined porous surfaces with structural optimization, Int. J. Heat Mass Transfer 44 (2) (2001) 443.
[950] S.G. Kandlikar, A theoretical model to predict pool boiling CHF incorporating effects of contact angle and orientation, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1071.
[951] Z.H. Liu, E. Ishibashi, Enhanced boiling heat transfer of water/salt mixtures in the restricted space of the compact tube bundle, Heat Transfer Eng. 22 (3) (2001) 4.
[952] B.K. Mori, W.D. Baines, Bubble departure from cavities, Int. J. Heat Mass Transfer 44 (4) (2001) 771.
[953] V.S. Nikolayev, D.A. Beysens, G.L. Lagier, J. Hegseth, Growth of a dry spot under a vapor bubble at high heat flux and high pressure, Int. J. Heat Mass Transfer 44 (18) (2001) 3499.
[954] X.F. Peng, Y.J. Huang, D.J. Lee, Transport phenomenon of a vapour bubble attached to a downward surface, Int. J. Therm. Sci. 40 (9) (2001) 797.
[955] X.F. Peng, Y. Tien, D.J. Lee, Bubble nucleation in microchannels: statistical mechanics approach, Int. J. Heat Mass Transfer 44 (15) (2001) 2957.
[956] H. Sakashita, T. Kumada, Method for predicting boiling curves of saturated nucleate boiling, Int. J. Heat Mass Transfer 44 (3) (2001) 673.
[957] M. Shoji, Y. Takagi, Bubbling features from a single artificial cavity, Int. J. Heat Mass Transfer 44 (14) (2001) 2763.
[958] G.H. Son, Numerical study on a sliding bubble during nucleate boiling, KSME J. 15 (7) (2001) 931.
[959] J. Straub, Boiling heat transfer and bubble dynamics in microgravity, Adv. Heat Transfer 35 (35) (2001) 57.
[960] Y.A. Zeigarnik, Regenerated boiling and enhancement of heat transfer, High Temp.—USSR 39 (3) (2001) 447.
[961] J.T. Zhang, B.X. Wang, X.F. Peng, Thermodynamic aspect of the shift of concave liquid–vapor interfacial phase equilibrium temperature and its effect on bubble formation, Int. J. Heat Mass Transfer 44 (9) (2001) 1681.
[962] J. Bonjour, M. Lallemand, Two-phase flow structure near a heated vertical wall during nucleate pool boiling, Int. J. Multiphase Flow 27 (10) (2001) 1789.

[963] V.I. Borzenko, S.P. Malyshenko, Mechanisms of phase exchange under conditions of boiling on surfaces with porous coatings, High Temp.—USSR 39 (5) (2001) 714.
[964] D. Boukeffa, M. Boumaza, M.X. Francois, S. Pellerin, Experimental and numerical analysis of heat losses in a liquid nitrogen cryostat, Appl. Therm. Eng. 21 (9) (2001) 967.
[965] V.K. Dhir, Numerical simulations of pool-boiling heat transfer, AICHE J. 47 (4) (2001) 813.
[966] G. Hetsroni, J.L. Zakin, Z. Lin, A. Mosyak, E.A. Pancallo, R. Rozenblit, The effect of surfactants on bubble growth, wall thermal patterns and heat transfer in pool boiling, Int. J. Heat Mass Transfer 44 (2) (2001) 485.
[967] R. Hohl, J. Blum, M. Buchholz, T. Luttich, H. Auracher, W. Marquardt, Model-based experimental analysis of pool boiling heat transfer with controlled wall temperature transients, Int. J. Heat Mass Transfer 44 (12) (2001) 2225.
[968] S.S. Hsieh, T.Y. Yang, Nucleate pool boiling from coated and spirally wrapped tubes in saturated R-134a and R-600a at low and moderate heat flux, J. Heat Transfer—Trans. ASME 123 (2) (2001) 257.
[969] J.S. Jeon, J.H. Na, H.C. Park, H.Y. Kwak, An experiment on thermosyphon boiling in uniformly heated vertical tube and asymmetrically heated vertical channel, KSME J. 15 (1) (2001) 98.
[970] M.G. Kang, Diameter effects on nucleate pool boiling for a vertical tube, J. Heat Transfer—Trans. ASME 123 (2) (2001) 400.
[971] M.A. Kedzierski, The effect of lubricant concentration, miscibility, and viscosity on R134a pool boiling, Int. J. Refrig. (Rev. Int. du Froid) 24 (4) (2001) 348.
[972] J. Kim, J. Benton, J. McQuillen, M. Vickerman, Subcooled pool boiling heat transfer in microgravity and Hi-g, J. Heat Transfer—Trans. ASME 123 (4) (2001) 620.
[973] N.H. Kim, K.K. Choi, Nucleate pool boiling on structured enhanced tubes having pores with connecting gaps, Int. J. Heat Mass Transfer 44 (1) (2001) 17.
[974] S.G. Liter, M. Kaviany, Pool-boiling CHF enhancement by modulated porous-layer coating: theory and experiment, Int. J. Heat Mass Transfer 44 (22) (2001) 4287.
[975] Z.W. Liu, W.W. Lin, D.J. Lee, Pool boiling of FC-72 and HFE-7100, J. Heat Transfer—Trans. ASME 123 (2) (2001) 399.
[976] R. Marek, J. Straub, The origin of thermocapillary convection in subcooled nucleate pool boiling, Int. J. Heat Mass Transfer 44 (3) (2001) 619.
[977] K. Mohrlok, K. Spindler, E. Hahne, The influence of a low viscosity oil on the pool boiling heat transfer of the refrigerant R507, Int. J. Refrig. (Rev. Int. du Froid) 24 (1) (2001) 25.
[978] C.C. Pascual, S.M. Jeter, S.I. Abdel-Khalik, A statistical analysis of EHD-enhanced nucleate boiling along a heated wire, Int. J. Heat Mass Transfer 44 (6) (2001) 1201.
[979] K.N. Rainey, S.M. You, Effects of heater size and orientation on pool boiling heat transfer from microporous coated surfaces, Int. J. Heat Mass Transfer 44 (14) (2001) 2589.
[980] T.J. Snyder, J.N. Chung, J.B. Schneider, Dielectrophoresis with application to boiling heat transfer in microgravity. II. Experimental investigation, J. Appl. Phys. 89 (7) (2001) 4084.
[981] T.J. Snyder, J.B. Schneider, J.N. Chung, Dielectrophoresis with application to boiling heat transfer in microgravity. I. Numerical analysis, J. Appl. Phys. 89 (7) (2001) 4076.
[982] H. Tatsumoto, K. Hata, K. Hama, Y. Shirai, M. Shiotsu, Critical heat flux on a flat plate in pressurized HeII, Cryogenics 41 (1) (2001) 35.
[983] S.R. Yang, Z.M. Xu, J.W. Wang, X.T. Zhao, On the fractal description of active nucleation site density for pool boiling, Int. J. Heat Mass Transfer 44 (14) (2001) 2783.
[984] Y.M. Yang, J.R. Maa, On the criteria of nucleate pool boiling enhancement by surfactant addition to water, Chem. Eng. Res. Des. 79 (A4) (2001) 409.
[985] H.Y. Yoon, S. Koshizuka, Y. Oka, Direct calculation of bubble growth, departure, and rise in nucleate pool boiling, Int. J. Multiphase Flow 27 (2) (2001) 277.
[986] N.J. Zhang, D.F. Chao, W.J. Yang, Enhancements of nucleate boiling and critical heat flux under microgravity conditions, J. Thermophys. Heat Transfer 15 (3) (2001) 326.
[987] Y.H. Zhao, T. Tsuruta, T. Masuoka, Critical heat flux of boiling heat transfer in a confined space, JSME Int. J. B—Fluids Therm. Eng. 44 (3) (2001) 344.
[988] J.X. Zheng, G.P. Jin, M.C. Chyu, Z.H. Ayub, Flooded boiling of ammonia with miscible oil outside a horizontal plain tube, Hvac&R Res. 7 (2) (2001) 185.
[989] D. Banerjee, V.K. Dhir, Study of subcooled film boiling on a horizontal disc: Part 2—Experiments, J. Heat Transfer—Trans. ASME 123 (2) (2001) 285.
[990] D. Banerjee, V.K. Dhir, Study of subcooled film boiling on a horizontal disc: Part I—Analysis, J. Heat Transfer—Trans. ASME 123 (2) (2001) 271.
[991] M. Ben David, Y. Zimmels, Y. Zvirin, Determination of the quench velocity and rewetting temperature of hot surfaces. Part I: Analytical solution of the micro-scale hydrodynamic model, Int. J. Heat Mass Transfer 44 (7) (2001) 1323.
[992] L.H. Chai, M. Shoji, X.F. Peng, Dry patch interaction caused by lateral conduction in transition boiling, Int. J. Heat Mass Transfer 44 (21) (2001) 4169.
[993] Z.H. Liu, J. Wang, Study on film boiling heat transfer for water jet impinging on high temperature flat plate, Int. J. Heat Mass Transfer 44 (13) (2001) 2475.
[994] P.K. Sarma, T. Subrahmanyam, V.D. Rao, A.E. Bergles, Turbulent film boiling on a horizontal cylinder, Int. J. Heat Mass Transfer 44 (1) (2001) 207.
[995] D. Walujastono, T. Okuda, K. Kamiuto, Pool film-boiling heat transfer from a horizontal downward-facing surface, J. Thermophys. Heat Transfer 15 (3) (2001) 368.
[996] S.B. Alekseev, S.V. Svetlov, Y.N. Ilyukhin, V.O. Kukhtevich, V.G. Sidorov, Critical heat flux in vertical steam-generating channels in the absence of circulation

of heat-transfer agent: critical power of channels of different shapes, High Temp.—USSR 39 (1) (2001) 128.
[997] C.N. Ammerman, S.M. You, Enhancing small-channel convective boiling performance using a microporous surface coating, J. Heat Transfer—Trans. ASME 123 (5) (2001) 976.
[998] J.R. Barbosa, G.F. Hewitt, Forced convective boiling of binary mixtures in annular flow. Part I: Liquid phase mass transport, Int. J. Heat Mass Transfer 44 (8) (2001) 1465.
[999] J.R. Barbosa, G.F. Hewitt, Forced convective boiling of binary mixtures in annular flow. Part II: Heat and mass transfer, Int. J. Heat Mass Transfer 44 (8) (2001) 1475.
[1000] M.D. Bartel, M. Ishii, T. Masukawa, Y. Mi, R. Situ, Interfacial area measurements in subcooled flow boiling, Nucl. Eng. Des. 210 (1–3) (2001) 135.
[1001] N. Boukadida, S. Ben Nasrallah, Mass and heat transfer during water evaporation in laminar flow inside a rectangular channel—validity of heat and mass transfer analogy, Int. J. Therm. Sci. 40 (1) (2001) 67.
[1002] J.E. Bryan, J. Seyed-Yagoobi, Influence of flow regime, heat flux, and mass flux on electrohydrodynamically enhanced convective boiling, J. Heat Transfer—Trans. ASME 123 (2) (2001) 355.
[1003] G.P. Celata, K. Mishima, G. Zummo, Critical heat flux prediction for saturated flow boiling of water in vertical tubes, Int. J. Heat Mass Transfer 44 (22) (2001) 4323.
[1004] L.H. Chai, M. Shoji, Boiling curves—bifurcation and catastrophe, Int. J. Heat Mass Transfer 44 (21) (2001) 4175.
[1005] D.K. Chen, S. Lin, Underpressure of vaporization of refrigerant R-134a through a diabetic capillary tube, Int. J. Refrig. (Rev. Int. du Froid) 24 (3) (2001) 261.
[1006] L.X. Cheng, T.K. Chen, Flow boiling heat transfer in a vertical spirally internally ribbed tube, Heat Mass Transfer 37 (2–3) (2001) 229.
[1007] L.H. Chien, R.L. Webb, Effect of geometry and fluid property parameters on performance of tunnel and pore enhanced boiling surfaces, J. Enhanc. Heat Transfer 8 (5) (2001) 329.
[1008] R.W.L. Fong, G.A. McRae, C.E. Coleman, T. Nitheanandan, D.B. Sanderson, Correlation between the critical heat flux and the fractal surface roughness of zirconium alloy tubes, J. Enhanc. Heat Transfer 8 (2) (2001) 137.
[1009] R. Ghafir, G. Lauriat, Forced convection heat transfer with evaporation in a heat generating porous medium, J. Porous Media 4 (4) (2001) 309.
[1010] M. Goto, N. Inoue, N. Ishiwatari, Condensation and evaporation heat transfer of R410A inside internally grooved horizontal tubes, Int. J. Refrig. (Rev. Int. du Froid) 24 (7) (2001) 628.
[1011] L.J. Guo, Z.P. Feng, X.J. Chen, Pressure drop oscillation of steam-water two-phase flow in a helically coiled tube, Int. J. Heat Mass Transfer 44 (8) (2001) 1555.
[1012] Y. Guo, D.C. Groeneveld, S.C. Cheng, Prediction of CHF enhancement due to flow obstacles, Int. J. Heat Mass Transfer 44 (23) (2001) 4557.
[1013] D.E. Hall, F.P. Incropera, R. Viskanta, Jet impingement boiling from a circular free-surface jet during quenching: Part 1—Single-phase jet, J. Heat Transfer—Trans. ASME 123 (5) (2001) 901.
[1014] D.E. Hall, F.P. Incropera, R. Viskanta, Jet impingement boiling from a circular free-surface jet during quenching: Part 2—Two-phase jet, J. Heat Transfer—Trans. ASME 123 (5) (2001) 911.
[1015] G. Hetsroni, A. Mosyak, Z. Segal, Nonuniform temperature distribution in electronic devices cooled by flow in parallel microchannels, IEEE Trans. Comp. Packag. Technol. 24 (1) (2001) 16.
[1016] L.D. Huang, L.C. Witte, Highly subcooled boiling in crossflow, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1080.
[1017] D.H. Hwang, C. Park, S.Q. Zee, A phenomenological approach to correcting DNB-type critical heat flux for non-uniform axial power shapes, Int. J. Heat Mass Transfer 44 (23) (2001) 4483.
[1018] N. Kazic, On the fluid flow with and without phase change near the isothermal wall, Z. Angew. Math. Mech. (4) (2001) S943.
[1019] H.J. Lee, S.Y. Lee, Heat transfer correlation for boiling flows in small rectangular horizontal channels with low aspect ratios, Int. J. Multiphase Flow 27 (12) (2001) 2043.
[1020] Y. Ma, J.N. Chung, An experimental study of critical heat flux (CHF) in microgravity forced-convection boiling, Int. J. Multiphase Flow 27 (10) (2001) 1753.
[1021] Y. Ma, J.N. Chung, A study of bubble dynamics in reduced gravity forced-convection boiling, Int. J. Heat Mass Transfer 44 (2) (2001) 399.
[1022] J. Mitrovic, Survival conditions of a vapour bubble in saturated liquid flowing inside a micro-channel, Int. J. Heat Mass Transfer 44 (11) (2001) 2177.
[1023] I.L. Pioro, D.C. Groeneveld, S.C. Cheng, S. Doerffer, A.Z. Vasic, Y.V. Antoshko, Comparison of CHF measurements in R-134a cooled tubes and the water CHF look-up table, Int. J. Heat Mass Transfer 44 (1) (2001) 73.
[1024] K.N. Rainey, G. Li, S.M. You, Flow boiling heat transfer from plain and microporous coated surfaces in subcooled FC-72, J. Heat Transfer—Trans. ASME 123 (5) (2001) 918.
[1025] K. Seo, Y. Kim, K.J. Lee, Y.C. Park, An experimental study on convective boiling of R-22 and R-410A in horizontal smooth and micro-fin tubes, KSME J. 15 (8) (2001) 1156.
[1026] G. Sun, G.F. Hewitt, Evaporation and condensation of steam-water in a vertical tube, Nucl. Eng. Des. 207 (2) (2001) 137.
[1027] S.F. Sun, Y.Y. Wu, R.Y. Zhao, The numerical calculation of heat transfer performance for annular flow of liquid nitrogen in a vertical annular channel, Cryogenics 41 (4) (2001) 231.
[1028] A.N. Varava, A.V. Dedov, A.T. Komov, V.V. Sukanov, V.K. Naumov, N.N. Semashko, Some heat exchange features in the high power beam dumps, Plasma Dev. Oper. 9 (3–4) (2001) 211.
[1029] D.T. Westheimer, G.P.B. Peterson, Visualization of flow boiling in an annular heat exchanger under microgravity conditions, J. Thermophys. Heat Transfer 15 (3) (2001) 333.

[1030] D.A. Yashar, M.J. Wilson, H.R. Kopke, D.M. Graham, J.C. Chato, T.A. Newell, An investigation of refrigerant void fraction in horizontal, microfin tubes, Hvac&R Res. 7 (1) (2001) 67.

[1031] Z.J. Yu, C.X. Sun, X.Y. Sun, Z.H. Liu, Heat transfer enhancement by fluidized solid particles in gas carrying evaporation, Chin. J. Chem. Eng. 9 (3) (2001) 247.

[1032] M.S. Chung, S.J. Lee, W.J. Lee, K.S. Chang, An interfacial pressure jump model for two-phase bubbly flow, Numer. Heat Transfer Part B—Fundamentals 40 (1) (2001) 83.

[1033] D. Delmastro, L. Juanico, A. Clausse, A delay theory for boiling flow stability analysis, Int. J. Multiphase Flow 27 (4) (2001) 657.

[1034] B.A. Gabaraev, S.A. Kovalev, Y.S. Molochnikov, S.L. Solov'ev, S.V. Usatikov, Rewetting and autowave change of boiling modes, High Temp.—USSR 39 (2) (2001) 302.

[1035] L.J. Guo, Z.P. Feng, X.J. Chen, An experimental investigation of the frictional pressure drop of steam-water two-phase flow in helical coils, Int. J. Heat Mass Transfer 44 (14) (2001) 2601.

[1036] G. Hetsroni, M. Gurevich, A. Mosyak, R. Rozenblit, Dryout in inclined gas–liquid pipe-lines, Chem. Eng. Res. Des. 79 (A4) (2001) 376.

[1037] H. Ki, P.S. Mohanty, J. Mazumder, Modelling of high-density laser-material interaction using fast level set method, J. Phys. D—Appl. Phys. 34 (3) (2001) 364.

[1038] S.W. Kim, H.C. No, Subcooled water critical pressure and critical flow rate in a safety valve, Int. J. Heat Mass Transfer 44 (24) (2001) 4567.

[1039] A.P. Kryukov, V.Y. Levashov, I.N. Shishkova, Numerical analysis of strong evaporation–condensation through the porous matter, Int. J. Heat Mass Transfer 44 (21) (2001) 4119.

[1040] J.W. Liu, D.J. Lee, A. Su, Boiling of methanol and HFE-7100 on heated surface covered with a layer of mesh, Int. J. Heat Mass Transfer 44 (1) (2001) 241.

[1041] T.Q. Liu, X.Y. Sun, Comprehensive evaluation and prediction of enhancement of boiling heat transfer with additives, Chin. J. Chem. Eng. 9 (1) (2001) 12.

[1042] P.R. Mawasha, R.J. Gross, Periodic oscillations in a horizontal single boiling channel with thermal wall capacity, Int. J. Heat Fluid Flow 22 (6) (2001) 643.

[1043] E.I. Mikulin, Y.A. Shevich, O.A. Lysyi, Boiling heat transfer and hydrodynamics in matrix-type channels, Exp. Therm. Fluid Sci. 25 (1–2) (2001) 265.

[1044] R.I. Nigmatulin, V.S. Shagapov, G.Y. Galeeva, D. Lhuillier, Explosive flow of boiling and degassing liquids out of pipes and reservoirs: the influence of wall friction, Int. J. Multiphase Flow 27 (3) (2001) 553.

[1045] Y.P. Peles, L.P. Yarin, G. Hetsroni, Steady and unsteady flow in a heated capillary, Int. J. Multiphase Flow 27 (4) (2001) 577.

[1046] P. Reinke, G. Yadigaroglu, Explosive vaporization of superheated liquids by boiling fronts, Int. J. Multiphase Flow 27 (9) (2001) 1487.

[1047] H.F. Smirnov, Boiling on coated surfaces and in porous structures, J. Porous Media 4 (1) (2001) 33.

[1048] I. Ueno, M. Shoji, Thermal-fluid phenomena induced by nanosecond-pulse heating of materials in water, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1123.

[1049] P.F. Vassallo, T.A. Trabold, R. Kumar, D.M. Considine, Slug-to-annular regime transitions in R-134a flowing through a vertical duct, Int. J. Multiphase Flow 27 (1) (2001) 119.

[1050] J. Wang, I. Catton, Evaporation heat transfer in thin biporous media, Heat Mass Transfer 37 (2) (2001).

[1051] W. Wu, J.H. Du, B.X. Wang, Boiling heat transfer on surfaces coated by porous wick with vapor channels, Microscale Thermophys. Eng. 5 (4) (2001) 277.

[1052] V.S. Ajaev, G.M. Homsy, Steady vapor bubbles in rectangular microchannels, J. Colloid Interf. Sci. 240 (1) (2001) 259.

[1053] R. Barron-Jimenez, G.P. Peterson, Experimental evaluation of triangular microgrooved on a condensing surface, J. Thermophys. Heat Transfer 15 (4) (2001) 401.

[1054] J.R. Burns, R.J.J. Jachuck, Condensation studies using cross-corrugated polymer film compact heat exchanger, Appl. Therm. Eng. 21 (4) (2001) 495.

[1055] R.C. Chu, S. Nishio, I. Tanasawa, Enhancement of condensation heat transfer on a finned tube using an electric field (Experiment and modelling analysis on enhancement of heat transfer using a bare wire electrode), J. Enhanc. Heat Transfer 8 (2) (2001) 99.

[1056] R.C. Chu, S. Nishio, I. Tanasawa, Enhancement of condensation heat transfer on a finned tube using an electric field—effects of electrode coating, J. Enhanc. Heat Transfer 8 (4) (2001) 215.

[1057] R. Kumar, H.K. Varma, K.N. Agrawal, B. Mohanty, A comprehensive study of modified Wilson plot technique to determine the heat transfer coefficient during condensation of steam and R-134a over single horizontal plain and finned tubes, Heat Transfer Eng. 22 (2) (2001) 3.

[1058] J.T. Kwon, Y.C. Ahn, M.H. Kim, A modeling of in-tube condensation heat transfer for a turbulent annular film flow with liquid entrainment, Int. J. Multiphase Flow 27 (5) (2001) 911.

[1059] X.H. Ma, J.B. Chen, D.Q. Xu, J.F. Lin, Heat transfer characteristics of dropwise condensation of steam on vertical polymer coated plates, Chin. J. Chem. Eng. 9 (1) (2001) 17.

[1060] I.S. Park, D.H. Choi, Heat- and mass-transfer analysis for the condensing film flow along a vertical grooved tube, Int. J. Heat Mass Transfer 44 (22) (2001) 4277.

[1061] F. Peters, A. Grassmann, The liquid temperature in diffusion controlled vapor condensation: analysis and experimental verification, Int. J. Heat Mass Transfer 44 (16) (2001) 3147.

[1062] K. Ramamurthi, S.S. Kumar, Collapse of vapor locks by condensation over moving subcooled liquid, Int. J. Heat Mass Transfer 44 (15) (2001) 2983.

[1063] M. Takahashi, A.K. Nayak, S. Kitagawa, H. Murakoso, Heat transfer in direct contact condensation of steam to subcooled water spray, J. Heat Transfer—Trans. ASME 123 (4) (2001) 703.

[1064] Y.X. Wang, J.L. Plawsky, P.C. Wayner, Optical measurement of microscale transport processes in dropwise

condensation, Microscale Thermophys. Eng. 5 (1) (2001) 55.
[1065] G. Desrayaud, G. Lauriat, Heat and mass transfer analogy for condensation of humid air in a vertical channel, Heat Mass Transfer 37 (1) (2001) 67.
[1066] C.H. Hsu, Laminar film condensation from downward flowing superheated vapors onto a non-isothermal sphere, Heat Mass Transfer 38 (1–2) (2001) 151.
[1067] L. Jia, X.F. Peng, Y. Yan, J.D. Sun, X.P. Li, Effects of water vapor condensation on the convection heat transfer of wet flue gas in a vertical tube, Int. J. Heat Mass Transfer 44 (22) (2001) 4257.
[1068] H.Y. Kim, Y.Y. Bae, C.H. Song, J.K. Park, S.M. Choi, Experimental study on stable steam condensation in a quenching tank, Int. J. Energy Res. 25 (3) (2001) 239.
[1069] C.J. Kobus, G.L. Wedekind, B.L. Bhatt, Predicting the onset of a low-frequency, limit-cycle type of oscillatory flow instability in multitube condensing flow systems, J. Heat Transfer—Trans. ASME 123 (2) (2001) 319.
[1070] J.C. Lee, Z. Rusak, Parametric investigation of nonadiabatic compressible flow around airfoils, Phys. Fluids 13 (1) (2001) 315.
[1071] T. Marshall, C. Girard, Modeling of ice formation and condensation on a cryogenic surface, Fusion Eng. Des. 54 (3–4) (2001) 473.
[1072] M. Mosaad, Mixed-convection laminar film condensation on an inclined elliptical tube, J. Heat Transfer—Trans. ASME 123 (2) (2001) 294.
[1073] Y. Pan, Condensation characteristics inside a vertical tube considering the presence of mass transfer, vapor velocity and interfacial shear, Int. J. Heat Mass Transfer 44 (23) (2001) 4475.
[1074] S.K. Singh, R. Kumar, B. Mohanty, Heat transfer during condensation of steam over a vertical grid of horizontal integral-fin copper tubes, Appl. Therm. Eng. 21 (7) (2001) 717.
[1075] F. Stratmann, M. Wilck, V. Zdimal, J. Smolik, 2-D model for the description of thermal diffusion cloud chambers: description and first results, J. Phys. Chem. B 105 (47) (2001) 11641.
[1076] S. Thumm, C. Philipp, U. Gross, Film condensation of water in a vertical tube with countercurrent vapour flow, Int. J. Heat Mass Transfer 44 (22) (2001) 4245.
[1077] R.L. Webb, K. Ermis, Effect of hydraulic diameter on condensation of R-134A in flat, extruded aluminum tubes, J. Enhanc. Heat Transfer 8 (2) (2001) 77.
[1078] M.I. Char, J.D. Lin, Conjugate film condensation and natural convection between two porous media separated by a vertical plate, Acta Mech. 148 (1–4) (2001) 1.
[1079] M.I. Char, J.D. Lin, H.T. Chen, Conjugate mixed convection laminar non-Darcy film condensation along a vertical plate in a porous medium, Int. J. Eng. Sci. 39 (8) (2001) 897.
[1080] A. Miyara, Flow dynamics and heat transfer of wavy condensate film, J. Heat Transfer—Trans. ASME 123 (3) (2001) 492.
[1081] A. Rosjorde, S. Kjelstrup, D. Bedeaux, B. Hafskjold, Nonequilibrium molecular dynamics simulations of steady-state heat and mass transport in condensation. II. Transfer coefficients, J. Colloid Interf. Sci. 240 (1) (2001) 355.
[1082] P.K. Sarma, M.A. Reddy, A.E. Bergles, S. Kakac, Condensation of vapours on a fin in the presence of non-condensable gas, Int. J. Heat Mass Transfer 44 (17) (2001) 3233.
[1083] S. Shiba, Y. Hirata, S. Yagi, Acidification of growing cloud droplet by rainout of SO_2(g), Water Air Soil Pollut. (art 2) (2001) 307.
[1084] Y.T. Wu, C.X. Yang, X.G. Yuan, Drop distributions and numerical simulation of dropwise condensation heat transfer, Int. J. Heat Mass Transfer 44 (23) (2001) 4455.
[1085] Y.T. Wu, C.X. Yang, X.G. Yuan, A theoretical study of the effect of surface thermal conductivity on heat transfer coefficient in dropwise condensation, Numer. Heat Transfer Part A—Applications 40 (2) (2001) 169.
[1086] Y.W. Zhang, A. Faghri, Numerical simulation of condensation on a capillary grooved structure, Numer. Heat Transfer Part A—Applications 39 (3) (2001) 227.
[1087] Y.W. Zhang, A. Faghri, M.B. Shafii, Capillary blocking in forced convective condensation in horizontal miniature channels, J. Heat Transfer—Trans. ASME 123 (3) (2001) 501.
[1088] Y.X. Zheng, F.T.T. Ng, G.L. Rempel, Catalytic distillation: a three-phase nonequilibrium model for the simulation of the aldol condensation of acetone, Ind. Eng. Chem. Res. 40 (23) (2001) 5342.
[1089] M. Belghazi, A. Bontemps, J.C. Signe, C. Marvillet, Condensation heat transfer of a pure fluid and binary mixture outside a bundle of smooth horizontal tubes. Comparison of experimental results and a classical model, Int. J. Refrig. (Rev. Int. du Froid) 24 (8) (2001) 841.
[1090] A. Cavallini, G. Censi, D. Del Col, L. Doretti, G.A. Longo, L. Rossetto, Experimental investigation on condensation heat transfer and pressure drop of new HFC refrigerants (R134a, R125, R32, R410A, R236ea) in a horizontal smooth tube, Int. J. Refrig. (Rev. Int. du Froid) 24 (1) (2001) 73.
[1091] K. Cho, S.J. Tae, Condensation heat transfer for R-22 and R-407C refrigerant-oil mixtures in a microfin tube with a U-bend, Int. J. Heat Mass Transfer 44 (11) (2001) 2043.
[1092] K.J. Kim, A.M. Lefsaker, A. Razani, A. Stone, The effective use of heat transfer additives for steam condensation, Appl. Therm. Eng. 21 (18) (2001) 1863.
[1093] Y.L. Hao, Y.X. Tao, Melting of a solid sphere under forced and mixed convection: flow characteristics, J. Heat Transfer—Trans. ASME 123 (5) (2001) 937.
[1094] C.K. Hsieh, M. Leung, Phase change in a cylinder and a cylindrical shell heated with an axisymmetric front moving in the axial direction, J. Heat Transfer—Trans. ASME 123 (3) (2001) 476.
[1095] J.M. Khodadadi, Y. Zhang, Effects of buoyancy-driven convection on melting within spherical containers, Int. J. Heat Mass Transfer 44 (8) (2001) 1605.
[1096] C.A. Hall, C. Mackie, A quasi-steady analytical solution to freezing planar Couette flow with viscous dissipation, J. Heat Transfer—Trans. ASME 123 (2) (2001) 407.

[1097] C.A. Hall, C. Mackie, Semi-analytic solutions for freezing induced by evaporative cooling, Int. J. Heat Mass Transfer 44 (6) (2001) 1161.
[1098] W.S. Jiaung, J.R. Ho, C.P. Kuo, Lattice Boltzmann method for the heat conduction problem with phase change, Numer. Heat Transfer Part B—Fundamentals 39 (2) (2001) 167.
[1099] G.F. Naterer, Applying heat-entropy analogies with experimental study of interface tracking in phase change heat transfer, Int. J. Heat Mass Transfer 44 (15) (2001) 2917.
[1100] G.F. Naterer, Establishing heat-entropy analogies for interface tracking in phase change heat transfer with fluid flow, Int. J. Heat Mass Transfer 44 (15) (2001) 2903.
[1101] S. Aoyama, H. Inaba, Melting characteristics of ice water slurry by warm air bubbling, Int. J. Therm. Sci. 40 (8) (2001) 724.
[1102] E. Faydi, J. Andrieu, P. Laurent, R. Peczalski, Experimental study and modelling of the ice crystal morphology of model standard ice cream. Part II: Heat transfer data and texture modelling, J. Food Eng. 48 (4) (2001) 293.
[1103] A.K. Galwey, D.B. Sheen, J.N. Sherwood, Should the melting of ice be represented as a solid state reaction?, Thermochim. Acta 375 (1–2) (2001) 161.
[1104] C.J. Ho, M.J. Ho, C.T. Yeh, Numerical study of oscillatory convection during melting of ice in a rectangular enclosure, Numer. Heat Transfer Part A—Applications 40 (5) (2001) 511.
[1105] T. Inada, X. Zhang, A. Yabe, Y. Kozawa, Active control of phase change from supercooled water to ice by ultrasonic vibration 1. Control of freezing temperature, Int. J. Heat Mass Transfer 44 (23) (2001) 4523.
[1106] M. Matsumoto, S. Hokoi, M. Hatano, Model for simulation of freezing and thawing processes in building materials, Build. Environ. 36 (6) (2001) 733.
[1107] K.M. Neaupane, T. Yamabe, A fully coupled thermo-hydro-mechanical nonlinear model for a frozen medium, Comput. Geotech. 28 (8) (2001) 613.
[1108] N. Scheerlinck, P. Verboven, K.A. Fikiin, J. De Baerdemaeker, B.M. Nicolai, Finite element computation of unsteady phase change heat transfer during freezing or thawing of food using a combined enthalpy and Kirchhoff transform method, Trans. ASAE 44 (2) (2001) 429.
[1109] X. Zhang, T. Inada, A. Yabe, S.S. Lu, Y. Kozawa, Active control of phase change from supercooled water to ice by ultrasonic vibration 2. Generation of ice slurries and effect of bubble nuclei, Int. J. Heat Mass Transfer 44 (23) (2001) 4533.
[1110] S.A. Argyropoulos, D. Mazumdar, A.C. Mikrovas, D.A. Doutre, Dimensionless correlations for forced convection in liquid metals: Part II. Two-phase flow, Metall. Mater. Trans. B—Process Metall. Mater. Process. Sci. 32 (2) (2001) 247.
[1111] M.A. Cruchaga, D.J. Celentano, A fixed-mesh finite element thermally coupled flow formulation for the numerical analysis of melting processes, Int. J. Numer. Meth. Eng. 51 (10) (2001) 1231.
[1112] A.R. Firth, N.B. Gray, A.K. Kyllo, Dynamics and control of solidification of molten metal flows, Metall. Mater. Trans. B—Process Metall. Mater. Process. Sci. 32 (1) (2001) 173.
[1113] E. Koleva, K. Vutova, G. Mladenov, The role of ingot-crucible thermal contact in mathematical modelling of the heat transfer during electron beam melting, Vacuum 62 (2–3) (2001) 189.
[1114] R. Komanduri, Z.B. Hou, Thermal analysis of the laser surface transformation hardening process, Int. J. Heat Mass Transfer 44 (15) (2001) 2845.
[1115] Y.J. Lai, J.C. Chen, Effects of the laser heating and air bubbles on the morphologies of c-axis $LiNbO_3$ fibers, J. Cryst. Growth 231 (1–2) (2001) 222.
[1116] J. Lawrence, A.A. Peligrad, E. Zhou, L. Li, D. Morton, Prediction of melt depth in selected architectural materials during high-power diode laser treatment, Opt. Lasers Eng. 35 (1) (2001) 51.
[1117] U. Narusawa, J.T. Blucher, D. Goldthwaite, Analysis of melt infiltration into a moving bundle of fibers relevant to processing of metal matrix composite wires, J. Porous Media 4 (3) (2001) 241.
[1118] A.A. Peligrad, E. Zhou, D. Morton, L. Li, A melt depth prediction model for quality control of laser surface glazing of inhomogeneous materials, Opt. Laser Technol. 33 (1) (2001) 7.
[1119] X.F. Peng, X.P. Lin, D.J. Lee, Y. Yan, B.X. Wang, Effects of initial molten pool and Marangoni flow on solid melting, Int. J. Heat Mass Transfer 44 (2) (2001) 457.
[1120] S. Petrescu, C. Ciubotaru, I. Fechete, Heat transfer at solid melting in solutions, Chem. Eng. J. 83 (1) (2001) 39.
[1121] P.M. Raj, S. Sarkar, S. Chakraborty, P. Dutta, Three-dimensional computational modelling of momentum, heat and mass transfer in laser surface alloying with distributed melting of alloying element, Int. J. Numer. Meth. Heat Fluid Flow 11 (5–6) (2001) 576.
[1122] N. Sombatsompop, A. Tangsongcharoen, Effects of glass–fiber content and coolant temperature on temperature and crystallinity profiles of PP melt during cooling, J. Appl. Polym. Sci. 82 (9) (2001) 2087.
[1123] K. Takagi, M. Otaka, H. Natsui, T. Arai, S. Yoda, Z.F. Yuan, K. Mukai, S. Yasuhiro, N. Imaishi, Experimental study on transition to oscillatory thermocapillary flow in a low Prandtl number liquid bridge, J. Cryst. Growth 233 (1–2) (2001) 399.
[1124] C. Wenger, A. Gladun, G. Krabbes, G. Fuchs, Magnetothermal instabilities in cylindrical melt-textured Y–Ba–Cu–O, IEEE Trans. Appl. Supercond. (art 3) (2001) 3533.
[1125] J.L. Xia, T. Ahokainen, Thermal stratification in a steel ladle, Can. Metall. Quart. 40 (4) (2001) 479.
[1126] J.L. Xia, T. Ahokainen, Transient flow and heat transfer in a steelmaking ladle during the holding period, Metall. Mater. Trans. B—Process Metall. Mater. Process. Sci. 32 (4) (2001) 733.
[1127] L.X. Yang, X.F. Peng, Features of molten pool free surface in laser processing, Progr. Nat. Sci. 11 (11) (2001) 843.

[1128] L.X. Yang, X.F. Peng, B.X. Wang, Numerical modeling and experimental investigation on the characteristics of molten pool during laser processing, Int. J. Heat Mass Transfer 44 (23) (2001) 4465.

[1129] H. Yoo, Initial transient behavior during close-contact melting induced by convective heating, Int. J. Heat Mass Transfer 44 (11) (2001) 2193.

[1130] A.M. Ahmed, R.H. Rangel, V.V. Sobolev, J.M. Guilemany, In-flight oxidation of composite powder particles during thermal spraying, Int. J. Heat Mass Transfer 44 (24) (2001) 4667.

[1131] C. Albano, R. Sciamanna, R. Gonzalez, J. Papa, O. Navarro, Analysis of nylon 66 solidification process, Eur. Polym. J. 37 (4) (2001) 851.

[1132] C.W. Buckley, T.L. Bergman, An experimental investigation of heat affected zone formation and morphology development during laser processing of metal powder mixtures, J. Heat Transfer—Trans. ASME 123 (3) (2001) 586.

[1133] A.K. Doufas, A.J. McHugh, Two-dimensional simulation of melt spinning with a microstructural model for flow-induced crystallization, J. Rheol. 45 (4) (2001) 855.

[1134] H.B. Lofgren, H.O. Akerstedt, Initial solidification in liquid metal film flow over a moving boundary, Int. J. Heat Mass Transfer 44 (4) (2001) 837.

[1135] J.L. White, C.H. Choi, Modeling heat transfer with crystallization in rods and filaments, Int. Polym. Process. 16 (1) (2001) 54.

[1136] M. Flamme, M. Kosters, M. Boss, Burner systems for glass melting furnaces with recuperative air preheating, Glastech. Ber.—Glass Sci. Technol. 74 (11–12) (2001) 307.

[1137] Z. Bingul, G.E. Cook, A.M. Strauss, Dynamic model for electrode melting rate in gas metal are welding process, Sci. Technol. Weld. Joining 6 (1) (2001) 41.

[1138] H.G. Fan, H.L. Tsai, S.J. Na, Heat transfer and fluid flow in a partially or fully penetrated weld pool in gas tungsten arc welding, Int. J. Heat Mass Transfer 44 (2) (2001) 417.

[1139] T. Fuhrich, P. Berger, H. Hugel, Marangoni effect in laser deep penetration welding of steel, J. Laser Appl. 13 (5) (2001) 178.

[1140] S. Hertzman, The influence of nitrogen on microstructure and properties of highly alloyed stainless steel welds, ISIJ Int. 41 (6) (2001) 580.

[1141] J. Jaidi, P. Dutta, Modeling of transport phenomena in a gas metal arc welding process, Numer. Heat Transfer Part A—Applications 40 (5) (2001) 543.

[1142] Y.P. Lei, X.H. Gu, Y.W. Shi, Numerical analysis of two-way interaction between weld-pool and arc for GTA welding process, J. Mater. Sci. Technol. 17 (1) (2001) 171.

[1143] G. Phanikumar, K. Chattopadhyay, P. Dutta, Modelling of transport phenomena in laser welding of dissimilar metals, Int. J. Numer. Meth. Heat Fluid Flow 11 (2–3) (2001) 156.

[1144] Y. Wang, H.L. Tsai, Impingement of filler droplets and weld pool dynamics during gas metal are welding process, Int. J. Heat Mass Transfer 44 (11) (2001) 2067.

[1145] M. Mbaye, E. Bilgen, Phase change process by natural convection–diffusion in rectangular enclosures, Heat Mass Transfer 37 (1) (2001) 35.

[1146] D. Pal, Y.K. Joshi, Melting in a side heated tall enclosure by a uniformly dissipating heat source, Int. J. Heat Mass Transfer 44 (2) (2001) 375.

[1147] K.A.R. Ismail, A.B. de Jesus, Parametric study of solidification of PCM around a cylinder for ice-bank applications, Int. J. Refrig. (Rev. Int. du Froid) 24 (8) (2001) 809.

[1148] Y.K. Oh, S.H. Park, K.O. Cha, An experimental study of accelerating phase change heat transfer, KSME J. 15 (12) (2001) 1882.

[1149] E.P. Ona, X. Zhang, K. Kyaw, F. Watanabe, H. Matsuda, H. Kakiuchi, M. Yabe, S. Chihara, Relaxation of supercooling of erythritol for latent heat storage, J. Chem. Eng. Jpn. 34 (3) (2001) 376.

[1150] S.K. Roy, B.L. Avanic, Turbulent heat transfer with phase change material suspensions, Int. J. Heat Mass Transfer 44 (12) (2001) 2277.

[1151] Y.X. Zhu, Y.P. Zhang, G.G. Li, F.J. Yang, Heat transfer processes during an unfixed solid phase change material melting outside a horizontal tube, Int. J. Therm. Sci. 40 (6) (2001) 550.

[1152] G.Y. An, X. Sun, J.Q. Wang, Turbulent fluid flow and heat transfer calculation in mold filling and solidification processes of castings, J. Mater. Sci. Technol. 17 (1) (2001) 69.

[1153] S. Broucaret, A. Michrafy, G. Dour, Heat transfer and thermo-mechanical stresses in a gravity casting die—influence of process parameters, J. Mater. Process. Technol. 110 (2) (2001) 211.

[1154] D.J. Browne, D. O'Mahoney, Interface heat transfer in investment casting of aluminum alloys, Metall. Mater. Trans. A—Phys. Metall. Mater. Sci. 32 (12) (2001) 3055.

[1155] D. Celentano, M. Cruchaga, N. Moraga, J. Fuentes, Modeling natural convection with solidification in mould cavities, Numer. Heat Transfer Part A—Applications 39 (6) (2001) 631.

[1156] J.W. Cho, H. Shibata, Effect of solidification of mold fluxes on the heat transfer in casting mold, J. Non-Cryst. Solids 282 (1) (2001) 110.

[1157] S.K. Das, Evaluation of solid–liquid interface profile during continuous casting by a spline based formalism, Bull. Mater. Sci. 24 (4) (2001) 373.

[1158] K. Fujisaki, In-mold electromagnetic stirring in continuous casting, IEEE Trans. Ind. Appl. 37 (4) (2001) 1098.

[1159] I.T. Im, W.S. Kim, K.S. Lee, A unified analysis of filling and solidification in casting with natural convection, Int. J. Heat Mass Transfer 44 (8) (2001) 1507.

[1160] J. Mahmoudi, M. Vynnycky, Modelling of fluid flow, heat transfer and solidification in the strip casting of copper base alloy (I). water model, Scand. J. Metall. 30 (1) (2001) 21.

[1161] J. Mahmoudi, M. Vynnycky, Modelling of fluid flow, heat transfer and solidification in the strip casting of copper base alloy (II). heat transfer, Scand. J. Metall. 30 (1) (2001) 30.

[1162] J. Mahmoudi, M. Vynnycky, H. Fredriksson, Modelling of fluid flow, heat transfer and solidification in the strip casting of a copper base alloy—(III). Solidification—a theoretical study, Scand. J. Metall. 30 (3) (2001) 136.

[1163] E. Majchrzak, R. Szopa, Analysis of thermal processes in solidifying casting using the combined variant of the BEM, J. Mater. Process. Technol. (special issue SI) (2001) 126.

[1164] S. Mazumdar, S.K. Ray, Sadhana-Academy Solidification control in continuous casting of steel, Proc. Eng. Sci. 26 (1–2) (2001) 179.

[1165] K. Mukunthan, L. Strezov, R. Mahapatra, W. Blejde, Evolution of microstructures and product opportunities in low carbon steel strip casting, Can. Metall. Quart. 40 (4) (2001) 523.

[1166] K.N. Prabhu, W.D. Griffiths, Metal/mould interfacial heat transfer during solidification of cast iron in sand moulds, Int. J. Cast Met. Res. 14 (3) (2001) 147.

[1167] Z.M. Ren, H.F. Dong, K. Deng, G.C. Jiang, Influence of high frequency electromagnetic field on the initial solidification during electromagnetic continuous casting, ISIJ Int. 41 (9) (2001) 981.

[1168] R. Schwarze, F. Obermeier, D. Janke, Numerical simulation of fluid flow and disperse phase behaviour in continuous casting tundishes, Model. Simul. Mater. Sci. Eng. 9 (4) (2001) 279.

[1169] M.A. Taha, N.A. El-Mahallawy, M.T. El-Mestekawi, A.A. Hassan, Estimation of air gap and heat transfer coefficient at different faces of Al and Al–Si castings solidifying in permanent mould, Mater. Sci. Technol. 17 (9) (2001) 1093.

[1170] V. Vassileva, K. Vutova, G. Mladenov, An investigation of the influence of heat transfer on crystallisation processes during electron beam melting and casting of metals, Vacuum 62 (2–3) (2001) 197.

[1171] M. Xiong, A.V. Kuznetsov, An investigation of the microporosity formation in an Al–4.1%Cu alloy casting in microgravity and in standard gravity, Heat Mass Transfer 38 (1–2) (2001) 35.

[1172] Q.Y. Xu, B.C. Liu, Modeling of As-cast microstructure of Al alloy with a modified cellular automaton method, Mater. Trans. (special issue SI) (2001) 2316.

[1173] R. Xu, G.F. Naterer, Inverse method with heat and entropy transport in solidification processing of materials, J. Mater. Process. Technol. 112 (1) (2001) 98.

[1174] D.V. Alexandrov, Solidification with a quasiequilibrium mushy region: exact analytical solution of nonlinear model, J. Cryst. Growth 222 (4) (2001) 816.

[1175] T.C. Jen, Y.N. Jiao, Numerical simulation of solute redistribution during transient liquid phase bonding process for Al–Cu alloy, Numer. Heat Transfer Part A—Applications 39 (2) (2001) 123.

[1176] M. Song, R. Viskanta, Lateral freezing of an anisotropic porous medium saturated with an aqueous salt solution, Int. J. Heat Mass Transfer 44 (4) (2001) 733.

[1177] K. Bartosch, A. Mersmann, Direct contact cooling techniques in melt suspension crystallization and their effect on the product purity, Chem. Eng. Sci. 56 (7) (2001) 2347.

[1178] D. Bouchard, F.G. Hamel, J.P. Nadeau, S. Bellemare, F. Dreneau, D.A. Tremblay, D. Simard, Effects of substrate surface conditions on heat transfer and shell morphology in the solidification of a copper alloy, Metall. Mater. Trans. B—Process Metall. Mater. Process. Sci. 32 (1) (2001) 111.

[1179] J.D. Chung, J.S. Lee, M. Choi, H. Yoo, A refined similarity solution for the multicomponent alloy solidification, Int. J. Heat Mass Transfer 44 (13) (2001) 2483.

[1180] C.S. Cui, F.Y. Cao, Z.Y. Li, Q.C. Li, Modeling of heat transfer and solidification of composite roll, J. Mater. Sci. Technol. 17 (1) (2001) 87.

[1181] M. Farid, A unified approach to the heat and mass transfer in melting, solidification, frying and different drying processes, Chem. Eng. Sci. 56 (18) (2001) 5419.

[1182] J.W. Gao, C.Y. Wang, Transport phenomena during solidification processing of functionally graded composites by sedimentation, J. Heat Transfer—Trans. ASME 123 (2) (2001) 368.

[1183] O.M. Haddad, M. Al-Nimr, M. Silieti, The effect of the gas-gap formation due to shrinkage on the rate of heat transfer during solidification, Numer. Heat Transfer Part A—Applications 40 (8) (2001) 887.

[1184] C. Karcher, P.H. Steen, High-Reynolds-number flow in a narrow gap driven by solidification. I. Theory, Phys. Fluids 13 (4) (2001) 826.

[1185] C. Karcher, P.H. Steen, High-Reynolds-number flow in a narrow gap driven by solidification. II. Planar-flow casting application, Phys. Fluids 13 (4) (2001) 834.

[1186] M. Kassemi, M. Kaforey, D. Matthiesen, Effect of void-generated thermocapillary convection on dopant segregation in microgravity solidification, J. Thermophys. Heat Transfer 15 (2) (2001) 219.

[1187] I.M. Moustafa, N. ElBagoury, M.I. Ammar, S.A. Ibrahim, A.A. Nofal, Solidification mechanism of martensitic stainless steel, Ironmaking Steelmaking 28 (5) (2001) 404.

[1188] K. Nagashio, K. Kuribayashi, Rapid solidification of $Y_3Al_5O_{12}$ garnet from hypercooled melt, Acta Mater. 49 (11) (2001) 1947.

[1189] K. Ohsasa, Numerical simulation of solidification for aluminum-base multicomponent alloy, J. Phase Equilib. 22 (4) (2001) 498.

[1190] K.N. Seetharamu, R. Paragasam, G.A. Quadir, Z.A. Zainal, B.S. Prasad, T. Sundararajan, Finite element modelling of solidification phenomena, Sadhana-Academy Proc. Eng. Sci. 26 (1–2) (2001) 103.

[1191] D. Windelberg, Geometry of solidification. I: Shrinkage criterion using results from finite element analysis, J. Test. Eval. 29 (4) (2001) 352.

[1192] H. Zhang, G.W. Chang, H.Q. Hu, Model of stabilizing continuous unidirectional solidification process, J. Mater. Sci. Technol. 17 (1) (2001) 107.

[1193] M. Akamatsu, M. Higano, H. Ozoe, Elliptic temperature contours under a transverse magnetic field computed for a Czochralski melt, Int. J. Heat Mass Transfer 44 (17) (2001) 3253.

[1194] K. Arafune, K. Yamamoto, A. Hirata, Interactive thermal and solutal Marangoni convection during compound semiconductor growth in a rectangular open boat, Int. J. Heat Mass Transfer 44 (13) (2001) 2405.

[1195] V.K. Artemyev, V.I. Folomeev, V.P. Ginkin, A.V. Kartavykh, M.G. Mil'vidskii, V.V. Rakov, The mechanism of Marangoni convection influence on dopant distribution in Ge space-grown single crystals, J. Cryst. Growth 223 (1–2) (2001) 29.
[1196] A.M. Balint, M.M. Mihailovici, D.G. Baltean, S. Balint, A modified chang-brown model for the determination of the dopant distribution in a Bridgman–Stockbarger semiconductor crystal growth system, J. Cryst. Growth 230 (1) (2001).
[1197] I.Y. Evstratov, V.V. Kalaev, V.N. Nabokov, A.I. Zhmakin, Y.N. Makarov, A.G. Abramov, N.G. Ivanov, E.A. Rudinsky, E.M. Smirnov, S.A. Lowry, E. Dornberger, J. Virbulis, E. Tomzig, W. Von Ammon, Global model of Czochralski silicon growth to predict oxygen content and thermal fluctuations at the melt-crystal interface, Microelectron. Eng. 56 (1–2) (2001) 139.
[1198] A.I. Feonychev, G.A. Dolgikh, Effects of constant and variable accelerations on crystals grown onboard spacecraft by the method of directional crystallization, Cosmic Res. 39 (4) (2001) 365.
[1199] A.Y. Gelfgat, P.Z. Bar-Yoseph, A. Solan, Effect of axial magnetic field on three-dimensional instability of natural convection in a vertical Bridgman growth configuration, J. Cryst. Growth 230 (1–2) (2001) 63.
[1200] O. Grabner, G. Muller, J. Virbulis, E. Tomzig, W. Von Ammon, Effects of various magnetic field configurations on temperature distributions in Czochralski silicon melts, Microelectron. Eng. 56 (1) (2001).
[1201] R. Guardani, S.M.S. Neiro, H. Bulau, J. Ulrich, Experimental comparison and simulation of static and dynamic solid layer melt crystallization, Chem. Eng. Sci. 56 (7) (2001) 2371.
[1202] T. Hibiya, S. Nakamura, T. Azami, M. Sumiji, N. Imaishi, K. Mukai, K. Onuma, S. Yoda, Marangoni flow of molten silicon, Acta Astronaut. 48 (2–3) (2001) 71.
[1203] J.P. Kalejs, Modeling contributions in commercialization of silicon ribbon growth from the melt, J. Cryst. Growth 230 (1–2) (2001) 10.
[1204] A.V. Kartavykh, E.S. Kopeliovich, M.G. Mil'vidskii, V.V. Rakov, A technological test of the Mir-station orbital flight modes for semiconductor single crystal growth, Instrum. Exp. Tech. 44 (1) (2001) 100.
[1205] M.G. Kim, G.O. Kim, B.K. Park, Numerical study on the vertical Bridgman crystal growth with thermosolutal convection, KSME J. 15 (8) (2001) 1188.
[1206] C.W. Lan, J.H. Chian, Three-dimensional simulation of Marangoni flow and interfaces in floating-zone silicon crystal growth, J. Cryst. Growth 230 (1–2) (2001) 172.
[1207] H. Lee, A.J. Pearlstein, Interface shape and thermally-driven convection in vertical Bridgman growth of gallium selenide: a semiconductor with anisotropic solid-phase thermal conductivity, J. Heat Transfer—Trans. ASME 123 (4) (2001) 729.
[1208] F.W. Leslie, N. Ramachandran, A technique for rapidly deploying a concentration gradient with applications to microgravity, Exp. Fluids 30 (5) (2001) 568.
[1209] K. Li, W.R. Hu, Numerical simulation of magnetic field design for damping thermocapillary convection in a floating half-zone, J. Cryst. Growth 222 (3) (2001) 677.
[1210] C.W. Lu, J.C. Chen, Numerical computation of sapphire crystal growth using heat exchanger method, J. Cryst. Growth 225 (2–4) (2001) 274.
[1211] C. Martinez-Tomas, V. Munoz, CdTe crystal growth process by the Bridgman method: numerical simulation, J. Cryst. Growth 222 (3) (2001) 435.
[1212] J.L. Plaza, E. Dieguez, Heat and momentum transfer numerical analysis in a vertical Bridgman growth system, Cryst. Res. Technol. 36 (7) (2001) 695.
[1213] N. Prabhu, J. Schultz, S.G. Advani, K.I. Jacob, Role of coupling microscopic and macroscopic phenomena during the crystallization of semicrystalline polymers, Polym. Eng. Sci. 41 (11) (2001) 1871.
[1214] A. Roy, H. Zhang, V. Prasad, B. Mackintosh, M. Ouellette, J.P. Kalejs, Growth of large diameter silicon tube by EFG technique: modeling and experiment, J. Cryst. Growth 230 (1–2) (2001) 224.
[1215] A. Seidl, S. Eichler, T. Flade, M. Jurisch, A. Kohler, U. Kretzer, B. Weinert, 200 mm GaAs crystal growth by the temperature gradient controlled LEC method, J. Cryst. Growth 225 (2–4) (2001) 561.
[1216] J.E. Simpson, S.V. Garimella, H.C. de Groh, R. Abbaschian, Bridgman crystal growth of an alloy with thermosolutal convection under microgravity conditions, J. Heat Transfer—Trans. ASME 123 (5) (2001) 990.
[1217] C. Stelian, T. Duffar, J.L. Santailler, F. Barvinschi, I. Nicoara, Analysis of the factors affecting the interface deflection in the vertical Bridgman configuration, Cryst. Res. Technol. 36 (7) (2001) 663.
[1218] C. Stelian, J.L. Plaza, F. Barvinschi, T. Duffar, J.L. Santailler, E. Dieguez, I. Nicoara, Modeling the solute segregation in vertical Bridgman growth by using free-surface technique, Cryst. Res. Technol. 36 (7) (2001) 651.
[1219] M. Sumiji, S. Nakamura, T. Azami, T. Hibiya, Optical observation of solid-melt interface fluctuation due to Marangoni flow in a silicon liquid bridge, J. Cryst. Growth 223 (4) (2001) 503.
[1220] K. Takano, Y. Shiraishi, J. Matsubara, T. Iida, N. Takase, N. Machida, M. Kuramoto, H. Yamagishi, Global simulation of the CZ silicon crystal growth up to 400 mm in diameter, J. Cryst. Growth 229 (1) (2001) 26.
[1221] J. Virbulis, T. Wetzel, A. Muiznieks, B. Hanna, E. Dornberger, E. Tomzig, A. Muhlbauer, W. von Ammon, Numerical investigation of silicon melt flow in large diameter CZ-crystal growth under the influence of steady and dynamic magnetic fields, J. Cryst. Growth 230 (1–2) (2001) 92.
[1222] Y.C. Won, K. Kakimoto, H. Ozoe, Transient three-dimensional numerical computation for unsteady oxygen concentration in a silicon melt during a Czochralski process under a cusp-shaped magnetic field, J. Cryst. Growth 233 (4) (2001) 622.
[1223] Z. Zeng, H. Mizuseki, K. Shimamura, K. Higashino, T. Fukuda, Y. Kawazoe, Marangoni convection in model

of floating zone under microgravity, J. Cryst. Growth 229 (1) (2001) 601.
[1224] D.A. Afremov, S.L. Solov'ev, Model of dispersion of a droplet of corium melt during its motion through the coolant as applied to the problem of steam explosion, High Temp.—USSR 39 (3) (2001) 474.
[1225] D. Attinger, D. Poulikakos, Melting and resolidification of a substrate caused by molten microdroplet impact, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1110.
[1226] F.Y. Cao, C.S. Cui, Q.C. Li, Modeling of heat transfer and solidification process of spray formed billet, J. Mater. Sci. Technol. 17 (1) (2001) 101.
[1227] M. Chung, R.H. Rangel, Parametric study of metal droplet deposition and solidification process including contact resistance and undercooling effects, Int. J. Heat Mass Transfer 44 (3) (2001) 605.
[1228] S. Haferl, V. Butty, D. Poulikakos, J. Giannakouros, K. Boomsma, C.M. Megaridis, V. Nayagam, Freezing dynamics of molten solder droplets impacting onto flat substrates in reduced gravity, Int. J. Heat Mass Transfer 44 (18) (2001) 3513.
[1229] H.O. Haraldsson, H.X. Li, Z.L. Yang, T.N. Dinh, B.R. Sehgal, Effect of solidification on drop fragmentation in liquid–liquid media, Heat Mass Transfer 37 (4–5) (2001) 417.
[1230] P. Shukla, R.K. Mandal, S.N. Ojha, Non-equilibrium solidification of undercooled droplets during atomization process, Bull. Mater. Sci. 24 (5) (2001) 547.
[1231] A.K. Srivastava, R.C. Anandani, A. Dhar, A.K. Gupta, Effect of thermal conditions on microstructural features during spray forming, Mater. Sci. Eng. A—Struct. Mater. Prop. Microstruct. Process. (issue SI) (2001) 587.
[1232] Y.P. Wan, H. Zhang, X.Y. Jiang, S. Sampath, V. Prasad, Role of solidification, substrate temperature and Reynolds number on droplet spreading in thermal spray deposition: measurements and modeling, J. Heat Transfer—Trans. ASME 123 (2) (2001) 382.
[1233] G.X. Wang, V. Prasad, S. Sampath, Rapid solidification in thermal spray deposition: microstructure and modelling, Sadhana-Academy Proc. Eng. Sci. 1 (2001).
[1234] Q. Xu, E.J. Lavernia, Influence of nucleation and growth phenomena on microstructural evolution during droplet-based deposition, Acta Mater. 49 (18) (2001) 3849.
[1235] H. Zhang, X.Y. Wang, L.L. Zheng, X.Y. Jiang, Studies of splat morphology and rapid solidification during thermal spraying, Int. J. Heat Mass Transfer 44 (24) (2001) 4579.
[1236] F. Deschamps, C. Sotin, Thermal convection in the outer shell of large icy satellites, J. Geophys. Res.—Planets 106 (E3) (2001) 5107.
[1237] R.C. Kerr, Thermal erosion by laminar lava flows, J. Geophys. Res.—Solid Earth 106 (B11) (2001) 26453.
[1238] D. Balsara, Fast and accurate discrete ordinates methods for multidimensional radiative transfer. Part I, Basic methods, J. Quant. Spectrosc. Radiat. Transfer 69 (6) (2001) 671.
[1239] P. Ben Abdallah, A. Charette, V. Le Dez, Influence of a spatial variation of the thermo-optical constants on the radiative transfer inside an absorbing-emitting semi-transparent sphere, J. Quant. Spectrosc. Radiat. Transfer 70 (3) (2001) 341.
[1240] P.L. Ben-Abdallah, S. Fumeron, V. Le Dez, A. Charette, Integral form of the radiative transfer equation inside refractive cylindrical media, J. Thermophys. Heat Transfer 15 (2) (2001) 184.
[1241] J.C. Chai, J.P. Moder, K.C. Karki, A procedure for view factor calculation using the finite-volume method, Numer. Heat Transfer Part B—Fundamentals 40 (1) (2001) 23.
[1242] K.J. Daun, K.G.T. Hollands, Infinitesimal-area radiative analysis using parametric surface representation, through NURBS, J. Heat Transfer—Trans. ASME 123 (2) (2001) 249.
[1243] S.A. El-Wakil, A.R. Degheidy, H.M. Machali, A. El-Depsy, Radiative transfer in a spherical medium, J. Quant. Spectrosc. Radiat. Transfer 69 (1) (2001) 49.
[1244] H. Habuka, K. Maruyama, T. Suzuki, Design of a rapid thermal processing system using a reflection-resolved ray tracing method, J. Electrochem. Soc. 148 (10) (2001) G543.
[1245] T.X. Huang, Z.J. Zheng, Y.K. Ding, Energy transfer via a thermal capillary, Phys. Plasmas 8 (11) (2001) 4898.
[1246] A.T. Kauati, A.J.S. Neto, N.C. Roberty, A source-detector methodology for the construction and solution of the one-dimensional inverse transport equation, Inverse Probl. Eng. 9 (1) (2001) 45.
[1247] I.K. Kim, W.S. Kim, A hybrid spatial differencing scheme for discrete ordinates method in 2D rectangular enclosures, Int. J. Heat Mass Transfer 44 (3) (2001) 575.
[1248] M.Y. Kim, S.W. Baek, J.H. Park, Unstructured finite-volume method for radiative heat transfer in a complex two-dimensional geometry with obstacles, Numer. Heat Transfer Part B—Fundamentals 39 (6) (2001) 617.
[1249] K. Lin, P. Dold, Radiative heat transfer in a resistance heated floating zone furnace: a numerical study with FIDAP, Cryst. Res. Technol. 36 (7) (2001) 629.
[1250] J. Liu, S.J. Zhang, Y.S. Chen, Modeling of radiative transfer in optical fiber drawing processes wish fresnel interfaces, Numer. Heat Transfer Part B—Fundamentals 39 (4) (2001) 345.
[1251] L.H. Liu, H.P. Tan, Z.H. He, Inverse radiation problem of source term in three-dimensional complicated geometric semitransparent media, Int. J. Therm. Sci. 40 (6) (2001) 528.
[1252] L.H. Liu, H.P. Tan, Q.Z. Yu, Inverse radiation problem of sources and emissivities in one-dimensional semi-transparent media, Int. J. Heat Mass Transfer 44 (1) (2001) 63.
[1253] P. Mahanta, S.C. Mishra, Modified collapsed dimension method for radiative heat transfer problems, J. Thermophys. Heat Transfer 15 (2) (2001) 246.
[1254] J.G. Marakis, J. Chamico, G. Brenner, F. Durst, Parallel ray tracing for radiative heat transfer-application in a distributed computing environment, Int. J. Numer. Meth. Heat Fluid Flow 11 (7) (2001) 663.
[1255] S. Maruyama, Y. Takeuchi, S. Hirasawa, A fast method of radiative heat transfer analysis between arbitrary three-dimensional bodies composed of specu-

lar and diffuse surfaces, Numer. Heat Transfer Part A—Applications 39 (8) (2001) 761.
[1256] J.P. Mulet, K. Joulain, R. Carminati, J.J. Greffet, Nanoscale radiative heat transfer between a small particle and a plane surface, Appl. Phys. Lett. 78 (19) (2001) 2931.
[1257] H.M. Park, D.H. Yoo, A multidimensional inverse radiation problem of estimating the strength of a heat source in participating media, Int. J. Heat Mass Transfer 44 (15) (2001) 2949.
[1258] M. Sakami, A. El Kasmi, A. Charette, Analysis of radiative heat transfer in complex two-dimensional enclosures with obstacles using the modified discrete ordinates method, J. Heat Transfer—Trans. ASME 123 (5) (2001) 892.
[1259] Z.M. Tan, P.F. Hsu, An integral formulation of transient radiative transfer, J. Heat Transfer—Trans. ASME 123 (3) (2001) 466.
[1260] K. Tang, R.O. Buckius, A statistical model of wave scattering from random rough surfaces, Int. J. Heat Mass Transfer 44 (21) (2001) 4059.
[1261] D.L. Thomson, A.J. Meade, Y. Bayazitoglu, Solution of the radiative transfer equation in discrete ordinate form by sequential function approximation, Int. J. Therm. Sci. 40 (6) (2001) 517.
[1262] A.I. Volokitin, B.N.J. Persson, Radiative heat transfer and vacuum friction between nanostructures, Phys. Low-Dimens. Struct. (2001) 5.
[1263] A.I. Volokitin, B.N.J. Persson, Radiative heat transfer between nanostructures, Phys. Rev. B 6320 (20) (2001) 5404.
[1264] S.A.B. Al-Omari, K. Kawajiri, T. Yonesawa, Soot processes in a methane-fueled furnace and their impact on radiation heat transfer to furnace walls, Int. J. Heat Mass Transfer 44 (13) (2001) 2567.
[1265] E.P. Keramida, A.G. Boudouvis, E. Lois, N.C. Markatos, A.N. Karayannis, Evaluation of two radiation models in CFD fire modeling, Numer. Heat Transfer Part A—Applications 39 (7) (2001) 711.
[1266] S.S. Krishnan, K.C. Lin, G.M. Faeth, Extinction and scattering properties of soot emitted from buoyant turbulent diffusion flames, J. Heat Transfer—Trans. ASME 123 (2) (2001) 331.
[1267] J.M. Ruan, H. Kobayashi, T. Niioka, Y.G. Ju, Combined effects of nongray radiation and pressure on premixed $CH_4/O_2/CO_2$ flames, Combust. Flame 124 (1–2) (2001) 225.
[1268] V.P. Solovjov, B.W. Webb, An efficient method for modeling radiative transfer in multicomponent gas mixtures with soot, J. Heat Transfer—Trans. ASME 123 (3) (2001) 450.
[1269] J.F. Wang, T. Niioka, The effect of radiation reabsorption on NO formation in CH_4/air counterflow diffusion flames, Combust. Theory Modell. 5 (3) (2001) 385.
[1270] J.X. Wen, L.Y. Huang, J. Roberts, The effect of microscopic and global radiative heat exchange on the field predictions of compartment fires, Fire Safety J. 36 (3) (2001) 205.
[1271] H. Xue, J.C. Ho, Y.M. Cheng, Comparison of different combustion models in enclosure fire simulation, Fire Safety J. 36 (1) (2001) 37.
[1272] M.J. Yu, S.W. Baek, S.J. Kang, Modeling of pulverized coal combustion with non-gray gas radiation effects, Combust. Sci. Technol. 166 (2001) 151.
[1273] S.W. Baek, J.H. Park, S.J. Kang, Transient cooling of a two-phase medium of spherical shape when exposed to the rarefied cold environment, Int. J. Heat Mass Transfer 44 (12) (2001) 2345.
[1274] P.E. Baudoux, A. Roblin, P. Chervet, New approach for radiative-transfer computations in axisymmetric scattering hot media, J. Thermophys. Heat Transfer 15 (3) (2001) 317.
[1275] M. Caldas, V. Semiao, An efficient procedure to evaluate asymptotic limits of particles scattering efficiency and asymmetry factor, Int. J. Heat Mass Transfer 44 (12) (2001) 2375.
[1276] M. Caldas, V. Semiao, A new approximate phase function for isolated particles and polydispersions, J. Quant. Spectrosc. Radiat. Transfer 68 (5) (2001) 521.
[1277] J. Yamada, Y. Kurosaki, T. Morikawa, Radiation emitted from fluidizing particles adjacent to a heated surface in a fluidized bed, Int. J. Therm. Sci. 40 (1) (2001) 104.
[1278] B.I. Aronov, Y. Zvirin, Temperature field inversion and break-down at the interface of semi-transparent two-layer system in radiative heat transfer, Int. J. Therm. Sci. 40 (10) (2001) 865.
[1279] M. Funatsu, H. Shirai, K. Kasuya, Radiative characteristics of carbonaceous ablation layers with reflection effects, JSME Int. J. B—Fluids Therm. Eng. 44 (3) (2001) 419.
[1280] Z.X. Guo, S. Kumar, Radiation element method for transient hyperbolic radiative transfer in plane-parallel inhomogeneous media, Numer. Heat Transfer Part B—Fundamentals 39 (4) (2001) 371.
[1281] Z.X. Guo, S. Maruyama, Prediction of radiative heat transfer in industrial equipment using the radiation element method, J. Press. Vess. Technol.—Trans. ASME 123 (4) (2001) 530.
[1282] B.K. Hur, N.J. Kim, T.B. Seo, C.B. Kim, A study on the calculation model for the emissivities of carbon dioxide and water vapor, KSME J. 15 (2) (2001) 248.
[1283] T.K. Kim, W.H. Park, C.H. Lee, Radiative transfer solutions for purely absorbing gray and nongray gases within a cubical enclosure, KSME J. 15 (6) (2001) 752.
[1284] H.M. Koo, H. Cha, T.H. Song, Convergence characteristics of temperature in radiation problems, Numer. Heat Transfer Part B—Fundamentals 40 (4) (2001) 303.
[1285] A. Lazard, S. Andre, D. Maillet, D. Baillis, A. Degiovanni, Flash experiment on a semitransparent material: interest of a reduced model, Inverse Probl. Eng. 9 (4) (2001) 413.
[1286] M. Lazard, S. Andre, D. Maillet, Transient coupled radiative–conductive heat transfer in a gray planar medium with anisotropic scattering, J. Quant. Spectrosc. Radiat. Transfer 69 (1) (2001) 23.
[1287] L.H. Liu, H.P. Tan, Transient radiation and conduction in a two-dimensional participating cylinder subjected to a pulse irradiation, Int. J. Therm. Sci. 40 (10) (2001) 877.
[1288] S.R. Mathur, J.Y. Murthy, Acceleration of anisotropic scattering computations using coupled ordinates

method (COMET), J. Heat Transfer—Trans. ASME 123 (3) (2001) 607.
[1289] M. Merkwitz, A quasi diffusive reflective method for the calculation of radiative heat transfer in semitransparent media between parallel planes with angle dependent reflection behaviour, Heat Mass Transfer 37 (2–3) (2001) 283.
[1290] T. Okamoto, T. Mutou, T. Takagi, Approach for incorporating narrow band nonuniformity into nongray analysis of radiative heat transfer in nonisothermal and nonhomogeneous gas fields, Int. J. Heat Mass Transfer 44 (21) (2001) 4147.
[1291] S.H. Wu, C.Y. Wu, Time-resolved spatial distribution of scattered radiative energy in a two-dimensional cylindrical medium with a large mean free path for scattering, Int. J. Heat Mass Transfer 44 (14) (2001) 2611.
[1292] F. Asllanaj, G. Jeandel, J.R. Roche, Numerical solution of radiative transfer equation coupled with nonlinear heat conduction equation, Int. J. Numer. Meth. Heat Fluid Flow 11 (5–6) (2001) 449.
[1293] J.M. Bergheau, F. Potier, Finite-element modeling of coupled radiative and diffusive heat transfer in nonparticipating media including symmetry and periodicity conditions, Numer. Heat Transfer Part B—Fundamentals 40 (3) (2001) 229.
[1294] F.H.R. Franca, O.A. Ezekoye, J.R. Howell, Inverse boundary design combining radiation and convection heat transfer, J. Heat Transfer—Trans. ASME 123 (5) (2001) 884.
[1295] A. Klar, C. Schmeiser, Numerical passage from radiative heat transfer to nonlinear diffusion models, Math. Models Meth. App. Sci. 11 (5) (2001) 749.
[1296] O. Klein, P. Philip, J. Sprekels, K. Wilmanski, Radiation- and convection-driven transient heat transfer during sublimation growth of silicon carbide single crystals, J. Cryst. Growth 222 (4) (2001) 832.
[1297] M. Laitinen, T. Tiihonen, Conductive–radiative heat transfer in grey materials, Quart. Appl. Math. 59 (4) (2001) 737.
[1298] K.H. Lee, R. Viskanta, Two-dimensional combined conduction and radiation heat transfer: comparison of the discrete ordinates method and the diffusion approximation methods, Numer. Heat Transfer Part A—Applications 39 (3) (2001) 205.
[1299] G. Miliauskas, Regularities of unsteady radiative–conductive heat transfer in evaporating semitransparent liquid droplets, Int. J. Heat Mass Transfer 44 (4) (2001) 785.
[1300] J. Monnier, J.P. Vila, Convective and radiative thermal transfer with multiple reflections. Analysis and approximation by a finite element method, Math. Models Meth. App. Sci. 11 (2) (2001) 229.
[1301] D. Rivas, C. Vazquez-Espi, An analysis of lamp if radiation in ellipsoidal mirror furnaces, J. Cryst. Growth 223 (3) (2001) 433.
[1302] T. Sakai, K. Sawada, Calculation of nonequilibrium radiation from a blunt-body shock layer, J. Thermophys. Heat Transfer 15 (1) (2001) 99.
[1303] T. Sakai, T. Tsuru, K. Sawada, Computation of hypersonic radiating flowfield over a blunt body, J. Thermophys. Heat Transfer 15 (1) (2001) 91.
[1304] P. Talukdar, S.C. Mishra, Transient conduction and radiation heat transfer with heat generation in a participating medium using the collapsed dimension method, Numer. Heat Transfer Part A—Applications 39 (1) (2001) 79.
[1305] K. Velusamy, T. Sundararajan, K.N. Seetharamu, Interaction effects between surface radiation and turbulent natural convection in square and rectangular enclosures, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1062.
[1306] W.M. Yan, H.Y. Li, Radiation effects on mixed convection heat transfer in a vertical square duct, Int. J. Heat Mass Transfer 44 (7) (2001) 1401.
[1307] L.Z. Shi, S.Y. Xu, R.F. Boehm, Analysis of a single-layer thermophotovoltaic system at moderate temperatures, J. Thermophys. Heat Transfer 15 (4) (2001) 453.
[1308] W.H. Zhao, K. Tian, S.G. Zhu, P. Lu, Surface temperature diagnostics using infrared multiwavelength radiation method, J. Thermophys. Heat Transfer 15 (1) (2001) 125.
[1309] W.Y. Chiou, R.T. Lee, Finite-element analysis of heat conduction problems with irregular region boundary using multilevel techniques, Numer. Heat Transfer Part B—Fundamentals 40 (2) (2001) 179.
[1310] P.A. Jayantha, I.W. Turner, A comparison of gradient approximations for use in finite-volume computational models for two-dimensional diffusion equations, Numer. Heat Transfer Part B—Fundamentals 40 (5) (2001) 367.
[1311] V.R. Voller, Numerical treatment of rapidly changing and discontinuous conductivities, Int. J. Heat Mass Transfer 44 (23) (2001) 4553.
[1312] J.L. Battaglia, O. Cois, L. Puigsegur, A. Oustaloup, Solving an inverse heat conduction problem using a non-integer identified model, Int. J. Heat Mass Transfer 44 (14) (2001) 2671.
[1313] S. Chantasiriwan, An algorithm for solving multidimensional inverse heat conduction problem, Int. J. Heat Mass Transfer 44 (20) (2001) 3823.
[1314] H.T. Chen, S.Y. Lin, L.C. Fang, Estimation of surface temperature in two-dimensional inverse heat conduction problems, Int. J. Heat Mass Transfer 44 (8) (2001) 1455.
[1315] C. Le Niliot, F. Lefevre, A method for multiple steady line heat sources identification in a diffusive system: application to an experimental 2D problem, Int. J. Heat Mass Transfer 44 (7) (2001) 1425.
[1316] C. Le Niliot, F. Lefevre, Multiple transient point heat sources identification in heat diffusion: application to numerical two- and three-dimensional problems, Numer. Heat Transfer Part B—Fundamentals 39 (3) (2001) 277.
[1317] H.M. Park, W.S. Jung, The Karhunen–Loeve Galerkin method for the inverse natural convection problems, Int. J. Heat Mass Transfer 44 (1) (2001) 155.
[1318] H.M. Park, W.S. Jung, On the solution of multidimensional inverse heat conduction problems using an

efficient sequential method, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1021.
[1319] H.M. Park, W.S. Jung, Recursive solution of an inverse heat transfer problem in rapid thermal processing systems, Int. J. Heat Mass Transfer 44 (11) (2001) 2053.
[1320] R. Throne, L. Olson, The steady inverse heat conduction problem: a comparison of methods with parameter selection, J. Heat Transfer—Trans. ASME 123 (4) (2001) 633.
[1321] E. Videcoq, D. Petit, Model reduction for the resolution of multidimensional inverse heat conduction problems, Int. J. Heat Mass Transfer 44 (10) (2001) 1899.
[1322] J. Blobner, R.A. Bialecki, G. Kuhn, Boundary-element solution of coupled heat conduction–radiation problems in the presence of shadow zones, Numer. Heat Transfer Part B—Fundamentals 39 (5) (2001) 451.
[1323] B.J. Driessen, J.L. Dohner, A finite element-boundary element method for advection–diffusion problems with variable advective fields and infinite domains, Int. J. Heat Mass Transfer 44 (11) (2001) 2183.
[1324] M. Hribersek, Inexact Newton–Krylov methods for nonlinear forced heat convection problems by BEM, Z. Angew. Math. Mech. (3) (2001) S501.
[1325] N.S. Mera, L. Elliott, D.B. Ingham, D. Lesnic, An iterative boundary element method for solving the one-dimensional backward heat conduction problem, Int. J. Heat Mass Transfer 44 (10) (2001) 1937.
[1326] A.O. Demuren, R.V. Wilson, M. Carpenter, Higher-order compact schemes for numerical simulation of incompressible flows, Part I: Theoretical development, Numer. Heat Transfer Part B—Fundamentals 39 (3) (2001) 207.
[1327] S.C. Sheen, Computation of convection–diffusion problems differenced with high-order upwind schemes, Numer. Heat Transfer Part B—Fundamentals 40 (2) (2001) 163.
[1328] R.V. Wilson, A.O. Demuren, M. Carpenter, Higher-order compact schemes for numerical simulation of incompressible flows, Part II: Applications, Numer. Heat Transfer Part B—Fundamentals 39 (3) (2001) 231.
[1329] B. Yu, W.Q. Tao, D.S. Zhang, Q.W. Wang, Discussion on numerical stability and boundedness of convective discretized scheme, Numer. Heat Transfer Part B—Fundamentals 40 (4) (2001) 343.
[1330] S.G. Ahmed, Boundary integral formulation and mushy zone model for phase change problem, Int. J. Numer. Meth. Heat Fluid Flow 11 (4) (2001) 371.
[1331] D.M. Christopher, Comparison of inter face-following techniques for numerical analysis of phase-change problems, Numer. Heat Transfer Part B—Fundamentals 39 (2) (2001) 189.
[1332] D.A. Knoll, W.B. Vanderheyden, V.A. Mousseau, D.B. Kothe, Preconditioning Newton–Krylov methods in solidifying flow applications, SIAM J. Sci. Comput. 23 (2) (2001) 381.
[1333] D.S. Schrage, On the application of ADI methods to predict conjugate phase change and diffusion heat transfer, Numer. Heat Transfer Part B—Fundamentals 39 (6) (2001) 563.
[1334] I. Wintruff, C. Gunther, A.G. Class, An interface-tracking finite-element method for melting and solidification problems—Part 1: Formulation, Numer. Heat Transfer Part B: Fundamentals 39 (2) (2001) 101.
[1335] I. Wintruff, C. Gunther, A.G. Class, An interface-tracking finite-element method for melting and solidification problems—Part 2: Verification and application, Numer. Heat Transfer Part B: Fundamentals 39 (2) (2001) 127.
[1336] A. Beskok, T.C. Warburton, An unstructured hp finite-element scheme for fluid flow and heat transfer in moving domains, J. Comput. Phys. 174 (2) (2001) 492.
[1337] P. De Palma, G. Pascazio, M. Napolitano, Accurate and efficient solutions of unsteady viscous flows, Int. J. Numer. Meth. Heat Fluid Flow 11 (4) (2001) 286.
[1338] H. Lai, Y.Y. Yan, The effect of choosing dependent variables and cell-face velocities on convergence of the SIMPLE algorithm using non-orthogonal grids, Int. J. Numer. Meth. Heat Fluid Flow 11 (5–6) (2001) 524.
[1339] Z. Mazhar, A procedure for the treatment of the velocity-pressure coupling problem in incompressible fluid flow, Numer. Heat Transfer Part B—Fundamentals 39 (1) (2001) 91.
[1340] S.Y. Moon, C.H. Sohn, C.W. Lee, Applications of a flowfield-dependent mixed explicit–implicit (FDMEI) method to heat and fluid dynamics problems, Numer. Heat Transfer Part B—Fundamentals 39 (4) (2001) 389.
[1341] M.M. Rahman, T. Siikonen, An artificial compressibility method for incompressible flows, Numer. Heat Transfer Part B—Fundamentals 40 (5) (2001) 391.
[1342] J.B.C. Silva, L.F.M. de Moura, A control-volume finite-element method (CVFEM) for unsteady, incompressible, viscous fluid flows, Numer. Heat Transfer Part B—Fundamentals 40 (1) (2001) 61.
[1343] S.F. Tsai, T.W.H. Sheu, Finite-element analysis of incompressible Navier–Stokes equations involving exit pressure boundary conditions, Numer. Heat Transfer Part B—Fundamentals 39 (5) (2001) 479.
[1344] B. Yu, H. Ozoe, W.Q. Tao, A modified pressure-correction scheme for the SIMPLER method MSIMPLER, Numer. Heat Transfer Part B—Fundamentals 39 (5) (2001) 435.
[1345] J.C. Jo, Y.I. Kim, S.K. Choi, Numerical analysis of thermal stratification in a circular pipe, J. Press. Vess. Technol.—Trans. ASME 123 (4) (2001) 517.
[1346] D.A. Mayne, A.S. Usmani, M. Crapper, h-adaptive finite element solution of unsteady thermally driven cavity problem, Int. J. Numer. Meth. Heat Fluid Flow 11 (2–3) (2001) 172.
[1347] P.J. Oliveira, R.I. Issa, An improved PISO algorithm for the computation of buoyancy-driven flows, Numer. Heat Transfer Part B—Fundamentals 40 (6) (2001) 473.
[1348] D.C. Wan, B.S.V. Patnaik, G.W. Wei, A new benchmark quality solution for the buoyancy-driven cavity by discrete singular convolution, Numer. Heat Transfer Part B—Fundamentals 40 (3) (2001) 199.
[1349] K. Abe, K. Suga, Towards the development of a Reynolds-averaged algebraic turbulent scalar-flux model, Int. J. Heat Fluid Flow 22 (1) (2001) 19.
[1350] G.B. Deng, J. Piquet, X. Vasseur, M. Visonneau, A new fully coupled method for computing turbulent flows, Comput. Fluids 30 (4) (2001) 445.

[1351] Z. Dragojlovic, D.A. Kaminski, J. Ryoo, Tuning of a fuzzy rule set for controlling convergence of a CFD solver in turbulent flow, Int. J. Heat Mass Transfer 44 (20) (2001) 3811.
[1352] Y.H. Guo, G.B. He, A.T. Hsu, Application of genetic algorithms to the development of a variable Schmidt number model for jet-in-crossflows, Int. J. Numer. Meth. Heat Fluid Flow 11 (8) (2001) 744.
[1353] M. Reyes, J. Rincon, J. Damia, Simulation of turbulent flow in irregular geometries using a control-volume finite-element method, Numer. Heat Transfer Part B—Fundamentals 39 (1) (2001) 79.
[1354] J. Steelant, E. Dick, Modeling of laminar-turbulent transition for high freestream turbulence, J. Fluids Eng.—Trans. ASME 123 (1) (2001) 22.
[1355] J.X. Wen, F. Liu, S. Lo, Performance comparison of a buoyancy-modified turbulence model with three LRN turbulence models for a square cavity, Numer. Heat Transfer Part B—Fundamentals 39 (3) (2001) 257.
[1356] Z.H. Yan, Parallel computation of turbulent combustion and flame spread in fires, Numer. Heat Transfer Part B—Fundamentals 39 (6) (2001) 585.
[1357] X.Q. Chen, Multigrid acceleration of computations of turbulent particle-laden flows, Numer. Heat Transfer Part B—Fundamentals 40 (2) (2001) 139.
[1358] M. Darwish, F. Moukalled, B. Sekar, A unified formulation of the segregated class of algorithms for multifluid flow at all speeds, Numer. Heat Transfer Part B—Fundamentals 40 (2) (2001) 99.
[1359] J. Ferry, S. Balachandar, A fast Eulerian method for disperse two-phase flow, Int. J. Multiphase Flow 27 (7) (2001) 1199.
[1360] A. Kitagawa, Y. Murai, F. Yamamoto, Two-way coupling of Eulerian–Lagrangian model for dispersed multiphase flows using filtering functions, Int. J. Multiphase Flow 27 (12) (2001) 2129.
[1361] G.N. Li, M.F. Modest, An effective particle tracing scheme on structured/unstructured grids in hybrid finite volume/PDF Monte Carlo methods, J. Comput. Phys. 173 (1) (2001) 187.
[1362] N.A. Patankar, D.D. Joseph, Lagrangian numerical simulation of particulate flows, Int. J. Multiphase Flow 27 (10) (2001) 1685.
[1363] N.A. Patankar, D.D. Joseph, Modeling and numerical simulation of particulate flows by the Eulerian–Lagrangian approach, Int. J. Multiphase Flow 27 (10) (2001) 1659.
[1364] G. Son, A numerical method for incompressible two-phase flows with open or periodic boundaries, Numer. Heat Transfer Part B—Fundamentals 39 (1) (2001) 45.
[1365] S.L. Lee, S.R. Sheu, A new numerical formulation for incompressible viscous free surface flow without smearing the free surface, Int. J. Heat Mass Transfer 44 (10) (2001) 1837.
[1366] P. Nithiarasu, A comparative study on the performance of two time stepping schemes for convection in a fluid saturated porous medium, Int. J. Numer. Meth. Heat Fluid Flow 11 (4) (2001) 308.
[1367] P.J. Oliveira, On the numerical implementation of nonlinear viscoelastic models in a finite-volume method, Numer. Heat Transfer Part B—Fundamentals 40 (4) (2001) 283.
[1368] E. Papanicolaou, D. Giebert, R. Koch, A. Schulz, A conservation-based discretization approach for conjugate heat transfer calculations in hot-gas ducting turbomachinery components, Int. J. Heat Mass Transfer 44 (18) (2001) 3413.
[1369] N.H. Abu-Hamdeh, A.I. Khdair, R.C. Reeder, A comparison of two methods used to evaluate thermal conductivity for some soils, Int. J. Heat Mass Transfer 44 (5) (2001) 1073.
[1370] V. Botton, P. Lehmann, R. Bolcato, R. Moreau, R. Haettel, Measurement of solute diffusivities. Part II. Experimental measurements in a convection-controlled shear cell. Interest of a uniform magnetic field, Int. J. Heat Mass Transfer 44 (17) (2001) 3345.
[1371] P. Dantzer, P. Millet, Heat flux calorimetry in intermetallic compound-H-2(g) systems: heat measurements and modeling in the low pressures range, Thermochim. Acta 370 (1–2) (2001) 1.
[1372] G.G. Gadzhiev, S.M. Ismailov, K.K. Abdullaev, M.M. Khamidov, Z.M. Omarov, Thermal and electrical properties of gadolinium sulfides at high temperatures, High Temp.—USSR 39 (3) (2001) 407.
[1373] V.Z. Geller, B.V. Nemzer, U.V. Cheremnykh, Thermal conductivity of the refrigerant mixtures R404A, R407C, R410A, and R507A, Int. J. Thermophys. 22 (4) (2001) 1035.
[1374] J.M. Hutchinson, S. Montserrat, The application of temperature-modulated DSC to the glass transition region II. Effect of a distribution of relaxation times, Thermochim. Acta 377 (1–2) (2001) 63.
[1375] E.V. Ivakin, A.S. Rubanov, Thermal diffusivity measurement of high-conducting solids by the method of transient gratings, Anal. Sci. (issue SI) (2001) S126.
[1376] J. Liu, Uncertainty analysis for temperature prediction of biological bodies subject to randomly spatial heating, J. Biomech. 34 (12) (2001) 1637.
[1377] C. Martinsons, A. Levick, G. Edwards, Precise measurements of thermal diffusivity by photothermal radiometry for semi-infinite targets using accurately determined boundary conditions, Anal. Sci. (issue SI) (2001) S114.
[1378] N.S. Mera, L. Elliott, D.B. Ingham, D. Lesnic, Use of the boundary element method to determine the thermal conductivity tensor of an anisotropic medium, Int. J. Heat Mass Transfer 44 (21) (2001) 4157.
[1379] P.N. Quested, B.J. Monaghan, The measurement of thermophysical properties of molten slags and fluxes, High Temp. Mate. Process. 20 (3–4) (2001) 219.
[1380] N.B. Singh, S.R. Coriell, W.M.B. Duval, S.S. Mani, K. Green, M.E. Glicksman, Thermal conductivity measurement in lead bromide, J. Cryst. Growth 225 (2–4) (2001) 512.
[1381] Z. Tamainot-Telto, R.E. Critoph, Monolithic carbon for sorption refrigeration and heat pump applications, Appl. Therm. Eng. 21 (1) (2001) 37.
[1382] A. Tommasi, B. Gibert, U. Seipold, D. Mainprice, Anisotropy of thermal diffusivity in the upper mantle, Nature 411 (6839) (2001) 783.

[1383] F. Wu, C. Wu, F.Z. Guo, D.Y. Li, Acoustically controlled heat transfer of ferromagnetic fluid, Int. J. Heat Mass Transfer 44 (23) (2001) 4427.
[1384] Z.Y. Zhang, Y.P. Xu, Measurement of the thermal conductivities 2-amino-2-methyl-1,3-propanediol (AMP), 2-amino-2-hydroxymethyl-1,3-propanediol (TRIS) and the mixture (AMP plus TRIS, mole ratio 50:50) in the temperature range from 20 °C to of their supermelting temperatures, Sol. Energy 71 (5) (2001) 299.
[1385] W. Zhu, F. Kapteijn, J.A. Moulijn, Diffusion of linear and branched C-6 alkanes in silicalite-1 studied by the tapered element oscillating microbalance, Micropor. Mesopor. Mater. 47 (2–3) (2001) 157.
[1386] N. Dogan, A.B. Tugrul, Optical and solar parameters of irradiated lead-alkali-silicate glass, Sol. Energy Mater. Sol. Cells 69 (3) (2001) 241.
[1387] V.H. Hidalgo, J.B. Varela, A.C. Menendez, S.P. Martinez, Effects of thermal spray procedure and thermal fatigue on microstructure and properties of NiCrAlMoFe coating, Surf. Eng. 17 (6) (2001) 512.
[1388] A. Iwamoto, R. Maekawa, T. Mito, Kapitza conductance of an oxidized copper surface in saturated HeII, Cryogenics 41 (5–6) (2001) 369.
[1389] J. Karlsson, M. Rubin, A. Roos, Evaluation of predictive models for the angle-dependent total solar energy transmittance of glazing materials, Sol. Energy 71 (1) (2001) 23.
[1390] A. Lahmar, J.P. Bardon, N. Hmina, Mechanical and thermal properties of Cu/Al_2O_3 systems; effects of substrate surface ion bombardment etching, J. Phys.—Condens. Matter 13 (18) (2001) 3931.
[1391] L. Li, T.D. Bennett, Incandescence measurement during CO_2 laser texturing of silicate glass, J. Heat Transfer—Trans. ASME 123 (2) (2001) 376.
[1392] Y. Ma, B. Zhu, K. Wu, Preparation and solar reflectance spectra of chameleon-type building coatings?, Sol. Energy 70 (5) (2001) 417.
[1393] A.D. McConnell, S. Uma, K.E. Goodson, Thermal conductivity of doped polysilicon layers, J. Microelectromech. Syst. 10 (3) (2001) 360.
[1394] H. Nagano, A. Ohnishi, Y. Nagasaka, Thermophysical properties of high-thermal-conductivity graphite sheets for spacecraft thermal design, J. Thermophys. Heat Transfer 15 (3) (2001) 347.
[1395] S. Orain, Y. Scudeller, S. Garcia, T. Brousse, Use of genetic algorithms for the simultaneous estimation of thin films thermal conductivity and contact resistances, Int. J. Heat Mass Transfer 44 (20) (2001) 3973.
[1396] A.V. Pogrebnyakov, Irradiation-assisted fabrication and thin-film properties of $YBa_2Cu_3O(7-x)$ microbridges, Supercond. Sci. Technol. 14 (12) (2001) 1090.
[1397] Z.A. Rotenberg, Thermoelectrochemical impedance of an electrode system metal/conducting polymer/solution, Russ. J. Electrochem. 37 (2) (2001) 113.
[1398] R.J. Samuels, N.E. Mathis, Orientation specific thermal properties of polyamide film, J. Electron. Packag. 123 (3) (2001) 273.
[1399] L. Shi, O. Kwon, A.C. Miner, A. Majumdar, Design and batch fabrication of probes for sub-100 nm scanning thermal microscopy, J. Microelectromech. Syst. 10 (3) (2001) 370.
[1400] Y.J. Su, H. Wang, W.D. Porter, A. Lopez, K.T. Faber, Thermal conductivity and phase evolution of plasma-sprayed multilayer coatings, J. Mater. Sci. 36 (14) (2001) 3511.
[1401] R.N. Supino, J.J. Talghader, Electrostatic control of microstructure thermal conductivity, Appl. Phys. Lett. 78 (12) (2001) 1778.
[1402] N. Taketoshi, T. Baba, A. Ono, Development of a thermal diffusivity measurement system for metal thin films using a picosecond thermoreflectance technique, Meas. Sci. Technol. 12 (12) (2001) 2064.
[1403] M.S. Zhang, Z. Yin, Q. Chen, W.F. Zhang, W.C. Chen, Study of structural and photoluminescent properties in barium titanate nanocrystals synthesized by hydrothermal process, Solid State Commun. 119 (12) (2001) 659.
[1404] K. Boomsma, D. Poulikakos, On the effective thermal conductivity of a three-dimensionally structured fluid-saturated metal foam, Int. J. Heat Mass Transfer 44 (4) (2001) 827.
[1405] D.R. Cahela, B.J. Tatarchuk, Permeability of sintered microfibrous composites for heterogeneous catalysis and other chemical processing opportunities, Catal. Today 69 (1–4) (2001) 33.
[1406] E. Egan, C.H. Amon, Measuring thermal conductivity enhancement of polymer composites: application to embedded electronics thermal design, J. Enhanc. Heat Transfer 8 (2) (2001) 119.
[1407] K.J. Kim, B. Montoya, A. Razani, K.H. Lee, Metal hydride compacts of improved thermal conductivity, Int. J. Hydrogen Energy 26 (6) (2001) 609.
[1408] V.A. Konstantinov, V.G. Manzhelii, V.P. Revyakin, R.O. Pohl, Search for the minimum thermal conductivity in mixed cryocrystals $(CH_4)(1-\xi)Kr–\xi$, Low Temp. Phys. 27 (9–10) (2001) 858.
[1409] F. Lin, W. Sun, Warping analysis in laminated object manufacturing process, J. Manuf. Sci. Eng., Trans. ASME 123 (4) (2001) 739.
[1410] S.R. Mirmira, M.C. Jackson, L.S. Fletcher, Effective thermal conductivity and thermal contact conductance of graphite fiber composites, J. Thermophys. Heat Transfer 15 (1) (2001) 18.
[1411] H. Miyafuji, S. Saka, $Na_2O–SiO_2$ wood-inorganic composites prepared by the sol-gel process and their fire-resistant properties, J. Wood Sci. 47 (6) (2001) 483.
[1412] R. Olives, S. Mauran, A highly conductive porous medium for solid-gas reactions: effect of the dispersed phase on the thermal tortuosity, Transport Porous Media 43 (2) (2001) 377.
[1413] Q. Wang, J. Gao, R. Wang, Z. Hua, Mechanical and rheological properties of HDPE/graphite composite with enhanced thermal conductivity, Polym. Compos. 22 (1) (2001) 97.
[1414] M.S. Apte, A. Matzain, H.Q. Zhang, M. Volk, J.P. Brill, J.L. Creek, Investigation of paraffin deposition during multiphase flow in pipelines and wellbores—Part 2: Modeling, J. Energy Resour. Technol.—Trans. ASME 123 (2) (2001) 150.

[1415] C.M. Bidabehere, U. Sedran, Simultaneous diffusion, adsorption, and reaction in fluid catalytic cracking catalysts, Ind. Eng. Chem. Res. 40 (2) (2001) 530.
[1416] S. Biloe, V. Goetz, S. Mauran, Characterization of adsorbent composite blocks for methane storage, Carbon 39 (11) (2001) 1653.
[1417] W. Konecki, The influence of technological parameters on the thermo-isolation and diffusive properties of polyacrylonitrile needle-punched nonwovens, Fibres Textiles East. Eur. 9 (1) (2001) 53.
[1418] A.Y. Krainov, Effect of radiant heat transfer on the minimum spark-ignition energy of gas suspensions, Combust. Explo. Shock Waves 37 (3) (2001) 259.
[1419] J.K. Lee, K.W. An, J.B. Ju, B.W. Cho, W.I. Cho, D. Park, K.S. Yun, Electrochemical properties of PAN-based carbon fibers as anodes for rechargeable lithium ion batteries, Carbon 39 (9) (2001) 1299.
[1420] D.J. Maclean, T. Alboussiere, Measurement of solute diffusivities. Part I. Analysis of coupled solute buoyancy-driven convection and mass transport, Int. J. Heat Mass Transfer 44 (9) (2001) 1639.
[1421] L. Monastyrskii, I. Olenych, P. Parandii, Numerical modeling of the pulse heat-transfer and impurities diffusion under mechanical stresses in semiconductor crystals, J. Cryst. Growth 230 (1–2) (2001) 314.
[1422] Q.T. Nguyen, Y. Germain, R. Clement, Y. Hirata, Pervaporation, a novel technique for the measurement of vapor transmission rate of highly permeable films, Polym. Test. 20 (8) (2001) 901.
[1423] S. Richter, S. Fleischer, M. Aritomi, R. Hampel, Transient two-phase flow in arbitrary inclined tubes caused by depressurization of liquid with dissolved gases, Int. J. Heat Mass Transfer 44 (1) (2001) 1.
[1424] J. Romero, H. Gu, S.N. Gulrajani, 3D transport in acid fracturing treatments: theoretical development and consequences for hydrocarbon production, SPE Prod. Facil. 16 (2) (2001) 122.
[1425] G.D. Verros, N.A. Malamataris, Computer-aided estimation of diffusion coefficients in non-solvent/polymer systems, Macromol. Theory Simul. 10 (8) (2001) 737.
[1426] T. Araki, Y. Sagara, K. Abdullah, A.H. Tambunan, Transport properties of cellular food materials undergoing freeze-drying, Drying Technol. 19 (2) (2001) 297.
[1427] G.S. Mittal, J. Zhang, Artificial neural network for the prediction of temperature, moisture and fat contents in meatballs during deep-fat frying, Int. J. Food Sci. Technol. 36 (5) (2001) 489.
[1428] Z. Pan, R.P. Singh, Physical and thermal properties of ground beef during cooking, Lebensmittel—Wissenschaft + Technologie (Science + Technology) 34 (7) (2001) 437.
[1429] P. Simon, L. Kolman, DSC study of oxidation induction periods, J. Therm. Anal. 64 (2) (2001) 813.
[1430] K. Ballerat-Busserolles, L. Meunier, A.H. Roux, G. Roux-Desgranges, Polymer–surfactant interactions: thermodynamics of some polypropylene glycols in sodium dodecylsulfate aqueous solutions at 298.15 K. Comparison with cationic CTAB aqueous solutions, Phys. Chem. Chem. Phys. 3 (14) (2001) 2872.
[1431] T.S. Banipal, G. Singh, B.S. Lark, Partial molar volumes of transfer of some amino acids from water to aqueous glycerol solutions at 25 °C, J. Solution Chem. 30 (7) (2001) 657.
[1432] D. Bruno, M. Capitelli, V. Cervellera, S. Longo, E.V. Kustova, E.A. Nagnibeda, Calculation of transport coefficients with vibrational nonequilibrium, J. Thermophys. Heat Transfer 15 (1) (2001) 70.
[1433] A.C.M. De Oca, On heat flow and non-reciprocity, Int. J. Mod. Phys. B 15 (22) (2001) 2993.
[1434] M. Fertig, A. Dohr, H.H. Fruhauf, Transport coefficients for high-temperature nonequilibrium air flows, J. Thermophys. Heat Transfer 15 (2) (2001) 148.
[1435] S. Hirano, T.S. Saitoh, M. Oya, M. Yamazaki, Temperature dependence of thermophysical properties of disodium hydrogenphosphate dodecahydrate, J. Thermophys. Heat Transfer 15 (3) (2001) 340.
[1436] M.N. Islam, R.K. Wadi, Thermodynamics of transfer of amino acids from water to aqueous sodium sulfate, Phys. Chem. Liq. 39 (1) (2001) 77.
[1437] J.K. Lee, T.L. Virkler, C.E. Scott, Effects of rheological properties and processing parameters on ABS thermoforming, Polym. Eng. Sci. 41 (2) (2001) 240.
[1438] S.Q. Li, X.G. Hu, R.S. Lin, W.Q. Sang, W.J. Fang, Transfer volumes of glycine, L-alanine and L-serine in glycerol–water mixtures at 25 °C, J. Solution Chem. 30 (4) (2001) 365.
[1439] Q.W. Liu, X.G. Hu, R.S. Lin, W.Q. Sang, S.Q. Li, Limiting partial molar volumes of glycine, L-alanine, and L-serine in ethylene glycol plus water mixtures at 298.15 K, J. Chem. Eng. Data 46 (3) (2001) 522.
[1440] R.G. Liu, H.L. Shao, X.C. Hu, The online measurement of Lyocell fibers and investigation of elongational viscosity of cellulose *N*-methylmorpholine-*N*-oxide monohydrate solutions, Macromol. Mater. Eng. 286 (3) (2001) 179.
[1441] S.P. Maharrey, D.R. Miller, Quartz capillary microreactor for studies of oxidation in supercritical water, AICHE J. 47 (5) (2001) 1203.
[1442] F. Rodante, S. Vecchio, F. Fantauzzi, Thermodynamics of dipeptides in water. Calorimetric determination of enthalpy change values related to proton transfer processes of a series of dipeptides in water, J. Therm. Anal. Calorim. 66 (1) (2001) 79.
[1443] P.G. Rohankar, A.S. Aswar, Thermodynamic study of glycine in aqueous solutions of nickel sulphate at 298.15 K, 303.15 K and 308.5 K, Ind. J. Chem. Section A—Inorg. Bio-Inorg. Phys. Theor. Anal. Chem. 40 (10) (2001) 1086.
[1444] T.M. Shao, X.C. Lin, M. Zhou, Absorption of some powder materials to YAG laser, Sci. China A—Math. Phys. Astron. (S) (2001) 489.
[1445] J.H. Wei, S.H. Xiang, Y.Y. Fan, N.W. Yu, J.C. Ma, S.L. Yang, Basic equations and calculation procedure for analysis of gas flow properties in tuyere under the influence of heat source, Steel Res. 72 (5) (2001).
[1446] G.Q. Wu, J.J. Neumeier, M.F. Hundley, Magnetic susceptibility, heat capacity, and pressure dependence of the electrical resistivity of $La_3Ni_2O_7$ and $La_4Ni_3O_{10}$, Phys. Rev. B 6324 (24) (2001) 5120.
[1447] C. Yang, M. Chen, Z.Y. Guo, B.B. Wei, Hypercooling and the specific heat capacity of Cu–Ni alloy, Chin. Phys. Lett. 18 (1) (2001) 126.

[1448] M.A. Abdelghani-Idrissi, F. Bagui, L. Estel, Analytical and experimental response time to flow rate step along a counter flow double pipe heat exchanger, Int. J. Heat Mass Transfer 44 (19) (2001) 3721.
[1449] D. Castiglia, S. Balabani, G. Papadakis, M. Yianneskis, An experimental and numerical study of the flow past elliptic cylinder arrays, Proc. Inst. Mech. Eng. Part C—J. Mech. Eng. Sci. 215 (11) (2001) 1287.
[1450] J.A. Chen, D.F. Wang, L.Z. Zheng, Experimental study of operating performance of a tube-and-fin radiator for vehicles, Proc. Inst. Mech. Eng. J. Auto. Eng. 215 (D8) (2001) 911.
[1451] L.I. Diez, C. Cortes, I. Arauzo, A. Valero, Combustion and heat transfer monitoring in large utility boilers, Int. J. Therm. Sci. 40 (5) (2001) 489.
[1452] H.M. Ettouney, H.T. El-Dessouky, W. Bouhamra, B. Al-Azmi, Performance of evaporative condensers, Heat Transfer Eng. 22 (4) (2001) 41.
[1453] A. Hartmann, A. Lucic, Application of the holographic interferometry in transport phenomena studies, Heat Mass Transfer 37 (6) (2001) 549.
[1454] P.X. Jiang, M.H. Fan, G.S. Si, Z.P. Ren, Thermal-hydraulic performance of small scale micro-channel and porous-media heat-exchangers, Int. J. Heat Mass Transfer 44 (5) (2001) 1039.
[1455] K. Kawano, M. Sekimura, K. Minakami, H. Iwasaki, M. Ishizuka, Development of micro channel heat exchanging, JSME Int. J. B—Fluids Therm. Eng. 44 (4) (2001) 592.
[1456] M.H. Kim, C.W. Bullard, Development of a microchannel evaporator model for a CO_2 air-conditioning system, Energy 26 (10) (2001) 931.
[1457] M.H. Kim, J.S. Shin, C.W. Bullard, Heat transfer and pressure drop characteristics during R22 evaporation in an oval microfin tube, J. Heat Transfer—Trans. ASME 123 (2) (2001) 301.
[1458] T.H. Lee, J.Y. Yun, J.S. Lee, J.J. Park, K.S. Lee, Determination of airside heat transfer coefficient on wire-on-tube type heat exchanger, Int. J. Heat Mass Transfer 44 (9) (2001) 1767.
[1459] S. Lin, P.A. Kew, K. Cornwell, Flow boiling of refrigerant R141B in small tubes, Chem. Eng. Res. Des. 79 (A4) (2001) 417.
[1460] X. Luo, W. Roetzel, U. Ludersen, The single-blow transient testing technique considering longitudinal core conduction and fluid dispersion, Int. J. Heat Mass Transfer 44 (1) (2001) 121.
[1461] T.A. Newell, R.K. Shah, An assessment of refrigerant heat transfer, pressure drop, and void fraction effects in microfin tubes, Hvac&R Res. 7 (2) (2001) 125.
[1462] D.S. Noh, S.K. Hong, H.S. Ryou, S.H. Lee, An experimental and numerical study on thermal performance of a regenerator system with ceramic honeycomb, KSME J. 15 (3) (2001) 357.
[1463] G.A. Quadir, A. Mydin, K.N. Seetharamu, Analysis of microchannel heat exchangers using FEM, Int. J. Numer. Meth. Heat Fluid Flow 11 (1) (2001) 59.
[1464] A. Roy, S.K. Das, An analytical solution for a cyclic regenerator in the warm-up period in presence of an axially dispersive wave, Int. J. Therm. Sci. 40 (1) (2001) 21.
[1465] N. Saji, S. Nagai, K. Tsuchiya, H. Asakura, M. Obata, Development of a compact laminar flow heat exchanger with stainless steel micro-tubes, Physica C 354 (1) (2001).
[1466] M.S. Soylemez, On the optimum sizing of cooling towers, Energy Convers. Manage. 42 (7) (2001) 783.
[1467] C.W.M. Van der Geld, F.L.A. Ganzevles, C. Simons, F. Weitz, Geometry adaptations to improve the performance of compact, polymer condensers, Chem. Eng. Res. Des. 79 (A4) (2001) 357.
[1468] J.V.C. Vargas, A. Bejan, Thermodynamic optimization of finned crossflow heat exchangers for aircraft environmental control systems, Int. J. Heat Fluid Flow 22 (6) (2001) 657.
[1469] J.V.C. Vargas, A. Bejan, D.L. Siems, Integrative thermodynamic optimization of the crossflow heat exchanger for an aircraft environmental control system, J. Heat Transfer—Trans. ASME 123 (4) (2001) 760.
[1470] C.C. Wang, W.S. Lee, W.J. Sheu, A comparative study of compact enhanced fin-and-tube heat exchangers, Int. J. Heat Mass Transfer 44 (18) (2001) 3565.
[1471] H.M. Yeh, C.S. Chen, Correction-factor analysis of solvent extraction in multipass membrane modules with recycle, J. Membr. Sci. 187 (1) (2001).
[1472] D.L. Youchison, M.T. North, Thermal performance of a dual-channel, helium-cooled, tungsten heat exchanger, Fusion Technol. (art 2) (2001) 899.
[1473] B.M. Burnside, K.M. Miller, D.A. McNeil, T. Bruce, Heat transfer coefficient distributions in an experimental kettle reboiler thin slice, Chem. Eng. Res. Des. 79 (A4) (2001) 445.
[1474] C. Casarosa, A. Franco, On the optimum thermal design of individual longitudinal fins with rectangular profile, Heat Transfer Eng. 22 (1) (2001) 51.
[1475] J.U.R. Khan, S.M. Zubair, An improved design and rating analyses of counter flow wet cooling towers, J. Heat Transfer—Trans. ASME 123 (4) (2001) 770.
[1476] J.P. Meyer, C.W. Wood, The design and experimental verification of heat exchanger accumulators used in small commercially available air conditioning systems, Int. J. Energy Res. 25 (10) (2001) 911.
[1477] L. Tantimuratha, G. Asteris, D.K. Antonopoulos, A.C. Kokossis, A conceptual programming approach for the design of flexible HENs, Comput. Chem. Eng. 25 (4) (2001).
[1478] L.K. Wang, B. Sunden, Design methodology for multistream plate-fin heat exchangers in heat exchanger networks, Heat Transfer Eng. 22 (6) (2001) 3.
[1479] R.L. Webb, A. Iyengar, Oval finned tube condenser and design pressure limits, J. Enhanc. Heat Transfer 8 (3) (2001) 147.
[1480] R.L. Webb, H. Lee, Brazed aluminum condensers for residential air conditioning, J. Enhanc. Heat Transfer 8 (1) (2001) 1.
[1481] N. Acharya, M. Sen, H.C. Chang, Analysis of heat transfer enhancement in coiled-tube heat exchangers, Int. J. Heat Mass Transfer 44 (17) (2001) 3189.
[1482] A.E. Bergles, The implications and challenges of enhanced heat transfer for the chemical process industries, Chem. Eng. Res. Des. 79 (A4) (2001) 437.

[1483] K. Bilen, U. Akyol, S. Yapici, Heat transfer and friction correlations and thermal performance analysis for a finned surface, Energy Convers. Manage. 42 (9) (2001) 1071.
[1484] P.R. Champagne, A.E. Bergles, Development and testing of a novel, variable-roughness technique to enhance, on demand, heat transfer in a single-phase heat exchanger, J. Enhanc. Heat Transfer 8 (5) (2001) 341.
[1485] J. Chen, H. Muller-Steinhagen, G.G. Duffy, Heat transfer enhancement in dimpled tubes, Appl. Therm. Eng. 21 (5) (2001) 535.
[1486] X.D. Chen, X.Y. Xu, S.K. Nguang, A.E. Bergles, Characterization of the effect of corrugation angles on hydrodynamic and heat transfer performance of four-start spiral tubes, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1149.
[1487] W.S. Fu, S.J. Yang, A numerical study of effects of the swinging amplitude of fins on heat transfer characteristics in a flow, Heat Mass Transfer 38 (1) (2001).
[1488] A. Klaczak, Heat transfer by laminar flow in a vertical and horizontal pipe with twisted-tape inserts, Heat Mass Transfer 37 (4) (2001).
[1489] B. Krasovitski, L. Tunkel, Vortex heat exchanger: design, experiment and mathematical model, J. Enhanc. Heat Transfer 8 (1) (2001) 15.
[1490] G. Lozza, U. Merlo, An experimental investigation of heat transfer and friction losses of interrupted and wavy fins for fin-and-tube heat exchangers, Int. J. Refrig. (Rev. Int. du Froid) 24 (5) (2001) 409.
[1491] T. O'Doherty, A.J. Jolly, C.J. Bates, Optimisation of heat transfer enhancement devices in a bayonet tube heat exchanger, Appl. Therm. Eng. 21 (1) (2001) 19.
[1492] Y.Y. Qi, Y.S. Kawaguchi, Z.Q. Lin, M. Ewing, R.N. Christensen, J.L. Zakin, Enhanced heat transfer of drag reducing surfactant solutions with fluted tube-in-tube heat exchanger, Int. J. Heat Mass Transfer 44 (8) (2001) 1495.
[1493] V.D. Sakalis, P.M. Hatzikonstantinou, Laminar heat transfer in the entrance region of internally finned square ducts, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1030.
[1494] V. Zimparov, Extended performance evaluation criteria for enhanced heat transfer surfaces: heat transfer through ducts with constant heat flux, Int. J. Heat Mass Transfer 44 (1) (2001) 169.
[1495] M. Aho, Reduction of chlorine deposition in FB boilers with aluminium-containing additives, Fuel 80 (13) (1943).
[1496] H.S. Aparajith, C. Balaji, V.R. Raghavan, Performance analysis of extended surfaces subjected to fouling, Heat Mass Transfer 37 (4) (2001).
[1497] H. Arro, A. Prikk, T. Pihu, Fouling and corrosion of heat transfer surfaces of FB boilers burning Estonian oil shale, Oil Shale 18 (3) (2001) 193.
[1498] M.J. Fernandez-Torres, A.M. Fitzgerald, W.R. Paterson, D.I. Wilson, A theoretical study of freezing fouling: limiting behaviour based on a heat and mass transfer analysis, Chem. Eng. Process. 40 (4) (2001) 335.
[1499] M.C. Georgiadis, L.G. Papageorgiou, Optimal scheduling of heat-integrated multipurpose plants under fouling conditions, Appl. Therm. Eng. 21 (16) (2001) 1675.
[1500] S. Jiangzhou, R.Z. Wang, Experimental research on characteristics of corrosion-resisting nickel alloy tube used in triple-effect LiBr/H_2O absorption chiller, Appl. Therm. Eng. 21 (11) (2001) 1161.
[1501] M.S. Khan, M.O. Budair, S.M. Zubair, A parametric study of $CaCO_3$ scaling in AISI 316 stainless steel tubes, Heat Mass Transfer 38 (1) (2001).
[1502] S. Padma, S.N. Veena, A.L. Rufus, V.S. Sathyaseelan, S. Velmurugan, S.V. Narasimhan, Corrosion of carbon steel and Monel-400 in EDTA based steam generator cleaning formulations, Mater. Corros. (Werkst. Korros.) 52 (10) (2001) 771.
[1503] A.K. Sheikh, S.M. Zubair, M. Younas, M.O. Budair, Statistical aspects of fouling processes, Proc. Inst. Mech. Eng. E (2001).
[1504] B. Shi, R.W. Rousseau, Crystal properties and nucleation kinetics from aqueous solutions of Na_2CO_3 and Na_2SO_4, Ind. Eng. Chem. Res. 40 (6) (2001) 1541.
[1505] S. Su, J.H. Pohl, D. Holcombe, J.A. Hart, A comparison of thermal condition between pilot- and full-scale furnaces for studying slagging and fouling propensity in PF boilers, Combust. Sci. Technol. 165 (2001) 129.
[1506] M.C. Van Beek, C.C.M. Rindt, J.G. Wijers, A.A. Van Steenhoven, Analysis of fouling in refuse waste incinerators, Heat Transfer Eng. 22 (1) (2001) 22.
[1507] J.P. Wen, X.L. Li, Flow boiling heat transfer in a new vapor–liquid–solid three-phase circulating fluidized bed evaporator, Chem. Eng. Commun. 185 (2001) 79.
[1508] X.M. Wu, R.L. Webb, Investigation of the possibility of frost release from a cold surface, Exp. Therm. Fluid Sci. 24 (3) (2001).
[1509] Q.F. Yang, J. Ding, Z.Q. Shen, Scaling and removal of calcium carbonate on electroless plating surface, Chin. J. Chem. Eng. 9 (2) (2001) 150.
[1510] E. Besnoin, O.M. Knio, Numerical study of thermoacoustic heat exchangers in the thin plate limit, Numer. Heat Transfer Part A—Applications 40 (5) (2001) 445.
[1511] D. Bouris, G. Papadakis, G. Bergeles, Numerical evaluation of alternate tube configurations for particle deposition rate reduction in heat exchanger tube bundles, Int. J. Heat Fluid Flow 22 (5) (2001) 525.
[1512] M.W. Browne, P.K. Bansal, An elemental NTU-epsilon model for vapour-compression liquid chillers, Int. J. Refrig. (Rev. Int. du Froid) 24 (7) (2001) 612.
[1513] F.B. Campos, P.L.C. Lage, Modeling and simulation of direct contact evaporators, Braz. J. Chem. Eng. 18 (3) (2001) 277.
[1514] D.D. Clarke, V.R. Vasquez, W.B. Whiting, M. Greiner, Sensitivity and uncertainty analysis of heat-exchanger designs to physical properties estimation, Appl. Therm. Eng. 21 (10) (2001) 993.
[1515] G. Comini, G. Croce, Convective heat and mass transfer in tube-fin exchangers under dehumidifying conditions, Numer. Heat Transfer Part A—Applications 40 (6) (2001) 579.
[1516] J.M. Corberan, P.F. de Cordoba, J. Gonzalvez, F. Alias, Semiexplicit method for wall temperature linked equations (SEWTLE): a general finite-volume technique for the calculation of complex heat exchangers,

Numer. Heat Transfer Part B—Fundamentals 40 (1) (2001) 37.
[1517] G. Diaz, M. Sen, K.T. Yang, R.L. McClain, Adaptive neurocontrol of heat exchangers, J. Heat Transfer—Trans. ASME 123 (3) (2001) 556.
[1518] G. Diaz, M. Sen, K.T. Yang, R.L. McClain, Dynamic prediction and control of heat exchangers using artificial neural networks, Int. J. Heat Mass Transfer 44 (9) (2001) 1671.
[1519] G. Fabbri, P. Feraboli, Analysis of turbulent heat transfer from sinusoidal profile finned dissipators, Heat Mass Transfer 38 (1) (2001).
[1520] L. Fang, J. Abraham, V.W. Goldschmidt, A thermal model of clamshell heat exchangers in residential gas furnaces, Hvac&R Res. 7 (3) (2001) 289.
[1521] A. Gossler, I.C. Wolton, A parallel approach to CFD with OpenMP compiler directives, Z. Angew. Math. Mech. (4) (2001) S999.
[1522] K.A.R. Ismail, C.L.F. Alves, M.S. Modesto, Numerical and experimental study on the solidification of PCM around a vertical axially finned isothermal cylinder, Appl. Therm. Eng. 21 (1) (2001) 53.
[1523] Y.L. Ju, Computational study of a 4 K two-stage pulse tube cooler with mixed Eulerian–Lagrangian method, Cryogenics 41 (1) (2001) 49.
[1524] H. Klein, G. Eigenberger, Approximate solutions for metallic regenerative heat exchangers, Int. J. Heat Mass Transfer 44 (18) (2001) 3553.
[1525] C. Korte, A.M. Jacobi, Condensate retention effects on the performance of plain-fin-and-tube heat exchangers: retention data and modeling, J. Heat Transfer—Trans. ASME 123 (5) (2001) 926.
[1526] J.L. Lage, Tube-to-tube heat transfer degradation effect on finned-tube heat exchangers, Numer. Heat Transfer Part A—Applications 39 (4) (2001) 321.
[1527] K.M. Lawton, S.R. Patterson, R.G. Keanini, Precision temperature control of high-throughput fluid flows: theoretical and experimental analysis, J. Heat Transfer—Trans. ASME 123 (4) (2001) 796.
[1528] J.S. Leu, M.S. Liu, J.S. Liaw, C.C. Wang, A numerical investigation of louvered fin-and-tube heat exchangers having circular and oval tube configurations, Int. J. Heat Mass Transfer 44 (22) (2001) 4235.
[1529] N. Makkinejad, Temperature profile in countercurrent/cocurrent spray towers, Int. J. Heat Mass Transfer 44 (2) (2001) 429.
[1530] R.S. Matos, J.V.C. Vargas, T.A. Laursen, F.E.M. Saboya, Optimization study and heat transfer comparison of staggered circular and elliptic tubes in forced convection, Int. J. Heat Mass Transfer 44 (20) (2001) 3953.
[1531] N. Milosavljevic, P. Heikkila, A comprehensive approach to cooling tower design, Appl. Therm. Eng. 21 (9) (2001) 899.
[1532] J.C. Min, R.L. Webb, Numerical predictions of wavy fin coil performance, J. Enhanc. Heat Transfer 8 (3) (2001) 159.
[1533] Y.S. Muzychka, M.M. Yovanovich, Modeling the f and j characteristics for transverse flow through an offset strip fin at low Reynolds number, J. Enhanc. Heat Transfer 8 (4) (2001) 243.
[1534] Y.S. Muzychka, M.M. Yovanovich, Modeling the f and j characteristics of the offset strip fin array, J. Enhanc. Heat Transfer 8 (4) (2001) 261.
[1535] P. Nanda, S.K. Das, H. Martin, Application of a new analogy for predicting heat transfer to cross rod bundle heat exchanger surfaces, Heat Transfer Eng. 22 (3) (2001) 17.
[1536] A. Pacheco-Vega, G. Diaz, M. Sen, K.T. Yang, R.L. McClain, Heat rate predictions in humid air–water heat exchangers using correlations and neural networks, J. Heat Transfer—Trans. ASME 123 (2) (2001) 348.
[1537] A. Pacheco-Vega, M. Sen, K.T. Yang, R.L. McClain, Neural network analysis of fin-tube refrigerating heat exchanger with limited experimental data, Int. J. Heat Mass Transfer 44 (4) (2001) 763.
[1538] H. Perez-Blanco, H. Tsuda, An analysis of the process of active enhancement of falling film absorption, Heat Mass Transfer 38 (1) (2001).
[1539] R.B. Peterson, J.A. Vanderhoff, Analysis of a bayonet-type counterflow heat exchanger with axial conduction and radiative heat loss, Numer. Heat Transfer Part A—Applications 40 (3) (2001) 203.
[1540] I.S. Ramon, M.P. Gonzalez, Numerical study of the performance of a church window tube bundle condenser, Int. J. Therm. Sci. 40 (2) (2001) 195.
[1541] A. Saidi, B. Sunden, A numerical investigation of heat transfer enhancement in offset strip fin heat exchangers in self-sustained oscillatory flows, Int. J. Numer. Meth. Heat Fluid Flow 11 (7) (2001) 699.
[1542] J.Y. Tu, C.A.J. Fletcher, Y. Zhou, Y.S. Morsi, Computational analysis of turbulent gas-particle flow in tube banks using a two-way coupling model, Chem. Eng. Commun. 188 (2001) 207.
[1543] L.K. Wang, B. Sunden, Detailed simulation of heat exchanger networks for flexibility consideration, Appl. Therm. Eng. 21 (12) (2001) 1175.
[1544] Y.H. Yu, M.H. Sosna, Modeling for industrial heat exchanger type steam reformer, Kor. J. Chem. Eng. 18 (1) (2001) 127.
[1545] P. Zhang, Y.P. Wang, C.L. Guo, K. Wang, Heat transfer in gas–liquid–liquid three-phase direct-contact exchanger, Chem. Eng. J. 84 (3) (2001) 381.
[1546] J.S. Allen, K.P. Hallinan, Liquid blockage of vapor transport lines in low Bond number systems due to capillary-driven flows in condensed annular films, Int. J. Heat Mass Transfer 44 (20) (2001) 3931.
[1547] K. Chung, K.S. Lee, D.J. Cha, A numerical study of flow distribution effect on a parallel flow heat exchanger, KSME J. 15 (11) (2001) 1563.
[1548] C. Darve, Y. Huang, T.H. Nicol, T.J. Peterson, Experimental investigations of HeII heat transfer through a short section of LHC inner triplet quadrupole heat exchanger, IEEE Trans. Appl. Supercond. (art 2) (2001) 1629.
[1549] F. Duprat, G.L. Lopez, Comparison of performance of heat regenerators: relation between heat transfer efficiency and pressure drop, Int. J. Energy Res. 25 (4) (2001) 319.
[1550] T.S. Fisher, K.E. Torrance, Optimal shapes of fully embedded channels for conjugate cooling, IEEE Trans. Adv. Packag. 24 (4) (2001) 555.

[1551] F. Halici, I. Taymaz, M. Gunduz, The effect of the number of tube rows on heat, mass and momentum transfer in flat-plate finned tube heat exchangers, Energy 26 (11) (2001) 963.
[1552] M.H. Kim, B. Youn, C.W. Bullard, Effect of inclination on the air-side performance of a brazed aluminum heat exchanger under dry and wet conditions, Int. J. Heat Mass Transfer 44 (24) (2001) 4613.
[1553] Y.T. Lin, K.C. Hsu, Y.J. Chang, C.C. Wang, Performance of rectangular fin in wet conditions: visualization and wet fin efficiency, J. Heat Transfer—Trans. ASME 123 (5) (2001) 827.
[1554] M.A. Tahat, G.A. Ibrahim, S.D. Probert, Performance instability of a refrigerator with its evaporator controlled by a thermostatic expansion-valve, Appl. Energy 70 (3) (2001) 233.
[1555] C.C. Wang, W.S. Lee, W.J. Sheu, Airside performance of staggered tube bundle having shallow tube rows, Chem. Eng. Commun. 187 (2001) 129.
[1556] H.S. Wang, H. Honda, Effects of tube diameter and tubeside fin geometry on the heat transfer performance of air-cooled condensers, J. Enhanc. Heat Transfer 8 (5) (2001) 315.
[1557] X. Zeng, M.C. Chyu, Z.H. Ayub, Experimental investigation on ammonia spray evaporator with triangular-pitch plain-tube bundle, Part I: Tube bundle effect, Int. J. Heat Mass Transfer 44 (12) (2001) 2299.
[1558] X. Zeng, M.C. Chyu, Z.H. Ayub, Experimental investigation on ammonia spray evaporator with triangular-pitch plain-tube bundle, Part II: Evaporator performance, Int. J. Heat Mass Transfer 44 (11) (2001) 2081.
[1559] X. Zhang, D.K. Tafti, Classification and effects of thermal wakes on heat transfer in multilouvered fins, Int. J. Heat Mass Transfer 44 (13) (2001) 2461.
[1560] F. Harahap, D. Setio, Correlations for heat dissipation and natural convection heat-transfer from horizontally-based, vertically-finned arrays, Appl. Energy 69 (1) (2001) 29.
[1561] Q. He, W.N. Zhang, A study on latent heat storage exchangers with the high-temperature phase-change material, Int. J. Energy Res. 25 (4) (2001) 331.
[1562] K.S. Lee, W.S. Kim, J.M. Si, Optimal shape and arrangement of staggered pins in the channel of a plate heat exchanger, Int. J. Heat Mass Transfer 44 (17) (2001) 3223.
[1563] X. Luo, W. Roetzel, The single-blow transient testing technique for plate-fin heat exchangers, Int. J. Heat Mass Transfer 44 (19) (2001) 3745.
[1564] D.A. McNeil, G. Cuthbertson, B.M. Burnside, An experimental study of low-pressure filmwise condensation on a small in-line tube bank, Proc. Inst. Mech. Eng. Part A—J. Power Energy 215 (A2) (2001) 231.
[1565] S.M. Saboya, F.E.M. Saboya, Experiments on elliptic sections in one- and two-row arrangements of plate fin and tube heat exchangers, Exp. Therm. Fluid Sci. 24 (1) (2001).
[1566] W.Y. Saman, S. Alizadeh, Modelling and performance analysis of a cross-flow type plate heat exchanger for dehumidification/cooling, Sol. Energy 70 (4) (2001) 361.
[1567] Y.S. Son, J.Y. Shin, Performance of a shell-and-tube heat exchanger with spiral baffle plates, KSME J. 15 (11) (2001) 1555.
[1568] N. Souidi, A. Bontemps, Countercurrent gas–liquid flow in plate-fin heat exchangers with plain and perforated fins, Int. J. Heat Fluid Flow 22 (4) (2001) 450.
[1569] E.M. Sparrow, J.P. Abraham, G.P. Martin, J.C.Y. Tong, An experimental investigation of a mass exchanger for transferring water vapor and inhibiting the transfer of other gases, Int. J. Heat Mass Transfer 44 (22) (2001) 4313.
[1570] C.C. Wang, W.S. Lee, W.J. Sheu, Y.J. Chang, Parametric study of the air-side performance of slit fin-and-tube heat exchangers in wet conditions, Proc. Inst. Mech. Eng. Part C—J. Mech. Eng. Sci. 215 (9) (2001) 1111.
[1571] H.M. Yeh, Y.K. Chen, Correction-factor analysis of membrane extraction in flat-plate modules, J. Chin. Inst. Chem. Eng. 32 (6) (2001) 511.
[1572] H.M. Yin, C.W. Bullard, P.S. Hrnjak, R-744 gas cooler model development and validation, Int. J. Refrig. (Rev. Int. du Froid) 24 (7) (2001) 692.
[1573] S. Arneth, J. Stichlmair, Characteristics of thermosyphon reboilers, Int. J. Therm. Sci. 40 (4) (2001) 385.
[1574] J. Baker, T. Oliver, T. Lin, R. Ponnapan, J. Leland, Correlations of critical Froude number for annular-rimming flow in rotating heat pipes, J. Fluids Eng.—Trans. ASME 123 (4) (2001) 909.
[1575] W.J. Bowman, D. Maynes, Comparison of standard and heat-pipe fins with specified tip temperature condition, J. Thermophys. Heat Transfer 15 (4) (2001) 421.
[1576] R.M. Castle, S.K. Thomas, K.L. Yerkes, The effect of working fluid inventory on the performance of revolving helically grooved heat pipes, J. Heat Transfer—Trans. ASME 123 (1) (2001) 120.
[1577] Y.M. Chen, S.C. Wu, C. Chu, Thermal performance of sintered miniature heat pipes, Heat Mass Transfer 37 (6) (2001) 611.
[1578] B.I. Lee, S.H. Lee, Manufacturing and temperature measurements of a sodium heat pipe, KSME J. 15 (11) (2001) 1533.
[1579] L.C. Lin, R. Ponnappan, J. Leland, Experimental investigation of oscillating heat pipes, J. Thermophys. Heat Transfer 15 (4) (2001) 395.
[1580] J. Ling, Y.D. Cao, A.P. Lopez, Experimental investigations of radially rotating miniature high-temperature heat pipes, J. Heat Transfer—Trans. ASME 123 (1) (2001) 113.
[1581] V. Maziuk, A. Kulakov, M. Rabetsky, L. Vasiliev, M. Vukovic, Miniature heat-pipe thermal performance prediction tool—software development, Appl. Therm. Eng. 21 (5) (2001) 559.
[1582] S.H. Moon, H.G. Yun, G. Hwang, T.G. Choy, Experimental study on the performance of miniature heat pipes with woven-wire wick, IEEE Trans. Comp. Packag. Technol. 24 (4) (2001) 591.
[1583] A. Nuntaphan, J. Tiansuwan, T. Kiatsiriroat, C.C. Wang, Performance improvement of thermosyphon heat exchangers by using two kinds of working fluids, Heat Transfer Eng. 22 (4) (2001) 28.

[1584] M.B. Shafii, A. Faghri, Y.W. Zhang, Thermal modeling of unlooped and looped pulsating heat pipes, J. Heat Transfer—Trans. ASME 123 (6) (2001) 1159.

[1585] J.L. Wang, I. Catton, Biporous heat pipes for high power electronic device cooling, Seventeenth Annual IEEE Semiconductor Thermal Measurement and Management Symposium, Proceedings 2001, 2001, p. 211.

[1586] Y.X. Wang, H.B. Ma, G.P. Peterson, Investigation of the temperature distribution on radiator fins with micro heat pipes, J. Thermophys. Heat Transfer 15 (1) (2001) 42.

[1587] Y.H. Yau, Theoretical determination of effectiveness for heat pipe heat exchangers operating in naturally ventilated tropical buildings, Proc. Inst. Mech. Eng. Part A—J. Power Energy 215 (A3) (2001) 389.

[1588] M.C. Zaghdoudi, C. Sarno, Investigation on the effects of body force environment on flat heat pipes, J. Thermophys. Heat Transfer 15 (4) (2001) 384.

[1589] Z.J. Zuo, M.T. North, K.L. Wert, High heat flux heat pipe mechanism for cooling of electronics, IEEE Trans. Comp. Packag. Technol. 24 (2) (2001) 220.

[1590] A. Alebrahim, A. Bejan, Thermodynamic optimization of heat-transfer equipment configuration in an environmental control system, Int. J. Energy Res. 25 (13) (2001) 1127.

[1591] I.T. Alzaharnah, M.S. Hashmi, B. Yilbas, Thermal stresses in thick-walled pipes subjected to fully developed laminar flow, J. Mater. Process. Technol. (special issue SI) (2001) 50.

[1592] M.A. Antar, S.M. Zubair, Thermoeconomic considerations in the optimum allocation of heat exchanger inventory for a power plant, Energy Convers. Manage. 42 (10) (2001) 1169.

[1593] P.K. Bansal, T. Wich, M.W. Browne, Optimisation of egg-crate type evaporators in domestic refrigerators, Appl. Therm. Eng. 21 (7) (2001) 751.

[1594] D. Bernal, C. Sepulveda, J.B. Graham, Water-tunnel studies of heat balance in swimming mako sharks, J. Exp. Biol. 204 (23) (2001) 4043.

[1595] Y.H. Bi, L.G. Chen, C. Wu, S.H. Wang, Effect of heat transfer on the performance of thermoelectric heat pumps, J. Non-Equilibr. Thermodyn. 26 (1) (2001) 41.

[1596] H.U. Borgstedt, C. Guminski, IUPAC-NIST solubility data series. 75. Nonmetals in liquid alkali metals, J. Phys. Chem. Ref. Data 30 (4) (2001) 835.

[1597] L. Brusa, A. Bianchi, G. Fruttuoso, A. Manfredini, F. Oriolo, M.D. Carelli, R.P. Kendig, F.E. Peters, Experimental investigation of mixing phenomena inside a concrete containment cooled by an innovative passive system, Nucl. Technol. 133 (1) (2001) 63.

[1598] N. Chawankul, S. Chuaprasert, P. Douglas, W. Luewisutthichat, Simulation of an agitated thin film evaporator for concentrating orange juice using AspenPlus (TM), J. Food Eng. 47 (4) (2001) 247.

[1599] L.G. Chen, J.Z. Gong, L.W. Sheng, F.R. Sun, C. Wu, Theoretical analysis and experimental confirmation of the performance of a thermoelectric refrigerator, J. Non-Equilibr. Thermodyn. 26 (1) (2001) 85.

[1600] L.G. Chen, S.B. Zhou, F.R. Sun, C. Wu, Performance of heat-transfer irreversible regenerated Brayton refrigerators, J. Phys. D—Appl. Phys. 34 (5) (2001) 830.

[1601] P.L. Dhar, S.K. Singh, Studies on solid desiccant based hybrid air-conditioning systems, Appl. Therm. Eng. 21 (2) (2001) 119.

[1602] C.D. Dudfield, R. Chen, P.L. Adcock, A carbon monoxide PROX reactor for PEM fuel cell automotive application, Int. J. Hydrogen Energy 26 (7) (2001) 763.

[1603] E. Friesen, J. Meseth, S. Guentay, D. Suckow, J.L. Jimenez, L. Herranz, V. Peyres, G.F. De Santi, A. Krasenbrink, M. Valisi, L. Mazzocchi, Containment behaviour in the event of core melt with gaseous and aerosol releases (CONGA), Nucl. Eng. Des. 209 (1) (2001).

[1604] S. Fu, Z.Q. Zhai, Numerical investigation of the adverse effect of wind on the heat transfer performance of two natural draft cooling towers in tandem arrangement, Acta Mech. Sinica 17 (1) (2001) 24.

[1605] G. Grazzini, R. Rinaldi, Thermodynamic optimal design of heat exchangers for an irreversible refrigerator, Int. J. Therm. Sci. 40 (2) (2001) 173.

[1606] M.N.A. Hawlader, S.K. Chou, K.J. Chua, J.C. Ho, A.S. Mujumdar, On the steady-state modelling of a two-stage evaporator system, Int. J. Energy Res. 25 (10) (2001) 859.

[1607] N. Lawrence, H.Y.P. Kortekaas, DECSIM—A PC-based diesel engine cycle and cooling system simulation program, Math. Comput. Modell. 33 (6) (2001).

[1608] A. Lazzaretto, F. Segato, Thermodynamic optimization of the HAT cycle plant structure—Part I: Optimization of the "basic plant configuration", J. Eng. Gas Turbines Power—Trans. ASME 123 (1) (2001) 1.

[1609] B. Mongey, N.J. Hewitt, J.T. McMullan, P.C. Henderson, G.A. Molyneaux, Performance trends and heat transfer considerations in an ammonia–water resorption cycle, Int. J. Energy Res. 25 (1) (2001) 41.

[1610] G. Mozurkewich, Heat transfer from transverse tubes adjacent to a thermoacoustic stack, J. Acoust. Soc. Am. 110 (2) (2001) 841.

[1611] A.J. Philippacopoulos, M.L. Berndt, Influence of debonding in ground heat exchangers used with geothermal heat pumps, Geothermics 30 (5) (2001) 527.

[1612] W.R. Smith, One-dimensional models for heat and mass transfer in pulse-tube refrigerators, Cryogenics 41 (8) (2001) 573.

[1613] A. Stegou-Sagia, On blends R32/R134a and R32/R125: thermodynamic and heat transfer aspects, Int. J. Energy Res. 25 (9) (2001) 793.

[1614] E. Thorin, Thermophysical properties of ammonia–water mixtures for prediction of heat transfer areas in power cycles, Int. J. Thermophys. 22 (1) (2001) 201.

[1615] D. Petersen, R. Rolfes, R. Zimmermann, Thermo-mechanical design aspects for primary composite structures of large transport aircraft, Rech. Aerospatiale 5 (2) (2001) 135.

[1616] A.A. Ameri, Heat transfer and flow on the blade tip of a gas turbine equipped with a mean-camberline strip, J. Turbomachine.—Trans. ASME 123 (4) (2001) 704.

[1617] E.E. Donahoo, C. Camci, A.K. Kulkarni, A.D. Belegundu, Determination of optimal row spacing for a staggered cross-pin array in a turbine blade cooling passage, J. Enhanc. Heat Transfer 8 (1) (2001) 41.

[1618] S. Teng, J.C. Han, G.M.S. Azad, Detailed heat transfer coefficient distributions on a large-scale gas turbine blade tip, J. Heat Transfer—Trans. ASME 123 (4) (2001) 803.
[1619] J. Chen, Thermodynamic and thermoeconomic analyses of an irreversible combined Carnot heat engine system, Int. J. Energy Res. 25 (5) (2001) 413.
[1620] D.Y. Goswami, G. Ek, M. Leung, C.K. Jotshi, S.A. Sherif, F. Colacino, Effect of refrigerant charge on the performance of air conditioning systems, Int. J. Energy Res. 25 (8) (2001) 741.
[1621] Z.L. Gu, H. Sato, X. Feng, Using supercritical heat recovery process in Stirling engines for high thermal efficiency, Appl. Therm. Eng. 21 (16) (2001) 1621.
[1622] S.C. Kaushik, S. Kumar, Finite time thermodynamic evaluation of irreversible Ericsson and Stirling heat engines, Energy Convers. Manage. 42 (3) (2001) 295.
[1623] S.O. Morner, S.A. Klein, Experimental evaluation of the dynamic behavior of an air-breathing fuel cell stack, J. Sol. Energy Eng.—Trans. ASME 123 (3) (2001) 225.
[1624] M.M. Prieto, E. Montanes, O. Menendez, Power plant condenser performance forecasting using a non-fully connected artificial neural network, Energy 26 (1) (2001) 65.
[1625] N. Ceyhan, M. Parlaktuna, A cyclic steam injection model for gas production from a hydrate reservoir, Energy Sources 23 (5) (2001) 437.
[1626] B.H. Chao, Instability of burner-stabilized flames with volumetric heat loss, Combust. Flame 126 (1–2) (2001) 1476.
[1627] I. Dhuyvetter, M.F. Reyniers, G.F. Froment, G.B. Marin, D. Viennet, The influence of dimethyl disulfide on naphtha steam cracking, Ind. Eng. Chem. Res. 40 (20) (2001) 4353.
[1628] W.H. Hsieh, L.Y. Sun, J.K. Chen, S.W. Wang, Theoretical simulation of combustion processes of airbag inflators, Proc. Inst. Mech. Eng. Part D, J. Automobile Eng. 215 (D1) (2001) 1.
[1629] B.V. Reddy, P.K. Nag, Effect of riser exit geometry on bed hydrodynamics and heat transfer in a circulating fluidized bed riser column, Int. J. Energy Res. 25 (1) (2001) 1.
[1630] A.A. Skordos, I.K. Partridge, Cure kinetics modeling of epoxy resins using a non-parametric numerical procedure, Polym. Eng. Sci. 41 (5) (2001) 793.
[1631] A. Tsutsumi, W. Chen, T. Hasegawa, K. Otawara, Neural networks for prediction of the dynamic heat-transfer rate in bubble columns, Ind. Eng. Chem. Res. 40 (23) (2001) 5358.
[1632] M. Bojic, F. Yik, P. Sat, Influence of thermal insulation position in building envelope on the space cooling of high-rise residential buildings in Hong Kong, Energy Build. 33 (6) (2001) 569.
[1633] A.F. Emery, Higher order perturbation analysis of stochastic thermal systems with correlated uncertain properties, J. Heat Transfer—Trans. ASME 123 (2) (2001) 390.
[1634] X.D. Fang, A study of the *U*-factor of a window with a cloth curtain, Appl. Therm. Eng. 21 (5) (2001) 549.
[1635] S.F. Kiefer, L.M. Silverberg, M.L. Gonzalez, Electrostatically actuated window blinds, J. Electrostat. 50 (4) (2001) 229.
[1636] K.H. Kim, S.Y. Kang, J.H. Lee, M.D. Oh, Analysis of thermal environment in an airport passenger terminal, Numer. Heat Transfer Part A—Applications 40 (5) (2001) 531.
[1637] S.J. Rees, P. Haves, A nodal model for displacement ventilation and chilled ceiling systems in office spaces, Build. Environ. 36 (6) (2001) 753.
[1638] S.J. Rees, J.J. McGuirk, P. Haves, Numerical investigation of transient buoyant flow in a room with a displacement ventilation and chilled ceiling system, Int. J. Heat Mass Transfer 44 (16) (2001) 3067.
[1639] M. Santamouris, N. Papanikolaou, I. Livada, I. Koronakis, C. Georgakis, A. Argiriou, D.N. Assimakopoulos, On the impact of urban climate on the energy consumption of buildings, Sol. Energy 70 (3) (2001) 201.
[1640] W. Zima, Numerical modeling of dynamics of steam superheaters, Energy 26 (12) (2001) 1175.
[1641] P. Chuangchid, M. Krarti, Foundation heat loss from heated concrete slab-on-grade floors, Build. Environ. 36 (5) (2001) 637.
[1642] M. Davies, S. Zoras, M.H. Adjali, Improving the efficiency of the numerical modelling of built environment earth-contact heat transfers, Appl. Energy 68 (1) (2001) 31.
[1643] Y.T. Ge, S.A. Tassou, Simulation of the performance of single jet air curtains for vertical refrigerated display cabinets, Appl. Therm. Eng. 21 (2) (2001) 201.
[1644] C. Gladstone, A.W. Woods, On buoyancy-driven natural ventilation of a room with a heated floor, J. Fluid Mech. 441 (2001) 293.
[1645] S.P. Malevsky-Malevich, E.K. Molkentin, E.D. Nadyozhina, O.B. Shklyarevich, Numerical simulation of permafrost parameters distribution in Russia, Cold Reg. Sci. Technol. 32 (1) (2001) 1.
[1646] B. Martin-Perez, S.J. Pantazopoulou, M.D.A. Thomas, Numerical solution of mass transport equations in concrete structures, Comput. Struct. 79 (13) (2001) 1251.
[1647] M.S. Sodha, Simulation of dynamic heat transfer between ground and underground structures, Int. J. Energy Res. 25 (15) (2001) 1391.
[1648] M.S. Sodha, Simulation of periodic heat transfer between ground and underground structures, Int. J. Energy Res. 25 (8) (2001) 689.
[1649] S. Zoras, M. Davies, M.H. Adjali, A novel tool for the prediction of earth-contact heat transfer: a multi-room simulation, Proc. Inst. Mech. Eng. Part C—J. Mech. Eng. Sci. 215 (4) (2001) 415.
[1650] N. Chakraborti, R. Kumar, D. Jain, A study of the continuous casting mold using a pareto-converging genetic algorithm, Appl. Math. Model. 25 (4) (2001) 287.
[1651] T. Jin, G.Q. Cai, Analytical thermal models of oblique moving heat source for deep grinding and cutting, J. Manuf. Sci. Eng., Trans. ASME 123 (2) (2001) 185.
[1652] T. Jin, G.Q. Cai, H.D. Jeong, N.K. Kim, Study on heat transfer in super-high-speed grinding: energy partition

to the workpiece in HEDG, J. Mater. Process. Technol. 111 (1–3) (2001) 261.
[1653] I.H. Katzarov, Y.B. Arsov, P. Stoyanov, T. Zeuner, A. Buehrig-Polaczek, P.R. Sahm, Porosity formation in axi-symmetric castings produced by counter-pressure casting method, Int. J. Heat Mass Transfer 44 (1) (2001) 111.
[1654] Y.H. Li, C.M. Sellars, Behaviour of surface oxide scale before roll bite in hot rolling of steel, Mater. Sci. Technol. 17 (12) (2001) 1615.
[1655] X.L. Liu, Numerical modeling on pultrusion of composite I beam, Compos.—Part A: Appl. Sci. Manuf. 32 (5) (2001) 663.
[1656] Z. Malinowski, Analysis of temperature fields in the tools during forging of axially symmetrical parts, Arch. Metall. 46 (1) (2001) 93.
[1657] A. Robert, T. Debroy, Geometry of laser spot welds from dimensionless numbers, Metall. Mater. Trans. B—Process Metall. Mater. Process. Sci. 32 (5) (2001) 941.
[1658] W.B. Rowe, Temperature case studies in grinding including an inclined heat source model, Proc. Inst. Mech. Eng. Part B—J. Eng. Manuf. 215 (4) (2001) 473.
[1659] K. Takatani, Y. Tanizawa, H. Mizukami, K. Nishimura, Mathematical model for transient fluid flow in a continuous casting mold, ISIJ Int. 41 (10) (2001) 1252.
[1660] S.W. Wen, P. Hilton, D.C.J. Farrugia, Finite element modelling of a submerged arc welding process, J. Mater. Process. Technol. (special issue SI) (2001) 203.
[1661] H.C. Wikle, S. Kottilingam, R.H. Zee, B.A. Chin, Infrared sensing techniques for penetration depth control of the submerged arc welding process, J. Mater. Process. Technol. 113 (1–3) (2001) 228.
[1662] H.Y. Chang, R.A. Adomaitis, J.N. Kidder, G.W. Rubloff, Influence of gas composition on wafer temperature in a tungsten chemical vapor deposition reactor: experimental measurements, model development, and parameter identification, J. Vac. Sci. Technol. B 19 (1) (2001) 230.
[1663] W. Chen, T. Hasegawa, A. Tsutsumi, K. Otawara, Scale-up effects on the time-averaged and dynamic behavior in bubble column reactors, Chem. Eng. Sci. 56 (21–22) (2001) 6149.
[1664] A. Djati, M. Brahimi, J. Legrand, B. Saidani, Entrance effect on mass transfer in a parallel plate electrochemical reactor, J. Appl. Electrochem. 31 (8) (2001) 833.
[1665] I.J. HC, H.P.A. Calis, C.M. van den Bleek, The polylith reactor as an alternative to the monolith and the randomly packed-bed reactor, Chem. Eng. Sci. 56 (3) (2001) 841.
[1666] Y.L. Ma, J. Zhu, Heat transfer in the downer and the riser of a circulating fluidized bed—a comparative study, Chem. Eng. Technol. 24 (1) (2001) 85.
[1667] F.G. Martins, M.A.N. Coelho, A new approach to evaluate the energetic efficiency of batch-jacketed reactors, Can. J. Chem. Eng. 79 (5) (2001) 828.
[1668] O.O. Fasina, H.P. Fleming, Heat transfer characteristics of cucumbers during blanching, J. Food Eng. 47 (3) (2001) 203.
[1669] M.K. Krokida, N.P. Zogzas, Z.B. Maroulis, Mass transfer coefficient in food processing: compilation of literature data, Int. J. Food Prop. 4 (3) (2001) 373.
[1670] R.Y. Murphy, E.R. Johnson, L.K. Duncan, E.C. Clausen, M.D. Davis, J.A. March, Heat transfer properties, moisture loss, product yield, and soluble proteins in chicken breast patties during air convection cooking, Poultry Science 80 (4) (2001) 508.
[1671] P.W.B. Poon, T. Durance, D.D. Kitts, Composition and retention of lipid nutrients in cooked ground beef relative to heat-transfer rates, Food Chemistry 74 (4) (2001) 485.
[1672] J. Boland, M. Dik, The level of complexity needed for weather data in models of solar system performance, Sol. Energy 71 (3) (2001) 187.
[1673] A. De Miguel, J. Bilbao, R. Aguiar, H. Kambezidis, E. Negro, Diffuse solar irradiation model evaluation in the North Mediterranean belt area, Sol. Energy 70 (2) (2001) 143.
[1674] M. Gazela, E. Mathioulakis, A new method for typical weather data selection to evaluate long-term performance of solar energy systems, Sol. Energy 70 (4) (2001) 339.
[1675] C.A. Glasbey, R. Graham, A.G.M. Hunter, Spatio-temporal variability of solar energy across a region: a statistical modelling approach, Sol. Energy 70 (4) (2001) 373.
[1676] W. Marion, R. George, Calculation of solar radiation using a methodology with worldwide potential, Sol. Energy 71 (4) (2001) 275.
[1677] D.D. Massie, J.F. Kreider, Comparison of and discrepancies between TMY and TMY2S predictions for simple photovoltaic and wind energy simulations, J. Sol. Energy Eng.—Trans. ASME 123 (1) (2001) 6.
[1678] H.C. Power, Estimating clear-sky beam irradiation from sunshine duration, Sol. Energy 71 (4) (2001) 217.
[1679] E. Ruiz, A. Soler, L. Robledo, Assessment of Muneer's luminous efficacy models in Madrid and a proposal for new models based on his approach, J. Sol. Energy Eng.—Trans. ASME 123 (3) (2001) 220.
[1680] M.D. Rymes, D.R. Myers, Mean preserving algorithm for smoothly interpolating averaged data, Sol. Energy 71 (4) (2001) 225.
[1681] Z. Sen, Angstrom equation parameter estimation by unrestricted method, Sol. Energy 71 (2) (2001) 95.
[1682] Z. Sen, A.D. Sahin, Spatial interpolation and estimation of solar irradiation by cumulative semivariograms, Sol. Energy 71 (1) (2001) 11.
[1683] Y.J. Shen, D.H. Chen, Z.M. Zhang, Thermal model of an absolute solar radiometer designed for future satellite missions, J. Sol. Energy Eng.—Trans. ASME 123 (1) (2001) 50.
[1684] J.A. Bonometti, C.W. Hawk, High temperature solar absorber material measurement technique, J. Sol. Energy Eng.—Trans. ASME 123 (3) (2001) 216.
[1685] H.M.S. Hussein, M.A. Mohamad, A.S. El-Asouri, Theoretical analysis of laminar-film condensation heat transfer inside inclined wickless heat pipes flat-plate solar collector, Renew. Energy (special issue SI) (2001) 525.

[1686] G.W.E. Van Decker, K.G.T. Hollands, A.P. Brunger, Heat-exchange relations for unglazed transpired solar collectors with circular holes on a square or triangular pitch, Sol. Energy 71 (1) (2001) 33.
[1687] G.A. Zueva, J. Magiera, Mathematical model of heat transfer in a solar collector and its experimental validation, Theor. Found. Chem. Eng. 35 (6) (2001) 604.
[1688] L.F. Cabeza, J. Illa, J. Roca, F. Badia, H. Mehling, S. Hiebler, F. Ziegler, Immersion corrosion tests on metal-salt hydrate pairs used for latent heat storage in the 32 to 36 °C temperature range, Mater. Corros. (Werkst. Korros.) 52 (2) (2001) 140.
[1689] C.A. Hall, C. Mackie, J.A. Perkins, Effect of environmental phase characteristics on the discharge of a thermal storage system, J. Sol. Energy Eng.—Trans. ASME 123 (3) (2001) 244.
[1690] X. Py, R. Olives, S. Mauran, Paraffin/porous-graphite-matrix composite as a high and constant power thermal storage material, Int. J. Heat Mass Transfer 44 (14) (2001) 2727.
[1691] M.A. Rosen, The exergy of stratified thermal energy storages, Sol. Energy 71 (3) (2001) 173.
[1692] A. Sari, K. Kaygusuz, Thermal energy storage system using some fatty acids as latent heat energy storage materials, Energy Sources 23 (3) (2001) 275.
[1693] A. Sari, K. Kaygusuz, Thermal energy storage system using stearic acid as a phase change material, Sol. Energy 71 (6) (2001) 365.
[1694] A. Sari, K. Kaygusuz, Thermal performance of myristic acid as a phase change material for energy storage application, Renew. Energy 24 (2) (2001) 303.
[1695] C.K. Yee, F.C. Lai, Effects of a porous manifold on thermal stratification in a liquid storage tank, Sol. Energy 71 (4) (2001) 241.
[1696] S. Arora, J. Davidson, J. Burch, S. Mantell, Thermal penalty of an immersed heat exchanger in integral collector storage systems, J. Sol. Energy Eng.—Trans. ASME 123 (3) (2001) 180.
[1697] D. Baker, G. Vliet, Designing solar hot water systems for scaling environments, J. Sol. Energy Eng.—Trans. ASME 123 (1) (2001) 43.
[1698] B.J. Brinkworth, Solar DHW system performance correlation revisited, Sol. Energy 71 (6) (2001) 377.
[1699] P.B.L. Chaurasia, J. Twidell, Collector cum storage solar water heaters with and without transparent insulation material, Sol. Energy 70 (5) (2001) 403.
[1700] D. Faiman, H. Hazan, I. Laufer, Reducing the heat loss at night from solar water heaters of the integrated collector-storage variety, Sol. Energy 71 (2) (2001) 87.
[1701] A. Fasulo, J. Follari, J. Barral, Comparison between a simple solar collector accumulator and a conventional accumulator, Sol. Energy 71 (6) (2001) 389.
[1702] B.J. Huang, T.H. Lin, W.C. Hung, F.S. Sun, Performance evaluation of solar photovoltaic/thermal systems, Sol. Energy 70 (5) (2001) 443.
[1703] M. Smyth, P.C. Eames, B. Norton, Annual performance of heat retaining integrated collector/storage solar water heaters in a northern maritime climate, Sol. Energy 70 (5) (2001) 391.
[1704] C. Wu, S.C. Mantell, J.H. Davidson, A method for estimating the creep behavior of pressurized polymer tubing, Exp. Mech. 41 (4) (2001) 368.
[1705] E.E. Anyanwu, U.U. Oteh, N.V. Ogueke, Simulation of a solid adsorption solar refrigerator using activated carbon/methanol adsorbent/refrigerant pair, Energy Convers. Manage. 42 (7) (2001) 899.
[1706] S. Goktun, I.D. Er, The optimum performance of a solar-assisted combined absorption-vapor compression system for air conditioning and space heating, Sol. Energy 71 (3) (2001) 213.
[1707] B.J. Huang, J.P. Chyng, Performance characteristics of integral type solar-assisted heat pump, Sol. Energy 71 (6) (2001) 403.
[1708] B.J. Huang, V.A. Petrenko, I.Y. Samofatov, N.A. Shchetinina, Collector selection for solar ejector cooling system, Sol. Energy 71 (4) (2001) 269.
[1709] K.A. Joudi, N.S. Dhaidan, Application of solar assisted heating and desiccant cooling systems for a domestic building, Energy Convers. Manage. 42 (8) (2001) 995.
[1710] Z.F. Li, K. Sumathy, Experimental studies on a solar powered air conditioning system with partitioned hot water storage tank, Sol. Energy 71 (5) (2001) 285.
[1711] Z.F. Li, K. Sumathy, Performance of chiller in a solar absorption air conditioning system with partitioned hot water storage tank, J. Sol. Energy Eng.—Trans. ASME 123 (1) (2001) 48.
[1712] D. Mugnier, V. Goetz, Energy storage comparison of sorption systems for cooling and refrigeration, Sol. Energy 71 (1) (2001) 47.
[1713] W. Rivera, A. Xicale, Heat transfer coefficients in two phase flow for the water/lithium bromide mixture used in solar absorption refrigeration systems, Sol. Energy Mater. Sol. Cells 70 (3) (2001) 309.
[1714] B.B. Saha, A. Akisawa, T. Kashiwagi, Solar/waste heat driven two-stage adsorption chiller: the prototype, Renew. Energy 23 (1) (2001) 93.
[1715] J.V.C. Vargas, J.S. Fleming, J.A.R. Parise, Maximum exergy input rate from a hot stream in solar-driven refrigerators, Int. J. Energy Res. 25 (9) (2001) 751.
[1716] R. Yang, P.L. Wang, A simulation study of performance evaluation of single-glazed and double-glazed collectors/regenerators for an open-cycle absorption solar cooling system, Sol. Energy 71 (4) (2001) 263.
[1717] A. Al-Ansari, H. Ettouney, H. El-Dessouky, Water–zeolite adsorption beat pump combined with single effect evaporation desalination process, Renew. Energy 24 (1) (2001) 91.
[1718] B. Bouchekima, B. Gros, R. Ouahes, M. Diboun, Brackish water desalination with heat recovery, Desalination (special issue SI) (2001) 147.
[1719] B. Bouchekima, B. Gros, R. Ouahes, M. Diboun, The performance of the capillary film solar still installed in South Algeria, Desalination (special issue SI) (2001) 31.
[1720] R.L. Hummel, Solar distillation with economies of scale, innovation and optimization, Desalination (special issue SI) (2001) 159.
[1721] A. Jemqvist, M. Jernqvist, G. Aly, Simulation of thermal desalination processes, Desalination (special issue SI) (2001) 187.

[1722] S.A. Kalogirou, Design of a new spray-type seawater evaporator, Desalination (special issue SI) (2001) 345.
[1723] K. Schwarzer, M.E. Vieira, C. Faber, C. Muller, Solar thermal desalination system with heat recovery, Desalination (special issue SI) (2001) 23.
[1724] A.H. Algifri, H.A. Al-Towaie, Efficient orientation impacts of box-type solar cooker on the cooker performance, Sol. Energy 70 (2) (2001) 165.
[1725] R. Oommen, S. Jayaraman, Development and performance analysis of compound parabolic solar concentrators with reduced gap losses—oversized reflector, Energy Convers. Manage. 42 (11) (2001) 1379.
[1726] P. Stumpf, A. Balzar, W. Eisenmann, S. Wendt, H. Ackermann, K. Vajen, Comparative measurements and theoretical modelling of single- and double-stage heat pipe coupled solar cooking systems for high temperatures, Sol. Energy 71 (1) (2001) 1.
[1727] S.I. Anwar, G.N. Tiwari, Evaluation of convective heat transfer coefficient in crop drying under open sun drying conditions, Energy Conver. Manage. 42 (5) (2001) 627.
[1728] P. Axaopoulos, P. Panagakis, A. Tsavdaris, D. Georgakakis, Simulation and experimental performance of a solar-heated anaerobic digester, Sol. Energy 70 (2) (2001) 155.
[1729] T.P. Bokhoven, J. Van Dam, P. Kratz, Large scale solar heating—recent experience with large solar thermal systems in the Netherlands, Sol. Energy 71 (5) (2001) 347.
[1730] R. Hodali, J. Bougard, Integration of a desiccant unit in crops solar drying installation: optimization by numerical simulation, Energy Convers. Manage. 42 (13) (2001) 1543.
[1731] H. Akbari, M. Pomerantz, H. Taha, Cool surfaces and shade trees to reduce energy use and improve air quality in urban areas, Sol. Energy 70 (3) (2001) 295.
[1732] G. Alvarez, J.J. Flores, P.K. Nair, Influence of thermal emittance on the performance of laminated solar control glazing, Appl. Therm. Eng. 21 (17) (2001) 1813.
[1733] I.G. Capeluto, E. Shaviv, On the use of 'solar volume' for determining the urban fabric, Sol. Energy 70 (3) (2001) 275.
[1734] S.T. Claros, A. Soler, Indoor daylight climate-comparison between light shelves and overhang performances in Madrid for hours with unit sunshine fraction and realistic values of model reflectance, Sol. Energy 71 (4) (2001) 233.
[1735] M.G. Davies, Hourly estimation of temperature using wall transfer coefficients, Build. Environ. 36 (2) (2001) 199.
[1736] M.W. Davis, A.H. Fanney, B.P. Dougherty, Prediction of building integrated photovoltaic cell temperatures, J. Sol. Energy Eng.—Trans. ASME 123 (3) (2001) 200.
[1737] N. Duarte, D. Naylor, P.H. Oosthuizen, S.J. Harrison, An interferometric study of free convection at a window glazing with a heated venetian blind, Hvac&R Res. 7 (2) (2001) 169.
[1738] A.H. Fanney, B.P. Dougherty, Building integrated photovoltaic test facility, J. Sol. Energy Eng.—Trans. ASME 123 (3) (2001) 194.
[1739] A. Ferrante, G. Mihalakakou, The influence of water, green and selected passive techniques on the rehabilitation of historical industrial buildings in urban areas, Sol. Energy 70 (3) (2001) 245.
[1740] F. Garde, T. Mara, A.P. Lauret, H. Boyer, R. Celaire, Bringing simulation to implementation: presentation of a global approach in the design of passive solar buildings under humid tropical climates, Sol. Energy 71 (2) (2001) 109.
[1741] G.P. Hammond, Thermal performance of advanced glazing systems, J. Inst. Energy 74 (498) (2001) 2.
[1742] J. He, A. Okumura, A. Hoyano, K. Asano, A solar cooling project for hot and humid climates, Sol. Energy 71 (2) (2001) 135.
[1743] K.H. Jeppsson, G. Gustafsson, Solar heat load in uninsulated livestock buildings, J. Agric. Eng. Res. 78 (2) (2001) 187.
[1744] P. Littlefair, Daylight, sunlight and solar gain in the urban environment, Sol. Energy 70 (3) (2001) 177.
[1745] W. Lorenz, A glazing unit for solar control, daylighting and energy conservation, Sol. Energy 70 (2) (2001) 109.
[1746] F.O.R. Pereira, C.A.N. Silva, B. Turkienikz, A methodology for sunlight urban planning: a computer-based solar and sky vault obstruction analysis, Sol. Energy 70 (3) (2001) 217.
[1747] P. Raman, S. Mande, V.V.N. Kishore, A passive solar system for thermal comfort conditioning of buildings in composite climates, Sol. Energy 70 (4) (2001) 319.
[1748] J. Rincon, N. Almao, E. Gonzalez, Experimental and numerical evaluation of a solar passive cooling system under hot and humid climatic conditions, Sol. Energy 71 (1) (2001) 71.
[1749] C.A. Roulet, Solar energy and global heat balance of a city, Sol. Energy 70 (3) (2001) 255.
[1750] N. Susheela, M.K. Sharp, Heat pipe augmented passive solar system for heating of buildings, J. Energy Eng.—ASCE 127 (1) (2001) 18.
[1751] A.N. Tombazis, S.A. Preuss, Design of passive solar buildings in urban areas, Sol. Energy 70 (3) (2001) 311.
[1752] A. Voeltzel, F.R. Carrie, G. Guarracino, Thermal and ventilation modelling of large highly-glazed spaces, Energy Build. 33 (2) (2001) 121.
[1753] P. Wallenten, Convective heat transfer coefficients in a full-scale room with and without furniture, Build. Environ. 36 (6) (2001) 743.
[1754] S.W. Wang, Y.M. Chen, A novel and simple building load calculation model for building and system dynamic simulation, Appl. Therm. Eng. 21 (6) (2001) 683.
[1755] G.C. Bakos, I. Ioannidis, N.F. Tsagas, I. Seftelis, Design, optimisation and conversion-efficiency determination of a line-focus parabolic-trough solar-collector (PTC), Appl. Energy 68 (1) (2001) 43.
[1756] J.H.M. Beyers, T.M. Harms, D.G. Kroger, A finite volume analysis of turbulent convective heat transfer for accelerating radial flows, Numer. Heat Transfer Part A—Applications 40 (2) (2001) 117.
[1757] M. Blanco-Muriel, D.C. Alarcon-Padilla, T. Lopez-Moratalla, M. Lara-Coira, Computing the solar vector, Sol. Energy 70 (5) (2001) 431.

[1758] Y.T. Chen, K.K. Chong, T.P. Bligh, L.C. Chen, J. Yunus, K.S. Kannan, B.H. Lim, C.S. Lim, M.A. Alias, N. Bidin, O. Aliman, S. Salehan, S.A. Rezan, C.M. Tam, K.K. Tan, Non-imaging, focusing heliostat, Sol. Energy 71 (3) (2001) 155.

[1759] P.C. Eames, M. Smyth, B. Norton, The experimental validation of a comprehensive unified model for optics and heat transfer in line-axis solar energy systems, Sol. Energy 71 (2) (2001) 121.

[1760] D. Feuermann, J.M. Gordon, High-concentration photovoltaic designs based on miniature parabolic dishes, Sol. Energy 70 (5) (2001) 423.

[1761] E.A. Fletcher, Some considerations on the electrolysis of water from sodium hydroxide solutions, J. Sol. Energy Eng.—Trans. ASME 123 (2) (2001) 143.

[1762] K.H. Funken, M. Roeb, P. Schwarzboezl, H. Warnecke, Aluminum remelting using directly solar-heated rotary kilns, J. Sol. Energy Eng.—Trans. ASME 123 (2) (2001) 117.

[1763] T. Guillard, G. Flamant, D. Laplaze, Heat, mass, and fluid flow in a solar reactor for fullerene synthesis, J. Sol. Energy Eng.—Trans. ASME 123 (2) (2001) 153.

[1764] S. Kraupl, A. Steinfeld, Experimental investigation of a vortex-flow solar chemical reactor for the combined ZnO-reduction and CH_4-reforming, J. Sol. Energy Eng.—Trans. ASME 123 (3) (2001) 237.

[1765] S. Kraupl, A. Steinfeld, Pulsed gas feeding for stoichiometric operation of a gas–solid vortex flow solar chemical reactor, J. Sol. Energy Eng.—Trans. ASME 123 (2) (2001) 133.

[1766] H. Kreetz, K. Lovegrove, A. Luzzi, Maximizing thermal power output of an ammonia synthesis reactor for a solar thermochemical energy storage system, J. Sol. Energy Eng.—Trans. ASME 123 (2) (2001) 75.

[1767] A. Kribus, P. Doron, R. Rubin, R. Reuven, E. Taragan, S. Duchan, J. Karni, Performance of the directly-irradiated annular pressurized receiver (DIAPR) operating at 20 bar and 1200 °C, J. Sol. Energy Eng.—Trans. ASME 123 (1) (2001) 10.

[1768] J. Lede, O. Boutin, E. Elorza-Ricart, M. Ferrer, F. Mollard, Production of zinc from the reduction of ZnO in the presence of cellulose in a solar simulator, J. Sol. Energy Eng.—Trans. ASME 123 (2) (2001) 102.

[1769] Malato, S.J. Blanco, P. Fernandez-Ibanez and, J. Caceres, Treatment of 2,4-dichlorophenol by solar photocatalysis: comparison of coupled photocatalytic-active carbon vs. active carbon, J. Sol. Energy Eng.—Trans. ASME 123 (2) (2001) 138.

[1770] S. Moller, R. Palumbo, The development of a solar chemical reactor for the direct thermal dissociation of zinc oxide, J. Sol. Energy Eng.—Trans. ASME 123 (2) (2001) 83.

[1771] N. Monnerie, J. Ortner, Economic evaluation of the industrial photosynthesis of rose oxide via lamp or solar operated photooxidation of citronellol, J. Sol. Energy Eng.—Trans. ASME 123 (2) (2001) 171.

[1772] Q.C. Murphree, A point focusing double parabolic trough concentrator, Sol. Energy 70 (2) (2001) 85.

[1773] J.P. Murray, Solar production of aluminum by direct reduction: preliminary results for two processes, J. Sol. Energy Eng.—Trans. ASME 123 (2) (2001) 125.

[1774] T. Shimizu, K. Shimizu, Y. Kitayama, T. Kodama, Thermochemical methane reforming using WO_3 as an oxidant below 1173 K by a solar furnace simulator, Sol. Energy 71 (5) (2001) 315.

[1775] R. Tamme, R. Buck, M. Epstein, U. Fisher, C. Sugarmen, Solar upgrading of fuels for generation of electricity, J. Sol. Energy Eng.—Trans. ASME 123 (2) (2001) 160.

[1776] M. Asmann, A. Wank, H. Kim, J. Heberlein, E. Pfender, Characterization of the converging jet region in a triple torch plasma reactor, Plasma Chem. Plasma Process. 21 (1) (2001) 37.

[1777] R. Bolot, M. Imbert, C. Coddet, On the use of a low-Reynolds extension to the Chen–Kim (k–ϵ) model to predict thermal exchanges in the case of an impinging plasma jet, Int. J. Heat Mass Transfer 44 (6) (2001) 1095.

[1778] X. Chen, H.P. Li, Heat transfer and fluid flow in a high-intensity free-burning arc: an improved modeling approach, Int. J. Heat Mass Transfer 44 (13) (2001) 2541.

[1779] M.H. Gordon, X. Duten, K. Hassouni, A. Gicquel, Energy coupling efficiency of a hydrogen microwave plasma reactor, J. Appl. Phys. 89 (3) (2001) 1544.

[1780] P. Han, X. Chen, Modeling of the subsonic-supersonic flow and heat transfer in a DC arc plasma torch, Plasma Chem. Plasma Process. 21 (2) (2001) 249.

[1781] P. Han, X. Chen, Modeling of the supersonic argon plasma jet at low gas pressure environment, Thin Solid Films 390 (1–2) (2001) 181.

[1782] R.M. Hartmanm, J.V. Heberlein, Quantitative investigations on arc-anode attachments in transferred arcs, J. Phys. D—Appl. Phys. 34 (19) (2001) 2972.

[1783] M. Hur, T.H. Hwang, W.T. Ju, C.M. Lee, S.H. Hong, Numerical analysis and experiments on transferred plasma torches for finding appropriate operating conditions and electrode configuration for a waste melting process, Thin Solid Films 390 (1–2) (2001) 186.

[1784] H.P. Li, X. Chen, Three-dimensional modelling of a dc non-transferred arc plasma torch, J. Phys. D—Appl. Phys. 34 (17) (2001) L99.

[1785] T. Nielsen, A. Kaddani, M.S. Benilov, Model for arc cathode region in a wide pressure range, J. Phys. D—Appl. Phys. 34 (13) (2001) 2016.

[1786] T. Nielsen, A. Kaddani, S. Zahrai, Modelling evaporating metal droplets in ablation controlled electric arcs, J. Phys. D—Appl. Phys. 34 (13) (2001) 2022.

[1787] T. Nozaki, Y. Miyazaki, Y. Unno, K. Okazaki, Energy distribution and heat transfer mechanisms in atmospheric pressure non-equilibrium plasmas, J. Phys. D—Appl. Phys. 34 (23) (2001) 3383.

[1788] C. Guyon, S. Cavadias, J. Amouroux, Heat and mass transfer phenomenon from an oxygen plasma to a semiconductor surface, Surf. Coat. Technol. 142 (2001) 959.

[1789] P. Kotalik, K. Volenik, Cooling rates of plasma-sprayed metallic particles in liquid and gaseous nitrogen, J. Phys. D—Appl. Phys. 34 (4) (2001) 567.

[1790] Y.L. Li, T. Ishigaki, Spheroidization of titanium carbide powders by induction thermal plasma processing, J. Am. Ceram. Soc. 84 (9) (2001) 1929.

[1791] A.N. Magunov, Kinetics of heat release during the interaction of a low-temperature oxygen plasma with a catalytically active surface, Plasma Phys. Rep. 27 (4) (2001) 355.
[1792] R. Ramasamy, V. Selvarajan, Numerical studies on velocity, temperature history and heat transfer to the particles injected into the argon plasma, Eur. Phys. J. D 15 (2) (2001) 229.
[1793] G. Soucy, M. Rahmane, X.B. Fan, T. Ishigaki, Heat and mass transfer during in-flight nitridation of molybdenum disilicide powder in an induction plasma reactor, Mater. Sci. Eng. A—Struct. Mater. Prop. Microstruct. Process. 300 (1–2) (2001) 226.
[1794] Z.Y. Zhang, Z.X. Han, G.S. Dulikravich, Numerical simulation of laser induced plasma during pulsed laser deposition, J. Appl. Phys. 90 (12) (2001) 5889.
[1795] I. Ahmed, T.L. Bergman, Simulation of thermal plasma spraying of partially molten ceramics: effect of carrier gas on particle deposition and phase change phenomena, J. Heat Transfer—Trans. ASME 123 (1) (2001) 188.
[1796] C.B. Ang, A. Devasenapathi, H.W. Ng, S.C.M. Yu, Y.C. Lam, A proposed process control chart for DC plasma spraying process. Part II. Experimental verification for spraying alumina, Plasma Chem. Plasma Process. 21 (3) (2001) 401.
[1797] M. Asmann, C.F.M. Borges, J. Heberlein, E. Pfender, The effects of substrate rotation on thermal plasma chemical vapour deposition of diamond, Surf. Coat. Technol. 142 (2001) 724.
[1798] M. Asmann, R.F. Cook, J.V. Heberlein, E. Pfender, Chemical vapor deposition of an aluminum nitride-diamond composite in a triple torch plasma reactor, J. Mater. Res. 16 (2) (2001) 469.
[1799] J.M. Badie, P. Bertrand, G. Flamant, Temperature distribution in a pilot plasma tundish: comparison between plasma torch and graphite electrode systems, Plasma Chem. Plasma Process. 21 (2) (2001) 279.
[1800] C.F.M. Borges, E. Pfender, J. Heberlein, Influence of nitrided and carbonitrided interlayers on enhanced nucleation of diamond on stainless steel 304, Diamond Relat. Mater. 10 (11) (2001) 1983.
[1801] M. Born, Investigations on the replacement of mercury in high-pressure discharge lamps by metallic zinc, J. Phys. D—Appl. Phys. 34 (6) (2001) 909.
[1802] B. Dussoubs, A. Vardelle, G. Mariaux, N. Themelis, P. Fauchais, Modeling of plasma spraying of two powders, J. Therm. Spray Technol. 10 (1) (2001) 105.
[1803] B. Edenhofer, W. Grafen, J. Muller-Ziller, Plasma-carburising—a surface heat treatment process for the new century, Surf. Coat. Technol. 142 (2001) 225.
[1804] N.A. Hussary, J.V.R. Heberlein, Atomization and particle-jet interactions in the wide-arc spraying process, J. Therm. Spray Technol. 10 (4) (2001) 604.
[1805] B.K. Roul, D.R. Sahu, S. Mohanty, B.C. Mohanty, S.K. Singh, Sintering of Al–Zr based oxide ceramics using thermal plasma, Mater. Chem. Phys. (special issue SI) (2001) 151.
[1806] Z.J. Shen, M. Nygren, Kinetic aspects of superfast consolidation of silicon nitride based ceramics by spark plasma sintering, J. Materials Chemistry 11 (1) (2001) 204.
[1807] M. Vardelle, A. Vardelle, P. Fauchais, K.I. Li, B. Dussoubs, N.J. Themelis, Controlling particle injection in plasma spraying, J. Therm. Spray Technol. 10 (2) (2001) 267.
[1808] Y.P. Wan, V. Gupta, Q. Deng, S. Sampath, V. Prasad, R. Williamson, J.R. Fincke, Modeling and visualization of plasma spraying of functionally graded materials and its application to the optimization of spray conditions, J. Therm. Spray Technol. 10 (2) (2001) 382.
[1809] J. Wilden, A. Wank, M. Asmann, J.V.R. Heberlein, M.I. Boulos, F. Gitzhofer, Synthesis of Si–C–N coatings by thermal plasmajet chemical vapour deposition applying liquid precursors, Appl. Organomet. Chem. 15 (10) (2001) 841.
[1810] M.S. Aberl, A. Joshi, R.M. Sonth, Heat transfer in MHD visco-elastic fluid flow over a stretching surface, Z. Angew. Math. Mech. 81 (10) (2001) 691.
[1811] E.M. Abo-Eldahab, Hall effects on magnetohydrodynamic free-convection flow at a stretching surface with a uniform free-stream, Phys. Scr. 63 (1) (2001) 29.
[1812] E.M. Abo-Eldahab, A.M. Salem, Radiation effect on MHD free convection flow of a gas past a semi-infinite vertical plate with variable viscosity, Int. J. Comput. Fluid Dyn. 14 (3) (2001) 243.
[1813] E.M. Aboeldahab, E.M.E. Elbarbary, Hall current effect on magnetohydrodynamic free-convection flow past a semi-infinite vertical plate with mass transfer, Int. J. Eng. Sci. 39 (14) (2001) 1641.
[1814] Z. Al-Qodah, M. Al-Busoul, The effect of magnetic field on local heat transfer coefficient in fluidized beds with immersed heating surface, J. Heat Transfer—Trans. ASME 123 (1) (2001) 157.
[1815] H.A. Attia, Influence of temperature dependent viscosity on the MHD-channel flow of dusty fluid with heat transfer, Acta Mech. 151 (1–2) (2001) 89.
[1816] L. Barleon, U. Burr, K.J. Mack, R. Stieglitz, Magneto-hydrodynamic heat transfer research related to the design of fusion blankets, Fusion Technol. 39 (2) (2001) 127.
[1817] A.J. Chamkha, Unsteady laminar hydromagnetic flow and heat transfer in porous channels with temperature-dependent properties, Int. J. Numer. Meth. Heat Fluid Flow 11 (5–6) (2001) 430.
[1818] S. Eckert, G. Gerbeth, W. Witke, H. Langenbrunner, MHD turbulence measurements in a sodium channel flow exposed to a transverse magnetic field, Int. J. Heat Fluid Flow 22 (3) (2001) 358.
[1819] B.C. Ghosh, N.C. Ghosh, MHD flow of a visco-elastic fluid through porous medium, Int. J. Numer. Meth. Heat Fluid Flow 11 (7) (2001) 682.
[1820] M.H. Kamel, Unsteady MHD convection through porous medium with combined heat and mass transfer with heat source/sink, Energy Convers. Manage. 42 (4) (2001) 393.
[1821] Y.J. Kim, Unsteady MHD convection flow of polar fluids past a vertical moving porous plate in a porous medium, Int. J. Heat Mass Transfer 44 (15) (2001) 2791.
[1822] M. Kinyanjui, J.K. Kwanza, S.M. Uppal, Magnetohydrodynamic free convection heat and mass transfer of a

heat generating fluid past an impulsively started infinite vertical porous plate with Hall current and radiation absorption, Energy Convers. Manage. 42 (8) (2001) 917.
[1823] M. Kumari, G. Nath, MHD boundary-layer flow of a non-Newtonian fluid over a continuously moving surface with a parallel free stream, Acta Mech. 146 (3–4) (2001) 139.
[1824] M.S. Malashetty, J.C. Umavathi, J.P. Kumar, Convective magnetohydrodynamic two fluid flow and heat transfer in an inclined channel, Heat Mass Transfer 37 (2–3) (2001) 259.
[1825] M.A. Mansour, N.A. El-Shaer, Radiative effects on magnetohydrodynamic natural convection flows saturated in porous media, J. Magn. Magn. Mater. 237 (3) (2001) 327.
[1826] A.A. Megahed, S.R. Komy, A.A. Afify, Similarity analysis in magnetohydrodynamics: effects of Hall and ion-slip currents on free convection flow and mass transfer of a gas past a semi-infinite vertical plate, Acta Mech. 151 (3–4) (2001) 185.
[1827] M. Sathyakrishna, S. Roy, G. Nath, Unsteady two-dimensional and axisymmetric MHD boundary-layer flows, Acta Mech. 150 (1–2) (2001) 67.
[1828] M.A. Seddeek, Thermal radiation and buoyancy effects on MHD free convective heat generating flow over an accelerating permeable surface with temperature-dependent viscosity, Can. J. Phys. 79 (4) (2001) 725.
[1829] K.D. Singh, S. Rakesh, MHD three-dimensional Couette flow with transpiration cooling, Z. Angew. Math. Mech. 81 (10) (2001) 715.
[1830] N.P. Singh, A.K. Singh, MHD effects on heat and mass transfer in flow of a dusty viscous fluid with volume fraction, Ind. J. Pure Appl. Phys. 39 (8) (2001) 496.
[1831] H.S. Takhar, A.J. Chamkha, G. Nath, Unsteady laminar MHD flow and heat transfer in the stagnation region of an impulsively spinning and translating sphere in the presence of buoyancy forces, Heat Mass Transfer 37 (4–5) (2001) 397.
[1832] H.S. Takhar, A.J. Chamkha, G. Nath, Unsteady three-dimensional MHD-boundary-layer flow due to the impulsive motion of a stretching surface, Acta Mech. 146 (1–2) (2001) 59.
[1833] H.S. Takhar, G. Nath, A.K. Singh, Unsteady MHD-boundary-layer of a source and vortex flow adjacent to a stationary surface, Acta Mech. 146 (1–2) (2001) 9.
[1834] N. Uda, A. Miyazawa, S. Inoue, N. Yamaoka, H. Horiike, K. Miyazaki, Forced convection heat transfer and temperature fluctuations of lithium under transverse magnetic fields, J. Nucl. Sci. Technol. 38 (11) (2001) 936.
[1835] K. Ueno, K. Saito, S. Kamiyama, Three-dimensional simulation of MHD flow with turbulence (reduction of turbulence to two-dimensional one in downstream), JSME Int. J. B—Fluids Therm. Eng. 44 (1) (2001) 38.
[1836] M. Xenos, N. Kafoussias, G. Karahalios, Magnetohydrodynamic compressible laminar boundary-layer adiabatic flow with adverse pressure gradient and continuous or localized mass transfer, Can. J. Phys. 79 (10) (2001) 1247.
[1837] Z.Y. Xu, C.J. Pan, W.H. Wei, Experimental investigation of magnetohydrodynamic effects caused by a manifold circular pipe, Fusion Technol. 40 (1) (2001) 79.