INFORMATION RETRIEVAL

Heterogeneous and homogeneous reactions in a tubular reactor, Solomon, R. L., and J. L. Hudson, **A.I.Ch.E. Journal, 13,** No. 3, p. 545 (May, 1967).

Key Words: A. Reactions-8, First-Order-0, Heterogeneous-0, Homogeneous-0, Reactor-9, Tubular-0, Isothermal-0, Laminar Flow-9, Eigenvalues-8, Eigenfunctions-8, Concentration-8, Galerkin Method-10.

Abstract: Irreversible, first-order, simultaneous heterogeneous and homogeneous reactions in an isothermal tubular reactor under laminar flow conditions are studied. Accurate values of the eigenvalues, eigenfunctions, and radial concentration profiles are found for the dilute system. Criteria are given as to when the homogeneous reaction may be neglected with respect to the heterogeneous reaction and vice versa. It is found that for a certain range of rate parameters well-known limiting solutions apply. Outside this range the new solutions must be used.

External flows of viscoelastic materials: fluid property restrictions on the use of velocity-sensitive probes, Metzner, A. B., and Gianni Astarita, **A.I.Ch.E. Journal, 13,** No. 3, p. 550 (May, 1967).

Key Words: A. Flow-8, 7, Fluids-9, Viscoelastic-0, Non-Newtonian-0, Deborah Number-6, Boundary Layer-7, Velocity-9, Velocity Profiles-9, Measurement-8, 9, Accuracy-8, Pitot Tubes-10, Hot-Wire Anemometry-10, Polymers-9, Heat Transfer-9, 7, Stagnation Point-9.

Abstract: The more pronounced macroscopic features of flows of viscoelastic materials around submerged objects are considered in the light of restrictions imposed on the flow by the Deborah number. It is seen that one major effect is to thicken the boundary layer appreciably in the region of the leading edge or stagnation point of the object in the fluid. The influence of this and other effects on the use of probes for determination of point values of the velocity of viscoelastic fluids is considered in some detail.

Equilibrium stage calculations, Tierney, John W., and Joseph A. Bruno, **A.I.Ch.E. Journal, 13,** No. 3, p. 556 (May, 1967).

Key Words: A. Calculations-8, Temperature-6, 8, Flow Rate-6, 8, Material Balance-7, 8, 9, Compositions-9, Stages-9, Plates-9, Enthalpy Balance-7, 8, Equations-10, Newton-Raphson Method-10, Equilibrium-9, Two-Phase System-9, Multicomponent-0, Columns-10, Distillation-10, Extraction-10, Stripping-10, Digital Computers-10, Matrices-10.

Abstract: Iterative methods for the determination of stage temperatures and interstage flow rates in the equilibrium stage problem are discussed, and the use of the Newton-Raphson method for solution of the systems of simultaneous equations is proposed.

Local and macroscopic transport from a 1.5-in. cylinder in a turbulent air stream, Galloway, T. R., and B. H. Sage, **A.I.Ch.E. Journal, 13,** No. 3, p. 563 (May, 1967).

Key Words: A. Heat Transfer Coefficients-8, 7, Local-0, Macroscopic-0, Cylinder-9, Copper-9, Air-9, Turbulence-6, Reynolds Number-6, Flow-6, Experimental-0, Frossling Number-10.

Abstract: This paper presents results concerning the effect of free-stream turbulence on the local transport from a cylinder. The local and macroscopic thermal transfer coefficients were experimentally investigated for a 1.5-in. copper cylinder located in a transverse flowing turbulent air stream.

Forced and natural convective mass transfer in multicomponent gaseous mixtures, Carlton, Herbert E., and Joseph H. Oxley, **A.I.Ch.E. Journal, 13,** p. 571 (May, 1967).

Key Words: A. Mass Transfer-8, 7, Mixtures-9, Gases-9, Diffusion-8, 7, Diffusivity-8, 7, Transport Properties-8, 7, Convection-7, Composition-6, Flow-6, Reynolds Number-6, Chilton-Colburn Analogy-10, Stefan-Maxwell Equation-10, Iron Carbonyl-1, Iron-2, Nickel Carbonyl-1, Nickel-2, Tungsten Hexafluoride-1, Tungsten-2.

Abstract: The use of the Chilton-Colburn analogy to obtain an effective film thickness over which the Stefan-Maxwell equations can be integrated was confirmed for binary mixtures and found applicable for ternary, quaternary, and presumably higher order mixtures under conditions of nonequimolal counterdiffusion in a differential convective flow system.

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eters which must be supplied as input for the multicomponent programs. The remainder of the book (about two-thirds) is devoted to two appendices. The first gives detailed descriptions of the computer programs, printouts, nomenclature, etc., and the second provides numerical parameters for a variety of components and binary mixtures.

Although multicomponent vapor-liquid equilibrium problems are, in principle, solved once the required number of thermodynamic and stoichiometric equations are written down, the necessary multiple trial-and-error calculations are practical only if carried out by computer. Thus it is highly appropriate for this monograph to treat the thermodynamics of vapor-liquid equilibrium from a sophisticated point of view and at the same time to provide computer programs for the numerical solution of practical problems.

The authors recognize that their work can be modified, extended, and improved. They have, however, provided a very complete and substantial framework upon which to build, and they themselves, if past work is any indication, are likely to be primary architects in any remodeling.

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ERRATUM

Corrections to "A New Gas-Gas Equilibria Prediction Method" by Richard Kaplan (*1*):

The author recently has acquired a copy of Kreglewski's (*2*) original article and finds that the separation into two gas phases was stated to be more probable the greater the difference between the D values of the components, not the D^2 values as was reported by Tsiklis and Maslennikova (*3*) and restated in Kaplan's communication. The prediction method retains its validity, however, since comparisons are made only between binary systems having one component in common; thus the predictions are unaffected whether D or D^2 values are considered.

Also, minus signs were omitted from the final two expressions for E in the corrected van der Waals approach.

NOTATION

D = solubility parameter at the critical point
E = energy of vaporization

LITERATURE CITED

1. Kaplan, Richard, *AIChE J.*, 13, 186 (1967).

2. Kreglewski, A., *Bull. Acad. Polon. Sci.* Classe III, 5, 667 (1957).
3. Tsiklis, D. S., and V. Ya. Maslennikova, *Dokl. Akad. Nauk. SSSR*, **161**, No. 3, 646 (1965), English translation.

In the paper "Behavior of Suspended Matter in Rapidly Accelerating Viscoelastic Fluids: The Uebler Effect" by A. B. Metzner (Vol. 13, No. 2, pp. 316-318), the following correction should be noted:

Figure 1 should be turned 90 deg. clockwise to represent the actual experimental arrangement used. This otherwise minor point is noted to emphasize the absence of significant buoyancy effects in the experiment described.

Academic Openings

As a convenience to its readers, the *Journal* will reprint in each issue the academic positions advertised in *CEP*. For details of the A.I.Ch.E. Employment Aids Program, write to F. J. Van Antwerpen, Secretary, American Institute of Chemical Engineers, 345 East 47 Street, New York, New York 10017.

ACADEMIC OPENINGS: Academic position in rapidly growing Chemical Engineering Department. Opportunities for consulting and research. Ph.D. required. Rank and salary open in the range of $9,000 to $13,000. Send resume to Thomas G. McWilliams, Jr., Chairman, Department of Chemical Engineering, West Virginia Institute of Technology, Montgomery, West Virginia 25136.

CLEMSON UNIVERSITY: The Department of Chemical Engineering is seeking a ninth staff member. We want a Ph.D. with industrial experience who has research interests in one of the following areas: Polymers, Optimization, Operations Research, Heat Transfer, or Catalysis. Rank and salary will depend on qualifications. Begin June or August 1967. Contact: C. E. Littlejohn, Head, Department of Chemical Engineering, Clemson University, Clemson, S. C. 29631.

CHEMICAL ENGINEERING PROFESSOR FOR SEPTEMBER, 1967: Ph.D. with graduate school teaching experience; rank and salary open; well established and accredited chemical engineering undergraduate curriculum (formerly Fenn College); graduate program under development; M.S. degree program planned for Fall, 1967. Write to Chairman, Department of Chemical Engineering, The Cleveland State University, Cleveland, Ohio 44115.

CHEMICAL ENGINEER: Assistant Professor beginning in 1967-68 academic year to teach computer methodology and assist graduate students in application of computers to research problems. Contact John Happel, Chairman, Chemical Engineering Dept., New York University, Bronx, N. Y. 10453.

FACULTY POSITION: Chemical Engineering —Developing department offers opportunity for research and teaching at B.S. and M.S. levels. Academic rank and salary dependent on qualifications. Ph.D. required. Write: Dean James S. Brown, Dean of Engineering, Tennessee Technological University, Cookeville, Tennessee 38501.

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INFORMATION RETRIEVAL

An experimental study of nonequimolal diffusion in ternary gas mixtures, Getzinger, R. W., and C. R. Wilke, **A.I.Ch.E. Journal, 13,** No. 3, p. 577 (May, 1967).

Key Words: A. Diffusion-8, Steady State-0, Cocurrent-0, Mass Transfer-8, Evaporation-8, Mixtures-9, Ternary-0, Gases-9, Testing-8, Stefan-Maxwell Equation-8, 9, Stefan Capillary Tubes-10, Methyl Alcohol-5, Benzene-5, Ethyl Alcohol-5, Carbon Tetrachloride-5, Chloroform-5, Air-9.

Abstract: This work is an experimental test of the Stefan-Maxwell equations as applied to cocurrent, steady state gaseous diffusion of two species through a stagnant third component. The Stefan capillary tube method was used to measure the diffusion rates.

A stochastic mixing model for homogeneous, turbulent, tubular reactors, Kattan, Abraham, and Robert J. Adler, **A.I.Ch.E. Journal, 13,** No. 3, p. 580 (May 1967).

Key Words: A. Mixing-8, 9, Stochastic Mixing Model-8, Reactors-9, Homogeneous-0, Tubular-0, Turbulent-0, Reactions-9, 7, Simulation-8, Rate of Mixing-6, Rate of Reaction-6, Mathematical Model-8, Conversion-7.

Abstract: A stochastic mixing model was developed for turbulent flow in homogeneous plug-flow reactors. Of special significance is the model's applicability when mixing and reaction rates are comparable, as well as when either rate dominates. The model's parameters may be determined by measuring conversion with instantaneous reactions. Experimental results reported by others are successfully simulated.

Prediction of the Joule-Thomson coefficients of a gas mixture from a generalized equation of state: the nitrogen-ethane system, Stockett, A. L., and L. A. Wenzel, **A.I.Ch.E. Journal, 13,** No. 3, p. 586 (May, 1967).

Key Words: A. Virial Coefficients-8, 7, Equation of State-8, 10, Joule-Thomson Coefficients-8, 7, Nitrogen-9, Ethane-9, Temperature-6, Pressure-6.

Abstract: With a thermodynamically consistent form of equation of state proposed by Foulkes, the virial coefficients of the pressure expansion were determined from Joule-Thomson coefficient data.

A static vapor pressure apparatus for mixtures, Davison, R. R., W. H. Smith, Jr., and K. W. Chun, **A.I.Ch.E. Journal, 13,** No. 3, p. 590 (May, 1967).

Key Words: A. Vapor Pressure-8, 9, Vapor-Liquid Equilibria-8, Static-0, Measurement-8, Mixtures-9, Flask-10, Condenser-10, Degassing-8, 6, Liquid-9, Composition-7, Water-9, Methyldiethylamine-9, Triethylamine-9.

Abstract: A static vapor pressure apparatus is described which is especially suitable for mixtures. A vapor pressure flask with a built-in condenser allows the mixture to be degassed without change in composition.

Liquid-vapor equilibrium in the system helium-methane, Heck, C. K., and M. J. Hiza, **A.I.Ch.E. Journal, 13,** No. 3 p., 593 (May, 1967).

Key Words: A. Vapor-Liquid Equilibrium-8, Phase Equilibria-8, Helium-9, Methane-9, 5, Binary System-9, Vapor Phase-9, Liquid Phase-9, Solubility-8, Low-Temperature-0.

Abstract: Liquid and gas phase compositions for the system helium-methane were measured at 15° intervals from 95° to 185°K. up to 200 atm. pressure.

Three turbulent drag coefficients in beds of spheres, Tallmadge, John A., **A.I.Ch.E. Journal, 13,** No. 3, p. 599 (May, 1967).

Key Words: A. Reynolds Number-6, Form Drag-7, Pressure Drag-7, Shear Drag-7, Drag Coefficients-7, Friction Factor-7, Beds-9, Spheres-9, Packed Beds-9, Distended Beds-9, Porosity-6, Experimental-0, Velocity-6. B. Velocity-6, Heat Transfer-7, Analogy-8, Shear Drag-7, Packed Beds-9.

Abstract: Form, shear, and total drag were studied in the 2,500 to 65,000 range of Reynolds number over a wide range of porosity. The effect of Reynolds number on form drag, total drag, and shear drag was determined. For the 2,500 to 6,000 range of Reynolds number, experimental evidence supports the apparently analogous behavior between average shear drag and average heat flux.

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