INFORMATION RETRIEVAL

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The use of a shock tube for exploratory studies of high temperature equilibrium and reaction rates: hydrogen-deuterium exchange, Gluckstein, Martin E., and Stuart W. Churchill, **A.I.Ch.E. Journal, 9,** No. 6, p. 821 (November, 1963).

Key Words: Shock Tubes-8, Reaction Kinetics-9, Kinetics-9, Equilibrium-9, Thermodynamics-9, High Temperature-9, Reactions-9, Exchanging- , Hydrogen-1, Deuterium-1, Pressure-6, Temperature-6, Velocity-6, Residence Time-6, Rate Constants-7, Equilibrium-7, Shock Tubes-10.

Abstract: The exchange reaction between hydrogen and deuterium was investigated in a shock tube. At the higher temperatures obtained by the addition of oxygen near-equilibrium compositions were attained. At the lower temperatures obtained in oxygen-free mixtures the reaction was sufficiently slow to permit determination of the overall reaction rate. It is concluded that a simple, inexpensive shock tube is a satisfactory device for exploratory studies of high temperature chemical equilibrium and reaction rates, but that an expensive, well-instrumented tube is necessary for precise rate determinations.

A mathematical solution for the condensation of vapors from noncondensing gases in laminar flow inside vertical cylinders, Baasel, William D., and Julian C. Smith, **A.I.Ch.E. Journal, 9,** No. 6, p. 826 (November, 1963).

Key Words: Air-2, Methanol-2, Noncondensible Gas-2, Predicting-8, Estimating-8, Laminar Flow-8, Vertical Cylindrical Cylinders-8, Diffusion-8, Condensation-9, Concentration Profiles-9, Velocity Profiles-9, Mass Transfer-9, Wetted-Wall Columns-9, Dissolution from Cast Pipes-9, Gas Absorption-9, Mathematical Solution-10, Burroughs-220 Computer-10, Computer-10, Navier-Stokes Equations-10.

Abstract: A mathematical-computer solution is presented for the determination of the condensation rate of vapors from noncondensing gases in laminar flow inside vertical cylinders if the physical constants and the dimensions of the system are known. The solution may be adapted easily to wetted-wall columns, dissolution of pipes cast of soluble material, and gas absorption. The computer predictions are compared with experimental results obtained by others.

Turbulent pipe flow heat transfer with a simultaneous chemical reaction of finite rate, Brian, P. L. T., **A.I.Ch.E. Journal, 9,** No. 6, p. 831 (November, 1963).

Key Words: Gas-5, Reaction Rate-6, Diffusion-8, Thermal Conduction-8, Heat Transfer-8, Reaction Kinetics-8, Mass Transfer-8, Eddy Diffusion-8, Turbulent Transport-8, Linearization-10, Mathematics-10, Computations-10, Finite- , Differences-10.

Abstract: From Deissler's eddy diffusivity function, numerical solutions are obtained for heat transfer accompanied by a reversible homogeneous chemical reaction. By restricting consideration to cases in which the temperature driving force is very small, the problem is linearized in terms of the partial derivatives of an arbitrary reaction kinetic expression. Thus the results are given general expression without reference to a particular kinetic equation. The effects of the Reynolds, Schmidt, and Prandtl numbers upon the solution for a finite chemical reaction rate are presented.

Calculation of thermal diffusion factors for the methane-*n*-butane system in the critical and liquid regions, Rutherford, W. M., **A.I.Ch.E. Journal, 9,** No. 6, p. 841 (November, 1963).

Key Words: Thermal Diffusion-8, Calculation-8, Methane-9, *n*-Butane-9, Isotopes-9, Isomers-9, Liquids-9, Heat of Transport-6, Enthalpy-6, Chemical Potential-6.

Abstract: An equation for the thermal diffusion factor has been applied to the methane-*n*-butane system in the critical and liquid regions of the phase diagram. Predicted values of the thermal diffusion factor are essentially in quantitative agreement with detailed experimental data for this system. This equation, based on steady state thermodynamic theory, may be generally applicable to the prediction of the thermal diffusion behavior of liquid systems.

NOTE: Additional pages of information retrieval abstracts and key words in this issue are available on request.

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control systems without the use of mathematics.

Included in the book is a good glossary of terms and numerous problems at the end of each chapter.

The book is well written and very few errors were detected. The book is written in simplified form and is not complete enough so that the reader would have difficulty analyzing or designing control systems. Even undergraduate students could have a more complete course in this subject. The book is not suitable for graduate courses.

There are two methods by which the reader may be introduced to the new mathematical principles needed. The author prefers to do this throughout the book at the time they are needed. The other method develops the necessary mathematical principles and then applies them to actual processes and control systems. Teachers will never agree on which of these methods is better.

This book can serve as an introduction, but will have to be followed by further study if one is to work in the area of process control.

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Liquid Extraction (2 ed.), Robert E. Treybal, McGraw-Hill, New York (1963). 621 pages. $16.50.

In this new edition of an authoritative work, considerably more has been changed than the price. Professor Treybal has done his usually thorough job here, and in updating the material the entire book has been essentially rewritten although the general organization has not been changed. The book is coherently put together and is eminently suitable for use as a textbook in advanced course work. At the same time coverage of the many phases of liquid extraction is sufficiently thorough to constitute an indispensable reference for workers in the field of extraction.

In the chapter on prediction of distribution, treatment of activity coefficient correlations has been extended and considerable data are given in useful form. A section on distillation methods for recovery of solvents has been added to the chapter on choice of solvent.

The theory discussion on diffusion has been revised and considerable material has been added on estimation of liquid diffusivities. Evidence supporting the two-resistance theory is presented, and discussion of mechanism of mass transfer to single drops is added.

(*Continued in January issue*)