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A fourth parameter for the vapor pressure and entropy of vaporization of polar fluids, Halm, R. L., and L. I. Stiel, *A.I.Ch.E. Journal*, **13**, No. 2, p. 351 (March, 1967).

Key Words: A. Thermodynamic Properties-8, Vapor Pressure-8, Entropy of Vaporization-8, Polar Fluids-9, Saturated Fluids-9, Normal Fluids-9, Fluids-9, Acentric Factor-10, Polarity Factor-10, Boiling Point-10, Heat of Vaporization-10.

Abstract: Pitzer's acentric factor approach has been extended to the vapor pressure and entropy of vaporization of polar fluids. Normal fluid vapor pressure functions were determined. A polarity factor was defined, and polar correction terms established for the vapor pressure and for the entropy of vaporization. The polar correction terms enable the accurate calculation of the vapor pressure and entropy of vaporization of a polar fluid from its normal boiling point and normal latent heat of vaporization.

Turbulent flow of unstable liquid-liquid dispersions: drop sizes and velocity distributions, Ward, J. P., and J. G. Knudsen, *A.I.Ch.E. Journal*, **13**, No. 2, p. 356 (March, 1967).

Key Words: A. Flow-8, Turbulent-0, Liquid-Liquid Dispersions-9, Dispersions-9, Unstable-0, Oil-9, Water-9, Size-8, Drops-9, Velocity Distribution-8, Velocity-8, Velocity Profiles-8, Friction-8, Friction Factors-8, Loss-8, Pressure-9, Determination-4, Viscosity-8, 9, Breakup-8, Coalescence-8.

Abstract: Friction losses, velocity profiles, and drop size distributions of liquid-liquid dispersions in turbulent flow were studied. The study of drop size distribution provided qualitative information concerning the breakup and coalescence processes in the flow system.

Penetration theory for diffusion accompanied by a reversible chemical reaction with generalized kinetics, Secor, R. M., and J. A. Beutler, *A.I.Ch.E. Journal*, **13**, No. 2, p. 365 (March, 1967).

Key Words: A. Solution-8, Penetration Theory-9, 8, Finite-Difference Method-10, Reaction Kinetics-8, Diffusion-8, Mass Transfer-8, Computer-10, Film Theory-9, 8.

Abstract: The penetration theory equations representing diffusion with a generalized, reversible, chemical reaction are solved by a finite-difference method. Many solutions are presented in graphical form. Approximate solutions to several limiting cases are obtained analytically by means of a steady state representation, and are useful for estimating results of the solution to the penetration theory equations.

The frequency domain evaluation of mathematical models for dynamic systems, Hays, James R., William C. Clements, Jr., and Thomas R. Harris, *A.I.Ch.E. Journal*, **13**, No. 2, p. 374 (March, 1967).

Key Words: A. Modeling-8, Mathematical Modeling-8, Frequency Domain-9, Integral Squared Error-10, 9, Minimization-9, Parseval's Theorem-10, Fourier Transforms-10, Least Squares Method-10.

Abstract: In mathematical modeling applications, one of the simplest and most widely applicable comparison criterion for dynamic systems is the integral of the squared error between the observed and predicted results (ϕ). This paper discusses the advantages of the minimization of ϕ in the frequency domain.

Mass transfer with chemical reaction from single gas bubbles, Johnson, A. I., A. E. Hamielec, and W. T. Houghton, *A.I.Ch.E. Journal*, **13**, No. 2, p. 379 (March, 1967).

Key Words: A. Solutions-8, Mass Transfer-8, 9, Mass Transfer Coefficients-8, 9, Steady State-0, Reactions-8, 9, Gas-9, Bubbles-9, Circulating-0, Noncirculating-0, Forced Convection-10, Velocity Profiles-10. B. Comparison-8, Solutions-9, Mass Transfer-9, Penetration Theory-9.

Abstract: Numerical solutions of the equations that describe steady state, forced-convection mass transfer around single circulating or noncirculating gas bubbles have been obtained for both first- and second-order chemical reaction conditions. The numerical results for circulating gas bubbles have been compared with penetration theory for both first- and second-order chemical reactions.

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text and as a reference for the practicing engineer. It does not appear to be a satisfactory textbook and it is doubtful that many schools would be interested in a graduate subject in a field as specific as the fluidization of solids. The book can be a valuable reference source, and the review of the U.S.S.R. work in English and the extensive bibliography of Russian publications are important contributions.

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Nucleation Phenomena, A symposium sponsored by Industrial and Engineering Chemistry and the Division of Industrial and Engineering Chemistry of the American Society, Alan S. Michaels, Chairman, American Chemical Society Publications, Washington, D. C. (1966). 89 pages, \$5.75.

This short, mighty volume is a collection of eight review papers, a preface, and an introduction. The review papers were presented at a symposium on nucleation in June, 1965, and thereupon published from September, 1965, to April, 1966, in *Industrial and Engineering Chemistry*.

The understanding of nucleation process (the mechanisms and kinetics of phase changes) is of considerable importance in a number of seemingly unrelated areas. Included among these areas, as indicated by the review papers, are alloy formations in metallurgy, nucleation in cloud chambers, nozzles, molecular beams and fogs, nucleation with boiling heat transfer, formation of crystals in polymeric melts, and nucleation in glasses. The contributors are all distinguished workers in this field and on the whole the caliber of their papers is quite high.

Nucleation research is a frontier area and the definitive text has yet to be written. These concise and readable articles offer the next best thing to a textbook and are capable of providing an introduction to, and a bibliography for, the field.

The two types of nucleation, namely, those changes which are of slight extent but extend over a large region and the converse are both treated. Whether these seemingly different phenomena will turn out to be special cases of a more general theory remains to be seen, but that is the stuff of research.

The format is quite attractive but some of the figures accompanying the text are deceiving. Figure 9 of page 10, which attempts to give a graphical

representation of the free energy change of formation per unit volume, is poorly drawn and only adds confusion to the textual description. The book is relatively error free and can certainly be recommended for the non-specialist and for the researcher who may be unaware of the breadth of applications.

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Effective Writing for Engineers, Managers, Scientists, H. J. Tichy, John Wiley and Sons, New York (1966). 337 pages, \$5.95.

Effective communication is a modern necessity and nowhere is it more essential than in organizations with large technical responsibilities. Scientists and engineers spend much of their time writing letters and reports, and the extent of their professional success is often closely related to their ability to write clearly and concisely. This book will be welcomed by many chemical engineers who seek practical advice toward improving their writing skills.

Dr. Tichy is a professor of English at Hunter College. She has extensive experience in teaching technical writing, having given short courses in a variety of industrial firms, including several chemical companies. Chemical engineers may recall her excellent articles on technical writing published in *Chemical Engineering Progress* in 1954. The theme of her entire book is simply this: Good writing follows from courtesy, from being considerate of the reader who wants to be told clearly, quickly, and efficiently what the writer has to say. Many illustrations are given to show how this may be done.

An entire chapter is devoted to the difficult subject "How to Begin" wherein Dr. Tichy quotes and critically discusses opening paragraphs from the technical literature, including several from the *A.I.Ch.E. Journal*. In other chapters, the author shows that she is well aware of the variety of writing which is required of engineers in business, government, academia, or elsewhere; she discusses how to write reports, memoranda, invitations, apologies, contracts, operating instructions, and all sorts of letters, including even letters of condolence. In all these discussions the common thread is consideration for the reader, clarity of expression, and most of all, economy of words. In what is perhaps the best