ERRATUM

In "A New Reduced Vapor Pressure Equation" by Richard E. Thek and Leonard I. Stiel [Vol. 12, No. 3, pp. 599-602 (1966)], Equation (13) should read as

$$\ln P_R = A\left(1.14893 - \frac{1}{T_R} - 0.11719\, T_R - 0.03174\, T_R^2 - 0.375 \ln T_R\right) + c\left[\frac{T_R^{n-1} - 1}{n-1} + k\left(\frac{1}{T_R} - 1\right)\right] \quad (13)$$

Equation (17), which is based on Equation (13), should read as

$$\ln P_R = A\left(1.14893 - \frac{1}{T_R} - 0.11719\, T_R - 0.03174\, T_R^2 - 0.375 \ln T_R\right) + (1.042\alpha_c - 0.46284A)\left[\frac{T_R^{5.2691 + 2.0753A - 3.1738a} - 1}{5.2691 + 2.0753A - 3.1738a} + 0.040\left(\frac{1}{T_R} - 1\right)\right] \quad (17)$$

Letter to the Editor

The Energy Balance for Ideal Gas Flow

In a recent communication by de Nevers [Vol. 13, No. 2, pp. 387-388 (1967)], the energy balance for an ideal gas bubbling through a liquid is obtained as

$$\frac{dQ}{dt} = \frac{1}{J g_c}\left(\frac{\Delta V^2}{2} + g\,\Delta Z\right) M_G$$

de Nevers, who states that the form of this equation is peculiar (because heat is *added* to the gas in order to keep it isothermal, although the process considered is dissipative), discusses in some detail the mechanism of dissipation through the liquid phase. It is our opinion that the reader is left with the impression that the energy balance takes this particular form due to the presence of the liquid phase.

In reality, the above equation is valid for an ideal gas flowing through any system whatsoever, provided that (1) the inlet and exit temperatures are equal, and (2) there is no shaft work done on the system. Consider an ideal gas flowing upward through a tube: the enthalpy being independent

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The growth of ice crystals in a stirred tank, Harriott, Peter, **AIChE Journal, 13,** No. 4, p. 755 (July, 1967).

Key Words: A. Growth-8, 7, Formation-8, 7, Ice-9, 2, Crystals-9, 2, Water-5, Brine-5, Sodium Chloride-5, Evaporation-10, 8, Butane-1, Heat Transfer-8, Diffusion-8, 6, Nucleation-8, Desalination-8.

Abstract: Ice crystals were grown in water or sodium chloride solutions by direct contact with evaporating butane, and the growth rate was measured.

On a conjecture of Aris—proof and remarks, Luss, Dan, and Neal R. Amundson, **AIChE Journal, 13,** No. 4, p. 759 (July, 1967).

Key Words: A. Optimization-8, Shape-6, Particle-9, Catalysts-9, Effectiveness Factor-7, Reactions-9, First-Order-0, Isothermal-0, Symmetrization-10, Mathematical Model-10.

Abstract: The purpose of this paper is to explore the effect of particle shape on effectiveness factors and to investigate certain extremal properties related to catalyst shape. It was found that of all catalyst particles of fixed volume for isothermal first-order chemical reactions the spherical particle has the lowest effectiveness factor.

Incorporation of ionic impurities in crystals growing from solution. The case of lead ions in potassium chloride crystals, Botsaris, G. D., E. A. Mason, and R. C. Reid, **AIChE Journal, 13,** No. 4, p. 764 (July, 1967).

Key Words: A. Crystallization-8, Potassium Chloride-2, Solutions-1, Measurement-8, Analysis-8, Distribution Coefficients-9, 7, Impurities-9, Distribution-9, Lead Ions-3, Metal Ions-3, Emission Spectrography-10, Equilibrium Distribution Coefficient-6, Growth-6, Crystal-9, Diffusion-6.

Abstract: Single seed crystals of potassium chloride were grown from aqueous solution under conditions of constant temperature, supersaturation, and impurity concentration. With emission spectrography as the method of analysis, the distribution of various metal ion impurities between the grown potassium chloride crystal and the solution was studied. The magnitude of the distribution coefficient is shown to depend on the equilibrium distribution coefficient between the solution and surface of the crystal, the rate of growth of the crystal, and the rate of diffusion of the impurity through the crystal lattice.

Process control by digital compensation, Mosler, H. A., L. B. Koppel, and D. R. Coughanowr, **AIChE Journal, 13,** No. 4, p. 768 (July, 1967).

Key Words: A. Control-8, Processes-9, Algorithms-10, Digital Computer-10, Digital Compensation-10, Response-8, Sampling-8.

Abstract: Discrete control algorithms, suitable for programming in a direct digital control computer, are presented. For processes whose dynamics can be adequately modeled as first order with delay, digital compensation algorithms are derived to yield theoretically a response with finite settling time, when the system is step forced in either set point or load. The utility of the proposed designs is experimentally verified by application to a higher order physical process whose dynamics are not fully described by the model. The results demonstrate that sampling frequencies may be reduced considerably below presently accepted values while still maintaining transient response characteristics of the system comparable with those obtainable from conventional continuous control.

Bubble frequencies and departure volumes at subatmospheric pressures, Cole, Robert, **AIChE Journal, 13,** No. 4, p. 779 (July, 1967).

Key Words: A. Frequency-8, Bubbles-9, Volumes-8, Departure-9, Nucleate Pool Boiling-8, 9, Flow Rate-7, Vapor-9, Jakob Number-6, Heat Transfer-8, Subatmospheric Pressure-10.

Abstract: Bubble frequencies and departure volumes in nucleate pool boiling have been obtained for a variety of liquids. The bubble dynamic data conclusively show the volumetric vapor flow rate to be a strong function of the Jakob number. The data also indicate the volumetric vapor flow rate per cross section to be independent of the Jakob number.

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of pressure, heat must be *added* to the system if (1) and (2) are fulfilled, because at the exit both the positional and the kinetic energies are larger than at the inlet. The viewpoint that heat *removal* is required to keep a dissipative system isothermal is oversimplified, and we do not regard as peculiar a result to the contrary.

The main point of this note is that the above equation is in no way related to the two-phase character of the phenomenon considered by de Nevers. It is simply the first law of thermodynamics as applied to an ideal gas in an open system under restrictions (1) and (2).

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