Electrolytes. Properties of Solutions. Methods for Calculation of Multicomponent Systems and Experimental Data on Thermal Conductivity and Surface Tension. By G. G. Aseyev. Begell House, Inc., New York. 1998. 611 pp. $275.50. ISBN 1-56700-106-8.

This volume is the sixth handbook by the author and others on the compilation and calculation of physical and chemical properties of inorganic substances and electrolyte solutions. In this volume, correlations of thermal conductivity and surface tension of multicomponent electrolyte solutions are presented. These correlations use water as the reference fluid for calculations. The correlations cover the range in temperature 0 to 350 °C and a wide range of concentrations. Correlation coefficients for thermal conductivity are presented for approximately 120 electrolytes, and the calculation method is presented with examples. The overall deviations from experimental data are presented for single-salt electrolyte solutions only, and the validity of the equation for multicomponent mixtures is examined for one mixture only. Correlation coefficients for the surface tension are presented for over 150 electrolytes. An example calculation is presented, but the result is not compared to experimental data. Correlations of this type are most useful when they are based on well validated experimental data and the representation of the data by the correlation is completely evaluated. This enables users to determine the validity of the correlation in their applications and estimate the expected accuracy of the prediction. The deviations of the correlations are presented for single-salt electrolyte solutions only; the extension to multicomponent systems is not discussed.

The presentation of the correlation equations and coefficients occupies the first 74 pages of the text, with the following 532 pages devoted to tables of thermal conductivity and surface tensions for single-salt electrolyte solutions. These tables apparently represent smoothed data from a wide variety of sources, with some unpublished data by the author. The general sources for the tables are given, but it is not explained how the tables were developed. One of the most useful items in such a text is the list of references. Unfortunately, the references were left out of the book on publication but are available by contacting Begell House at www.begellhouse.com. The data used for the correlations are somewhat dated, with the most recent data from 1991. The text also contains many typographical errors.

In summary, the information presented in the book should be used with caution, especially when applying the correlations to multicomponent solutions. Predicted results should be verified with available data before the correlation is used in critical applications.

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