

Book Review

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The experimental determination of solubilities

John Wiley and Sons, 2003,
658 pp; price £175.00, €262.5.
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This book is Volume 6 of the *Wiley Series in Solution Chemistry*, and Peter Fogg, the Editor-in-Chief, and his Editorial Board are to be thanked for their continued timely selection of important subjects for this series. The experimental determination of solubilities is paradoxically both one of the oldest areas of chemistry and still at the cutting edge in the development of new technologies and even in the understanding of the outer solar system as revealed by space probes. The analytical problems and technical challenges of measuring solubilities when dealing with gases, liquids and solids at a wide range of temperatures and pressures are daunting. This book gives a modern, well-referenced and critical review of existing methods and their application. The individual chapters have been written by an impressive range of international experts who have comprehensively reviewed the field with the deliberate exception of the solubility of metals in metals and solids in supercooled liquids, which was thought best covered in metallurgical and ceramics texts.

The book has five sections. The first, the 'Fundamentals of Solubility', lays the foundations for the rest of the book. It consists of chapters on 'Thermodynamics of Solubility' and 'Kinetics and Mechanisms of Crystal Growth and Dissolution', together with a list of symbols and a brief section on 'Quantities and Conversions'. The second section, 'Gases', has chapters on their solubility in 'Liquids', 'Polymers', 'Molten Salts and Metals' and 'Solid Metals', whilst the third section, 'Liquids', covers 'Liquid-Liquid' solubility. The fourth is the largest section and includes chapters on 'Solubility of Solids in Liquids', 'Solubility of Sparingly Soluble Ionic Solids in Liquids', 'Solubility of Salt-Water Systems at High Temperatures, Pressures', 'Solubility of Metals and Non-metallic Substances in Liquid Metals', and 'Solubility of Solids in Solids'. The fifth and last section on 'Special Systems' covers 'Solubility of Solids and Liquids in Supercritical Fluids', 'Solubility of Solids and Liquids in Cryogenic Fluids', and finally 'Solubility of Polymers in Liquids'. The authors of the chapter 'Solubility of Gases in Liquids' have departed from the IUPAC recommended nomenclature and definition of quantities used in the rest of the book because they feel that following the nomenclature found in the original literature will be easier for the readers. Table 2, 'Methods for determining the solubility of metals in solid metals', includes 'N in Steels' and

appears a little misplaced in the references for Chapter 4.4, 'Solubility of Metals and Non Metallic Substances in Liquid Metals'. It is a useful table, however, and worth including in the book. The editors have very sensibly not insisted on restrictive uniformity in the style and layout of each chapter, preferring instead to let the text flow freely and reflect the nature of the subject material. In consequence, the book is a pleasure to use and, with each chapter having an excellent collection of well-selected references, will be useful well into the future.

It is a must for any serious library and contains material useful to an unusually wide range of scientists and technologists, both for specialist and general use. It is rare to find a book relevant to areas from physiology through to supercritical water oxidations, deep-water research and technologies and refrigerant cycles to the understanding of atmospheric and surface phenomena of the cold cosmic bodies in the outer solar system.

We await further volumes in this unusually useful series on solution chemistry. The value of this volume and this series extends far beyond chemistry.

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