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Book Review

Problem Solving in Analytical Chemistry, by Themistocles P. Hadjiioannou, Gary D. Christian, Constantinos E. Efstathiou and Demetrios P. Nikolelis. Pergamon Press, Oxford, 1988, ISBN 0–08–036967–7 and supplemental Solutions Manual, ISBN 0–08–36972–3.

This practical handbook is translated from a Greek text published in 1984. It is divided into 18 chapters covering many aspects of quantitative analytical chemistry. It is intended primarily for undergraduate students of analytical chemistry, although other audiences are also recognized. The emphasis is on the classical techniques of titrimetry, potentiometry and gravimetry, while there are also sections on absorption spectrophotometry, separation (liquid–liquid extraction and ion-exchange) methods and gas–liquid chromatography. Furthermore, there is an emphasis on applications for the analysis of inorganic substances. The book contains over 1000 examples of analytical chemistry problems that may be used in teaching the theory and practice of the subject. However, as the emphasis of the book is on problem solving, it may be difficult to use as a stand-alone textbook, except in a course in which the main orientation is on problem solving. The limited coverage of organic substances and of instrumental methods may be seen as disadvantages by some teachers. For this reason, the book probably would be most useful in pharmaceutical chemistry or pharmaceutical analysis courses as a supplemental resource for the instructor, particularly in dealing with concentration expressions, statistical analysis and the theory of equilibria.

About 340 problems are given in the text as worked examples. Approximately 640 further problems are also given in the book, with worked solutions in a companion volume (the Solutions Manual). Answers to the odd-numbered problems of this latter set are also given in the main text. The book is thus quite flexible in its applicability to different styles of teaching. A nice feature is that the set of unsolved problems at the end of each chapter is subdivided by the same headings which are found in the body of the chapter. Thus, homework or examination problems can be quickly assigned, based on the material covered in a particular class or lecture period. The book provides a wealth of material which would otherwise be an irksome task for the busy teacher to obtain.

The theory and principles of the subject matter are covered concisely and competently, although terminology is occasionally confused or inconsistent. For example, the treatment of activity coefficients suggests the use of the extended Debye–Hückel equation for more accurate activity corrections than those afforded by the Debye–Hückel limiting law. However, the equation given is actually the Güntelberg modification of the (unextended) Debye–Hückel equation. Another example is the use of the term "law of mass preservation" on p. 34, but "law of mass conservation" on p. 60.

The body of the text is set in a typeface which presents an appearance which is complementary to its emphasis on more classical analytical subject material. The text layout was prepared using a computer program which has unfortunately resulted in an occasional sub-heading appearing at the foot of the previous page.

Appendices are included which contain equilibrium constants (acids, bases, solubility products and complexes), standard and formal electrode potentials, and common logarithms. This soft-cover book is also available in a hard-cover version (ISBN 0–08–0369–5).

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