Book & Media Reviews

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Analytical Chemistry for Technicians, 3rd Edition

by John Kenkel

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reviewed by David T. Harvey

Faculty teaching analytical chemistry in programs awarding two-year degrees in chemical or laboratory science technology face a shortage of textbooks written specifically for this audience. John Kenkel, a faculty member in the Laboratory Science Technology program at Southeast Community College in Nebraska, has written several textbooks to fill this gap. This third edition of *Analytical Chemistry for Technicians*, whose development received support from DuPont and the National Science Foundation, is the latest addition to this much-needed resource.

The textbook's organization will be familiar to anyone who has taught an introductory course in analytical chemistry, covering the usual array of wet-chemical and instrumental methods of analysis. Kenkel begins his textbook with two introductory chapters on sources of error, elementary statistics, sampling, and sample preparation. Three chapters cover gravimetric and titrimetric methods, including a chapter focusing on common applications. Instrumental methods, including atomic and molecular spectroscopy, gas chromatography, liquid chromatography, and electroanalytical methods comprise nine chapters. The textbook ends with two chapters new to this edition that cover physical testing methods, such as viscosity and tensile strength, and bioanalysis. All chapters were written with an emphasis on incorporating relevant skills from the Voluntary Industry Standards program. Also new to this edition is a CD-ROM that takes students through the process of completing an analysis. Each chapter includes directions for experiments (a total of 66 experiments in all) and an extensive set of questions and problems.

In addition to its comprehensive coverage of the analytical techniques students will most likely encounter when entering an industrial position in chemical technology, Kenkel's text has several notable features, two of which are highlighted here. First, scattered throughout the text are 55 "workplace scenes" featuring chemical technologists working in pharmaceutical labs, chemical manufacturing plants, and environmental labs, to name a few. Each scene includes a photograph of the chemical technologist at work and explains what s/he is doing and why it is important. These scenes provide students with tangible examples of their future work environment.

A second notable feature is Kenkel's frequent use of flow charts showing what is often called "the analytical approach to solving problems." The inclusion of such a flow chart is a common feature of analytical textbooks, but Kenkel takes this a step further by beginning each major section of the text with an updated flow chart detailing the experimental steps and data analysis techniques specific to a particular analytical method. Thus, for example, when introducing spectrochemical analyses, Kenkel notes the need for obtaining the sample's mass or volume, preparing one or more standard solutions, and calibrating the spectrometer as essential steps in the experimental procedure, and the need for constructing a calibration curve as an important part of the data analysis. Students will find that these charts also provide a quick and useful summary of key ideas.

Although the book is largely free of errors and omissions, there are a few worth noting. Kenkel's treatment of the statistics of sampling is in error when providing an example of the number of samples needed when both the sampling variance and lab analysis variance are high. When first discussing the use of a single calibration standard, Kenkel properly notes that an accurately known calibration constant is essential, but fails to note that an appropriate blank is equally important (although the importance of a blank is noted later in the text). In the discussion of atomic spectroscopy, the opportunity to note that non-linear calibration curves are not uncommon is missed. Finally, when presenting the Nernst equation, Kenkel notes that it is temperature dependent but does not provide students with a form of the equation that allows them to make suitable corrections.

As its title suggests, this textbook is most appropriate for students completing a two-year program in chemical technology. Faculty teaching introductory analytical chemistry at four-year colleges and universities will find that the textbook's level of presentation, particularly with respect to its quantitative treatment of analytical chemistry, makes it unsuitable as a primary textbook. For example, students using this textbook will understand what a standard addition method is and why it is important, but will not be able to complete the necessary calculations. Students in such courses, however, may appreciate that Kenkel's less quantitative approach and, consequently, might find it useful as a secondary source of information.

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