

Preface

A lot of operations in chemical analysis are carried out in solution, in particular in aqueous solutions. Because water is both a dissociating and ionizing solvent, the chemical reactions occurring within it are generally ionic reactions. From another standpoint, in order to obtain valid analytical conclusions, the chemical reactions proposed to perform the analysis must be carried out until their term, that is, until their equilibrium has been reached.

One of the great interests in the analytical chemistry practiced in aqueous solutions lies in the fact that it can be quasi-systematically described by mathematical equations, which can be grouped themselves in mathematical systems, systems being, in principle, always determined. Because they are not so easily soluble, they induce the use of informatics or the adoption of pertinent simplifications. Without any doubt, adopting pertinent simplifications is a difficult task for anybody who has not thoroughly mastered the discipline. Therefore, in my opinion, it is imperative, systematically, to write first all the equations describing the phenomena in solution that must be satisfied. Next, one or several simplifications may be made according to the conditions of the experiment. The results of the calculations issuing from the preceding simplifications can then be challenged experimentally in the third stage. This methodology constitutes the heart of this book.

Briefly, it is the fortunate balance existing between the theoretical aspects resulting from the mathematical equations governing the phenomena and the purely experimental aspects that confer the great academic interest on analytical chemistry in aqueous solutions. Therefore, analytical chemistry appears to be as close to pure physics as to chemistry. Furthermore, the IUPAC classifies analytical chemistry in the realm of physical chemistry. It is one of the goals of this book to provide an example of such an assertion.

Analytical chemistry consists of studying the physical and chemical phenomena that are applied in chemical analysis. Hence, the two disciplines should not be confused. However, in this book, numerous examples coming, of course, from the realm of chemical analysis are given in order to illustrate the principles of analytical chemistry that are studied. These examples are taken from the fields of inorganic and organic chemistries and even from that of biochemistry. Finally, a large place is given to the analysis of pharmaceutically active ingredients.

I particularly want to thank Professor Maurice Bernard, honorary dean of the faculty of sciences of Caen, for having introduced me to and helped me into this kind of chemistry. I do not forget the very fascinating time during which I worked with him. I also thank my wife, Gwenola Burgot, professor of analytical chemistry in the faculty of pharmacy of the University of Rennes I, who, of course, immediately understood the interest in such a book and who has always encouraged me to continue the great task that was its writing. I still thank Gabriel Gorre, holder of the superior chair of physics in the Lycee Joliot-Curie of Rennes, for his thorough reading of the manuscript.

My great thanks also go to André Le Goff, who was one of my English teachers in school. He has considerably helped me in the translation of the French version of this book into the English one. My English needed his help!

Finally, I also thank Annick Simon-Malard for the diligency and devotion she exhibited during the preparation of the different versions of this book.

Last but not least, I dedicate this book to James Newton Butler, professor of chemistry in the division of applied sciences at Harvard University, for the book he wrote in 1964 entitled *Ionic Equilibrium, a Mathematical Approach*. My book has only the pretense of being a continuation of his masterpiece in analytical chemistry.

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