

An introductory chapter is followed by two chapters that constitute the methodological review. These chapters deal primarily with potentiometric measurements of *pH*. Spectroscopy and other less prominent experimental approaches are reviewed adequately but in less detail. On the basis of potentiometric *pH* determinations and the known total cation content of a solution, the formulas for the various hydrolysis products and their formation equilibrium constants can, in principle, be computed. In practice the computations are not simple, because a variety of species of the general formula $M_x(OH)_y$ need to be considered. Typically *x* ranges to 3 and *y* to 5. The chapters outline the degree of accuracy in the data that is required for valid computations and discuss how junction potential, asymmetry, and activity coefficient potentiometric errors are identified, estimated, and minimized.

The interpretation of potentiometric data is a subject on which the perspective of insiders is especially appreciated. Chapter 3 summarizes the graphical and the more recent computer techniques and discusses the degree of confidence that can be placed in the results. The relative merits of inductive and deductive approaches are discussed. An agreement factor involving the difference between observed and calculated ligand number is used, and criteria for data best fit are given. These two chapters provide a sound review that will be useful both for graduate students and for those already active in hydrolysis chemistry.

The largest portion of the book consists of chapters reviewing and summarizing the hydrolysis chemistry of the cations in order of their place in the periodic table. Earlier work is critically reviewed. Best values for the equilibrium constants are proposed, and in many cases graphs presenting hydrolysis species as a function of *pH* and total cation concentration are included. Some practical aspects of the kinetics of hydrolysis product formation are dealt with.

A chapter aimed at organizing present knowledge of hydrolysis behavior concludes the text. It should prove of great interest to inorganic chemists concerned with complex formation. The authors present some generalizations, based on thermodynamic data, concerning entropy, enthalpy, and structural features of polynuclear species.

The book has several helpful features. It includes a listing of symbols and definitions, a periodic table of the elements that includes references to the chapters in which the various elements are dis-

cussed, and a bibliography of over 700 items. At strategic points in the chapters on methodology, preceding material is recapitulated—an evidence of regard for the nonspecialist reader. The appendixes include a computer program for processing data by a general nonlinear least-squares procedure and a subroutine for hydrolysis data that uses the ligand number as the dependent variable. The introductory chapter includes a historical overview showing that a large proportion of the reliable data on the subject have accumulated within the past 20 years. Historical and philosophical perspective is offered at several other points in the text.

The book reads well. Although clear, the style is not pedagogic. At points in chapters 2 and 3 some examples would have helped the nonexpert. Diagrams are used in sufficient number and detail.

In summary, the book provides a succinct, clear account of the hydrolysis reactions of cations.

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