Element Speciation in Bioinorganic Chemistry

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Element speciation determines the different forms a chemical element can take within a given compound, enabling chemists to predict possible ramifications for the environment and human health. This comprehensive book focuses on the analytical aspects and instrumentation of speciation, while covering the gamut of metal speciation forms with adverse effects on biological materials and the environment at large.

The book consists of contributions by a truly international group of leading authorities on element speciation in bioinorganic chemistry. The editor--a contributor here himself--traces the developments in the field, discussing the advances made over the past decade in various methodologies and the significance of the increased capacity to detect extremely small concentrations of trace elements in various media.

Several chapters are dedicated to the various methods and applications of speciation, exploring specific analytical methods, such as direct, chromatographic and nonchromatographic methods, as well as nuclear-based and voltammetric methods. Others cover speciation in various natural water and marine environments and its manifestation in biological materials, human serum, or foodstuff. In addition, the book examines speciation theory and legal aspects as well as questions of quality and sources of errors--issues that underscore the perennial need to develop new methods for obtaining still more accurate data.

Extremely broad in scope and rich in detail, this volume provides the key to improving the state of the art in the field, and is sure to stimulate further research. It stands as a one-of-a-kind reference for analytical and inorganic chemists, as well as biochemists, in a wide range of disciplines, including toxicology, environmental science, nutrition research, clinical chemistry, and pharmacology.

A complete reference for the analytical and instrumental aspects of speciation

This unique volume provides both a comprehensive reference and a practical guide to the complete range of issues arising from element speciation. It concentrates on analytical methods and instrumentation in bioinorganic chemistry--especially as applied to water-related projects--while addressing the larger environmental and human-health concerns of our times.

Complete with over 100 illustrations, this collaborative effort by an international group of experts describes
* Methods for the detection and analysis of species elements, including direct methods, atomic spectrometry, nuclear activation analysis and radio tracer, high-performance chromatography, or voltammetric procedures
* Specific effects of various species elements, including heavy metals, arsenic, and many other trace elements
* Biological materials showing concentrations of trace elements, including human serum, milk, and marine organisms
* Various environments affected by element speciation, such as natural waters, sea waters, estuarine, and coastal environments
* How to avoid common pitfalls and obtain sound and accurate data

For anyone involved in environmental and earth sciences, as well as the related areas of public health, pharmacology, toxicology, nutritional research, or environmental regulations, this important work offers the most systematic survey of element speciation to date. It also provides historical perspective, a preview of

expected developments, and a multitude of new ideas for further research.

The author of approximately 240 published papers and three previous books, Dr. Caroli is an active member of numerous national and international committees and organizations concerned with chemicals in the environment. He also sits on the editorial or advisory boards of several scientific journals, including the Journal of Analytical Atomic Spectroscopy, Environmental Science and Pollution Research International, and Microchemical Journal.

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