

Preface

This book is the third in a unique line of handbooks, initiated in the early 1980s by Ernest Merian in cooperation with several of his colleagues leading in 1984 to a first book – **Metalle in der Umwelt** – published by Verlag Chemie. The design of the book, which became fondly known as the ‘**MERIAN**’, was from the beginning highly appreciated for its clear organization excellently and interdisciplinary covering the broad range from general information, basic elemental data, industrial uses, environmental distribution to biological and medicinal aspects. Since many readers from various scientific branches could benefit from it, an updated and extended English edition titled **Metals and Their Compounds in the Environment** followed relatively quickly in 1991. It was not unexpected that this edition sold very well over many years until it went out-of-print in 2001.

Ernest Merian passed away in 1995 at the age of 75 while traveling to one of his many scientific conferences, but already realized at that time the great success and admiration his work and particularly the voluminous English edition had received worldwide. The book is frequently quoted in the literature as it has been accepted as a major multielement source handbook. Progress, in the intervening years, in many scientific areas called for an update

rather than a simple reprint of the book and the publisher was seeking for someone or some group who that might be willing to produce a new edition. Dr. Steffen Pauly, in charge of the section of WILEY-VCH responsible for a possible update of the ‘**MERIAN**’, participated in April 1997 in the 7th International Symposium on Biological and Environmental Reference Materials (BERM-7) in Antwerp, Belgium. BERM-7 was co-organized by Dr. Markus Stoeppler, who took part as an author in the German Edition of the ‘**MERIAN**’ and as an author and a member of the scientific advisory board for the English Edition as well. Thus it was natural that Dr. Pauly asked Dr. Stoeppler his opinion about an update. Fortunately there were two other colleagues at the symposium, Prof. Manfred Anke, Germany, and Dr. Milan Ihnat, Canada, both very experienced as authors and editors of scientific publications and also knowledgeable with the subjects treated in the **MERIAN**. All three have in addition a long history of co-operation.

Thus at Antwerp general agreement was reached for a co-editorship of Anke, Ihnat and Stoeppler, followed by action by the publisher to ask former members of the Editorial Advisory Board and a few new ones for participation and by the editors to discuss a preliminary outline for the con-

tent of the book. In the course of the preliminary planning phase, including the six members of the Editorial Advisory Board (three former and three new), it was jointly decided that the comprehensive character of the book could be significantly strengthened and the basis of the literature sources increased if not only metals and some metalloids previously covered, but also several other metals and nonmetals that play important roles in industry, environment, medicine, nutrition and biota, namely alkali metals, alkaline earths, nitrogen, sulfur, phosphorus and the halogens, were to be included as separate chapters. This was finally accepted by the publisher with a slightly changed title influencing the length of the whole text, the organization of the introductory and the analytical part as well. Subsequently the final working phase started in 2002.

This updated and significantly extended 2nd edition of the 'MERIAN' is a tribute to Ernest Merian and therefore also bears his name in the editorial lineup as the book constitutes a continuation and some broadening of his initial comprehensive concept that was not significantly changed by his successors. This book, presented in three volumes, includes 81 chapters written by 83 experts from 20 countries around the world, based on the available international literature on approximately 1700 text pages. As the authors came from very different research areas it was thus unavoidable that their main interest often influences the style, content and general focus of individual chapters.

The first volume is composed of two parts. Part I deals with Element Distribution in the Environment and consists of twelve chapters ranging from "Composition of the Earth's Upper Crust, Natural Cycles of Elements, Natural Resources" to "From the Biological System of the Elements to Bio-

monitoring". Part II discusses in ten chapters "Effects of Elements in the Food Chain and on Human Health" and ranges from "Essential and Toxic Effects of Elements on Microorganisms" to "Ecogenetics". Here several chapters are new or newly written due to the somewhat changed general concept with more emphasis on element essentiality.

The second volume contains Part III covering all metallic elements, with some chapters carefully updated and/or extended and others new (as e.g. Mercury and the Platinum-Group Elements) from the Alkali Metals to Zirconium in 44 chapters of varying length due to the elements' individual essential, eco-chemical and eco-toxicological relevance. The chapter following organization, in order to maintain comparability with the 1st edition and among chapters, consists of seven sections with some freedom for the authors to add and organize subsections individually: 1) Introduction, 2) Physical and Chemical Properties and Analytical Methods (the latter mainly as a subsection with more details for elements for which chemical speciation is essential), 3) Sources, Production, Important Compounds, Uses, Waste Products and Recycling, 4) Distribution in the Environment, in Foods and Living Organisms, 5) Uptake, Absorption, Transport and Distribution, Metabolism and Elimination in Plants, Animals and Humans, 6) Effects (beneficial and/or adverse) on Plants, Animals and Humans, 7) Hazard Evaluation and Limiting Concentrations, 8) Complete References using the Harvard (Name and Date) System. The reference citation system, regrettably not continuously found in the 1st edition, has been, as far as possible, followed in this edition for the benefit of our readers.

The third volume contains Part IV with some important metalloids and nonmetals

from Boron to Tellurium and all Halogens; Part V deals with three chapters: Standards and Regulations Regarding Metals and Their Compounds, Analytical Chemistry of Element Determination (Non Nuclear and Nuclear) and Analytical Chemistry of Speciation (Principles, Main methods). The latter is a new contribution by an expert in this area in order to emphasize the increasing importance of speciation for clarification of many elemental actions. Part VI contains additional information in a Glossary (Acronyms, Abbreviations, Symbols and definitions), some general tabulated information, and an Index.

The editors wish to thank all contributing authors for their careful work and for compliance with the general editorial concepts, and publisher and their colleagues in the editorial advisory board for their always quick and very helpful discussions and expert advice. We thank in particular Prof. Dr. Marika Geldmacher von Mallinckrodt, Prof. Dr. Robert F.M. Herber and Dr. Mathias Seifert for very effective support

in the final phase of urgent manuscript control during proof reading, and Dipl.-Ing. Karl-Heinz Schaller, for his steady advice when detailed information on actual national and international limit values was required. Our thanks go also to Dr. Steffen Pauly at WILEY-VCH for his encouragement in the planning and realizing this book and his continuous involvement in all editorial matter concerning the publisher's part. We are highly indebted to Dr. Waltraud Wüst at WILEY-VCH for her invaluable help in all technical and organizational matter concerning manuscripts, corrections and daily advice. Without her active support, hard work, friendly attitude, and always good ideas, the often critical deadlines would never have been so successfully reached. The support of Institutional libraries and staff therein for assistance with literature verification and acquisition is gratefully acknowledged. Finally we are indebted to our families for their support and understanding during this time-consuming undertaking.

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2003 December