

Preface

The aim of this book is to give an account of current research and understanding about a chemical element, antimony. The book is addressed to all who share an interest in any aspect of the element.

Antimony has for centuries attracted the interest of many people in a number of different ways, and still does. The history of antimony applications is very long and unusually fascinating. The history of humankind follows the history of the exploitation and use of natural resources and, in particular, of metals and metalloids. However, not many chemical elements have been used in such a variety of applications as has antimony, and probably none has ended up being so ubiquitously present in our everyday life. This book has been designed to acquaint the reader with some of the main aspects of mineralogy, exploitation, biogeochemical behavior, and effects of the use of antimony. Surprisingly, in spite of the extensive scientific literature, no similar books have been published so far. This work aspires to fill that gap.

Any chemical element forms a multifaceted subject. I have chosen a very broad title for this book in order to provide a general umbrella allowing the discussion of different subjects around the element, but obviously the book does not contain 'all that is known' on antimony. Although I have tried to adopt a comprehensive approach, in managing the compromise between subjects to be treated and keeping the book within a reasonable size, some subjects have been deliberately left out. This text is admittedly idiosyncratic and its contents inevitably reflect my own background and interests as an environmental chemist. I admit that I regret the absence of chapters devoted to aspects such as the discussion of the chemical characteristics that make this element so versatile in its applications, or the best analytical methods to apply. I hope a future work will cover them. It has also been necessary to arrive at a compromise between depth of coverage of included subjects and book length, with many viewpoints given only limited space. The authors have devoted much effort to this aspect. I hope that, in spite of these limitations, readers will gain an appreciation of the scope of the subject and will consequently be adequately prepared to understand the growing literature on this interesting element.

The book comprises 16 chapters. It opens with a presentation of historical aspects of the use of antimony (Chapter 1). Then, mineralogy (Chapter 2), deposits (Chapter 3), and anthropogenic flows and stocks (Chapter 4) are discussed. The prominent situation of China in the current mining and production of the element is examined in Chapter 5. The ensuing three chapters are devoted to different aspects related to antimony in soils: diffuse soil contamination (Chapter 6), soil-plant transfer (Chapter 7), and shooting range contamination (Chapter 8). They are followed by a critical appraisal of the journey of antimony across the aquatic continuum (Chapter 9) and the examination of the fate of radioactive antimony in the environment (Chapter 10). Biomethylation and biovolatilization of the element is reviewed (Chapter 11), followed by a discussion of the molecular mechanisms of

antimony transport and detoxification (Chapter 12). The use of pentavalent antimonials in the treatment of human leishmaniasis is considered in the next chapter (Chapter 13) before moving to human exposure (Chapter 14), ecotoxicology (Chapter 15), and current regulations (Chapter 16).

As mentioned, there are gaps in the book that are my responsibility, but it is important to realize that there are also many gaps in our knowledge, which will be apparent in the text. I hope that this book will help to motivate future researchers to fill these gaps and also make readers aware of the need to embrace uncertainty when dealing with any scientific subject. Scientific knowledge by definition continuously evolves and our knowledge of antimony is no exception. Helping readers face up to the 'known unknowns' about antimony is also an objective of the book.

While preparing this book I have been very conscious of how much I owe to many friends and colleagues for their help in stimulating my efforts to understand this element over the years. Particular mention should be made of the three conferences on antimony that took place in 2005 (Heidelberg, organized by Bill Shoty, Michael Krachler, and Bin Chen), 2011 (Jena, co-organized by Jurajz Majlan and myself), and 2015 (Leipzig, co-organized by late Birgit Daus and myself). I am deeply appreciative of the many hours of stimulating discourses and interactions in these conferences. I think they have played a key role in creating a thriving 'antimony community,' some of which members are contributing authors of this book.

Personally, I am also indebted to Nelson Belzile for introducing me to the charms of the element. I am most grateful to many colleagues who have reviewed individual chapters and have given useful advice. Credit for the creation of this volume is, of course, primarily due to its authors.