

## BOOK REVIEW

**Arsenic Contamination of Groundwater: Mechanism, Analysis, and Remediation**, Edited by Satinder Ahuja, John Wiley & Sons, Inc; Hoboken, New Jersey, USA. ISBN: 978-0-470-14447-3, pp 387, Hardcover, \$ 150.00.

5 Arsenic contamination of groundwater, which is the primary source of drinking water, is now regarded as one of the worst public health crises in more than 35 countries world wide, including the United States. This book is very timely and covers some of the most important aspects of the “arsenic contamination of groundwater.” In particular, 10 topics on arsenic release mechanism involving bacteria in the bio-geochemical process, the review of the arsenic analysis method in the field and laboratory, and some critical arsenic removal technologies for its remediation in countries like Bangladesh, India are valuable. 15

The book consists of 15 chapters. The first chapter begins with an overview on the groundwater arsenic contamination problem in general, followed by chapters on: fate of arsenic in irrigation water and its potential impact on the 20 food chain, mechanism of arsenic release into groundwater water, the role of microbes in the geochemical behavior of arsenic in groundwater system, detection of dissimilatory arsenate-respiring bacteria, biogeochemical mechanisms of arsenic mobilization and sequestration, geomicrobiology of iron and arsenic in anoxic sediments, development 25 of low cost measurement technologies for on site arsenic determination, reliability of test kits, prediction and modeling of arsenic removal, development of a simple arsenic filter, community based wellhead arsenic removal units, water 30 supply technologies for arsenic mitigation, and solutions for arsenic contamination of groundwater.

Mitigation, the present arsenic crisis, which is known as the world’s worst natural calamity, needs sound knowledge of geochemistry, analytical chemistry as well as separation chemistry. In a nutshell, this book brings all these features 35 together and describes its applications in solving the problems. Particularly, Chapter 2 deals with the fate of arsenic in irrigation water and its potential impact on the food chain as it occurs in Bangladesh and in similar environments.

40 Contamination of the irrigation water by arsenic, the retention, release, distribution, and build up of arsenic in soil, and consequence accumulation in various crops irrigated with arsenic rich water are critical information. The result

of arsenic accumulation in crops and its consequence on dietary intake and possible natural remediation measures to combat arsenic accumulation in soils and crops are also 45 discussed.

The mechanism of arsenic release in groundwater is still under dispute in the academic world. This debate is addressed in Chapters 3 through 6. These mechanisms include the processes via pyrite oxidation; arsenic release via oxy- 50 hydroxide reduction, and the recent hypothesis and explanation of the role of microbe and organic carbon reduction in arsenic mobilization.

The current status of arsenic determination and the development of low cost analytical methods and testing kits are described in Chapters 7 and 8. Chapters 9 through 14 55 address the mitigation of arsenic, existing and emerging remediation methods, ranging from coagulation with ferric chloride or alum to award winning technologies that have been recognized by the National Academy of Engineering (NAE) for their affordability, reliability, ease of maintenance, social acceptability, and environmental friendliness, which met or exceeded the local government’s guidelines 60 for arsenic removal. These chapters also provide the basic chemistry for these processes. Chapter 10, in particular, deals with the modeling tool to predict pilot-and full-scale performance from laboratory studies and to provide guidance for arsenic removal process development, scale-up and design. Finally, potential solutions to this devastating problem are discussed in chapter 15. 70

This book should be an indispensable and valuable reference source to all scientific libraries and to those who are engaged in arsenic research, as well as students of the sciences. This could be a core reference for scientists working 75 in the fields of geochemistry, analytical chemistry, environmental chemistry, and separation science and technology involving arsenic in water.

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