Book Reviews *

The Sulfur Problem: Cleaning Up Industrial Feedstocks. By Diane Stirling (University of Glasgow). Royal Society of Chemistry: Cambridge. 2000. x+ 94 pp. £55.00. ISBN 0-85404-541-4

This book, a RSC Clean Technology Monograph, addresses sulfur pollution, its main sources, and the methods of cleaning it up. The first four chapters address the origin of sulfur pollution and the methods of its removal. The author next focuses on the solid sorbents, their chemistry and synthesis, and the methods of surface characterization. The balance of the book consists of a short summary of solid-state chemistry, physics, principles of physical chemistry, and enough chemical engineering for understanding the removal of sulfur-containing gases on solid adsorbents and evaluating the performance of materials applied.

In the first chapter, the problem of sulfur pollution and its origins are emphasized. The reader learns about natural and anthropogenic sources of sulfur-containing gases in the environment. The author emphasizes the environmental effects of the presence of SO_2 in the atmosphere, giving several examples of "real-life" incidents detrimental for humans, structures, and the biosphere. The next chapter addresses the aspect of industrial hydrodesulfurization of fossil fuel leading to the production of hydrogen sulfide, as well as the role of catalysts and the mechanisms of the reactions. This is followed by a comprehensive chapter on the methods of removal of hydrogen sulfide from industrial flue gases. It includes examples of basic chemical reactions and schemes of industrial processes as well as a discussion of SO_2 removal by absorption into a liquid, oxidation, and adsorption on solid sorbents at different temperature regimes. In this chapter, the reader learns that the products of reactions depend on the methods used, the underlying chemistry, and the conditions of the processes. In Chapter 4, the cleanup of sulfur dioxide is described in a similar fashion. These four chapters provide the reader with a good understanding of sulfur-containing gases in the environment and the general methods used for desulfurization.

In the remaining chapters, the author introduces the basic facts about the chemistry and physics of solid sorbents. Chapter 5 describes in detail inorganic oxides and layered structures along with the outline of their synthesis. The principles of physicochemical methods commonly used for their characterization, such as XRD, FTIR, UV−vis, TA, SEM, TEM, and measurement of surface area, are then presented. This chapter is written in such a way that anyone having a basic knowledge of chemistry and physics can understand how the methods of characterization work and what the main physical and chemical rules applied in their development are. Although Chapter 5 is entitled "Synthesis and Characterization of Solid Sorbents", it is limited to only two major classes of materials, inorganic oxides and layered structures. It does not address activated carbons, which is an important drawback in my opinion. Since the author refers to the broad application of activated carbons as effective adsorbents of sulfur containing gases in Chapters 3 and 4, I felt that those important materials were forgotten in the detailed description of solid sorbents.

Chapter 6 addresses surface energies and interactions between particles. It is very informative and follows the concise description of physiochemical methods of Chapter 5. In the last chapter, the author focuses on the principles of methods used to determine the sorption capacity of solid sorbents. Methods based on the equilibrium process, such as the determination of adsorption isotherms and the theories behind them, are covered, as are sorption kinetics, mass transfer, diffusion, and calculation and understanding of the breakthrough curves, which is very important for real-life performance of adsorption systems. Each chapter ends with a concise summary and references for further reading. Generally, the references cover important papers and books published from the 1960s through the 1990s.

Overall, this is a very useful book addressing sulfur pollution problems and the methods of their prevention and control. It links chemistry, solid-state physics, and chemical engineering and shows how all of these disciplines can be combined effectively to solve environmental problems. This monograph should be of value to both entry-level students in environmental chemistry and engineering and advanced researchers looking for a clear description and understanding of the sulfur pollution problem and methods used for sorbents characterization.

Teresa J. Bandosz, *City College of the City University of New York*

JA0048026

10.1021/ja0048026

Emulsions, Foams, and Thin Films. Edited by K. L. Mittal (Hopewell Junction, New York) and Promod Kumar (Gillette Research Institute). Marcel Dekker: New York, Basel. 2000. xxvi + 488 pp. ISBN 0-8247-0366-9

This book brings together the research presented at the Symposium on Emulsions, Foams and Thin Films that was part of the 72nd Colloid & Surface Science Symposium (June 1998). Its 27 chapters are organized into six sections: General Overviews; Emulsions; Foams; Thin Films; Adsorption and Monolayers; and General Papers. A sampling of the chapter headings includes the following: Coupling of Coalescence and Flocculation in Dilute O/W Emulsions; Preparation of Novel Silicone-Based Antifoams Having a High Defoaming Performance; Thinning and Rupture of Aqueous Surfactant Films on Silica; Protein−Silicone Interactions at Liquid−Liquid Interfaces; and Rheological Instabilities in Waterborne Coatings.

JA004830O

10.1021/ja004830o

NMR Spectra of Polymers and Polymer Additives. By Anita J. Brandolini and Deborah D. Hills (Mobil Chemical Co., Edison, NJ). Marcel Dekker: New York. 2000. viii + 634 pp. $195.00. ISBN 0-8247-8970-9.

This reference book gives the NMR spectra of approximately 300 commercially significant polymers and polymer additives. ^{13}C spectra are presented most commonly, although ^{1}H, ^{19}F, ^{29}Si, and ^{31}P are also provided where useful. The polymers are organized according to the chemical structure of the backbone and type of pendant groups, e.g., "Aliphatic Backbones: Aromatic Pendant Groups". Each entry provides the molecular structure of the polymer, peak assignments, experimental parameters, references, and comments, which include common and trade names, its uses, likely blend components and additives, and other practical background information.

JA004828X

10.1021/ja004828x

Annual Review of Biophysics and Biomolecular Structure. Volume 29. Edited by Robert M. Stroud (University of California, San Francisco), Wilma K. Olson (Rutgers, The State University of New Jersey), and Michael P. Sheetz (Duke University). Annual Reviews: Palo Alto, CA. 2000. viii + 634 pp. $163.00. ISBN 0-8243-1829-3

The 20 chapters in this volume cover a wide range of topics of interest to scientists interested in biomolecules and issues associated with them. A sample of chapters includes "Quantitative Chemical Analysis of Single Cells", "Atomic Force Microscopy in the Study of Macromoleuclar Crystal Growth", and "Electrostatic Mechanisms of DNA Deformation". References are current through early 1999, and there is a subject index for the volume.

JA0048073

10.1021/ja0048073

*Unsigned book reviews are by the Book Review Editor.