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Book Review

Characterization and Chemical Modification of the Silica Surface, edited by E.F. Vansant, P. Van Der Voort and K.C. Vrancken; Elsevier, Amsterdam, 1995, XVI+556 pp., price Dfl. 410, ISBN 0-444-81928-2.

The book intends to provide a comprehensive up-to-date survey on the characterization and chemical modification of the silica surface. It is written by three authors who have in-depth experience both in the chemistry and the methods characterizing the silica surface.

The book is divided in three main parts. The first part on "The Silica Surface" contains seven chapters. Chapter 1 provides an introduction into the various forms of silica and their syntheses. Chapter 2 highlights the characterization of the pore structure of silica. Chapters 3 to 6 summarize the state-of-the-art of knowledge and experience in assessing the surface silanol groups. Chapter 7 adds some information on silicates.

While Part 1 is of a more introductory character, Part 2 can be considered as the essential core of the book, covering five chapters (Chapters 8–12). Chapter 8 deals with the wide field of application areas of surface modified silicas and related to that the various routes of synthesis and manufacture. Chapter 9 is exclusively devoted to the silanization reactions at the silica surface. Aminosilanes were chosen as reagents to demonstrate the usefulness of modern spectroscopic techniques in elucidating the surface reactions. Chapter 10 deals with the modification of the silica surface with boron compounds including the results of classical work as well as novel developments. The formation of Si–O–X surface bonds, where X is Ti, Al, P and transition metals is described in Chapter 11. Part 2 is complemented by an in-depth treatment of the ammoniation of modified silica (Chapter 12).

Part 3 is reserved for coating techniques. The various coating techniques are surveyed in Chapter 13, with very little context, however, to the silica modification. The chemical surface coating technique is presented in Chapter 14, based on the authors' rich experience.

The appendix lists the numerous surface analytical techniques which are applied throughout the chapters. This appendix appears a very useful addition for those readers who are less familiar with these modern techniques.

The survey of such an enormously broad field, condensed in an individual monograph, is not an easy task. The authors have done an excellent job by providing an up-to-date treatment of this important area. However, to strengthen the value and quality of the book some chapters, e.g. Chapters 1, 2, 7, 8 and 13, need a thorough polishing and revision in some parts.

Also numerous typing errors should be omitted and often imprecisely defined terms should be clearly explained. Despite the above, this book was delightful to read.

The monograph is not written for beginners. It is more intended for the specialists who are interested in the detailed aspects of silica chemistry and its surface modification. As such it can be highly recommended to those who desire an advanced level of understanding of silica surface chemistry.

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