BOOK REVIEWS

The Fractal Approach to Heterogeneous Chemistry: Surfaces, Colloids, Polymers

Edited by David Avnir, Wiley, New York, 1989, 460 pp., $75.00.

The fractal geometry creates new research possibilities in heterogeneous chemistry, especially in studies of phenomena in colloids and surface science. The above book edited by D. Avnir provides a basic overview of terminology and main concepts in fractal geometry, and covers a wide area of heterogeneous chemistry.

Although fractal geometry has initiated extensive studies in various areas of heterogeneous chemistry, no published data are currently available that deal with foundations of fractal geometry and its applications in chemistry, physics, and related sciences. The book edited by D. Avnir fills this gap. The editor is a leading authority in fractal geometry and heterogeneous chemistry. Contributors to this book are all known authorities in the above-mentioned area, and successfully selected the most important topics for successive chapters and maintained consistent terminology in the whole book; this is especially important because 27 authors were involved in preparing the above volume.

The first chapter provides an overview of the fractal language prepared by B. B. Mandelbrot, and basic concepts and terminology of fractals elaborated by P. Pfeifer and M. Obert. The second chapter discusses methods for determining fractal dimensions: image analysis by B. H. Kaye, scattering techniques by P. W. Schmidt, and methods using energy migration processes by P. Evesque. The third chapter is devoted to the formation mechanisms of fractal objects. Polymerization and aggregation growth processes are discussed by M. Daoud and J. E. Martin. Simulations of aggregation processes and their experimental studies are presented by P. Meakin and M. Matsushita, respectively. C. Daccord prepared a section on disintegration and dissipation processes. Flow and interfacial instabilities in Newtonian and colloidal fluids are discussed by H. Van Damme, whereas fractal interfaces in diffusion, invasion, and corrosion are presented by B. Sapoval et al. Processes in fractal environments, the fourth chapter, covers: molecular interactions and diffusion in fractal environments by S. Havlin, the fractal nature of molecule-surface interactions and reactions by D. Farin and D. Avnir, diffusion-controlled reaction kinetics by R. Kopelman, fractal electrodes by A. Le Mehaute, adsorption and porosity by J. J. Fripiat, flow in porous media by P. M. Adler, and chromatography by M. Sernetz et al. The last chapter deals with special topics, which include fractals and geochemistry by P. A. Burrough, and fractal analysis of proteins by R. Elber.

As this brief description of contents shows, Avnir's book concentrates on key problems of modern heterogeneous chemistry. The book is recommended to all those interested in heterogeneous chemistry of surfaces, colloids and polymers. Beginners can find sections, which introduce them to fractal geometry and show its applications in chemistry. Scientists working in surface and colloidal sciences can find sections, which will stimulate their further research.

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