

PHYSICAL CHEMISTRY

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Diffusion in Nanoporous Materials

Two-Volume Set

Jörg Kärger, Douglas M. Ruthven, and Doros N. Theodorou

The only book that combines the important process of diffusion with highly interesting porous solids!

Diffusion in Zeolites and other Microporous Solids, originally published in 1992, set the standard in the field for a very long time. This new two-volume set will become THE reference for the next decade. Jointly written by three well known researchers in this field, it presents a coherent treatise, rather than a compilation of separate review articles, covering the theoretical fundamentals, molecular modeling, experimental observation and technical applications. A stringent structure offers beginners a didactical approach, and specialists a wide variety of information.



Introduction

THEORY

Diffusion as a Random Walk

Diffusion and Non-Equilibrium Thermodynamics

Diffusion Mechanisms

Single-File Diffusion

Sorption Kinetics

MOLECULAR MODELLING

Constructing Molecular Models and Sampling

Equilibrium Probability Distributions

Molecular Dynamics Simulations

Infrequent-Event Techniques for Diffusion in Microporous Solids

MEASUREMENT METHODS

Measurement of Elementary Diffusion Processes

Diffusion Measurement by Monitoring Molecular Displacement

Imaging of Transient Concentration Profiles

Direct Macroscopic Measurement of Sorption and Tracer Exchange Rates

Chromatographic and Permeation Methods of Measuring Intraparticle Diffusion

DIFFUSION IN SELECTED SYSTEMS

Amorphous Materials and Extra-Crystalline (Meso/Macro-)Pores

8-Ring Zeolites

Large-Pore (12-Ring) Zeolites

Medium-Pore (10-Ring) Zeolites

Metal-Organic Frameworks (MOFs)

SELECTED APPLICATIONS

Zeolite Membranes

Diffusional Effects in Zeolite Catalysis

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