



# Adsorption and Diffusion in Nanoporous Materials

*Rolando M.A. Roque-Malherbe*

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As nanomaterials get smaller, their properties increasingly diverge from their bulk material counterparts. Written from a materials science perspective, *Adsorption and Diffusion in Nanoporous Materials* describes the methodology for using single-component gas adsorption and diffusion measurements to characterize nanoporous solids.

Concise, yet comprehensive, the book covers both equilibrium adsorption and adsorption kinetics in dynamic systems in a single source. It presents the theoretical and mathematical tools for analyzing microporosity, kinetics, thermodynamics, and transport processes of the adsorbent surface. Then it examines how these measurements elucidate structural and morphological characteristics of the materials. Detailed descriptions of the phenomena include diagrams, essential equations, and fully derived, concrete examples based on the author's own research experiences and insight. The book contains chapters on statistical physics, dynamic adsorption in plug flow bed reactors, and the synthesis and modification of important nanoporous materials. The final chapter covers the principles and applications of adsorption for multicomponent systems in the liquid phase.

Connecting recent advances in adsorption characterization with developments in the transport and diffusion of nanoporous materials, this book is ideal for scientists involved in the research, development, and applications of new nanoporous materials.

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