
Contents

Preface.....	vii
Editor.....	ix
Contributors.....	xi

Part I Basic Principles, Recent Advances, and Expected Developments of Advanced Characterization Techniques

1 Scattering Techniques	3
<i>Gérald Lelong, David L. Price, and Marie-Louise Saboungi</i>	
2 Studying Diffusion and Mass Transfer at the Microscale.....	53
<i>Christian Chmelik, Douglas M. Ruthven, and Jörg Kärger</i>	
3 Nanoscale Microscopies.....	95
<i>Anthony A.G. Tomlinson</i>	
4 Calorimetric Techniques.....	129
<i>Philip L. Llewellyn</i>	
5 Combination of In Situ and Ex Situ Techniques for Monitoring and Controlling the Evolution of Nanostructure of Nanoporous Materials.....	165
<i>G.N. Karanikolos, F.K. Katsaros, G.E. Romanos, K.L. Stefanopoulos, and N.K. Kanellopoulos</i>	

Part II Fundamentals, Recent Advances, and Expected Developments of Simulation Methods

6 Mesoscopic Methods.....	223
<i>P.M. Adler and J.-F. Thovert</i>	
7 Characterization of Macroscopically Nonhomogeneous Porous Media through Transient Gas Sorption or Permeation Measurements	253
<i>J.H. Petropoulos and K.G. Papadokostaki</i>	

Part III Fundamentals, Recent Advances and Improvements, Membrane, Catalytic and Novel Processes Involving Nanoporous Materials

- 8 Synthesis Processes of Nanoporous Solids.....283**
P. Cool, V. Meynen, and E.F. Vansant
- 9 Sorption Processes.....307**
F. Rodríguez-Reinoso, A. Sepúlveda-Escribano, and J. Silvestre-Albero
- 10 Fundamental Approach to Supercritical Hydrogen Adsorptivity of Nanoporous Carbons353**
Shigenori Utsumi and Katsumi Kaneko
- 11 Membrane Processes.....387**
A.F.P. Ferreira, M.C. Campo, A.M. Mendes, and F. Kapteijn
- 12 Diffusional Transport in Functional Materials: Zeolite, MOF, and Perovskite Gas Separation Membranes, Proton Exchange Membrane Fuel Cells, Dye-Sensitized Solar Cells423**
J. Caro
- 13 Zeolites and Mesoporous Aluminosilicates as Solid Acid Catalysts: Fundamentals and Future Challenges449**
Ana Primo, Avelino Corma, and Hermenegildo García

Part IV Case Studies of Applications of Advanced Techniques in Involving Nanoporous Materials

- 14 Recent Developments in Gas-to-Liquid Conversion and Opportunities for Advanced Nanoporous Materials.....481**
Gabriele Centi and Siglinda Perathoner
- 15 Advanced Materials for Hydrogen Storage.....513**
Th.A. Steriotis, G.C. Charalambopoulou, and A.K. Stubos
- Index549**