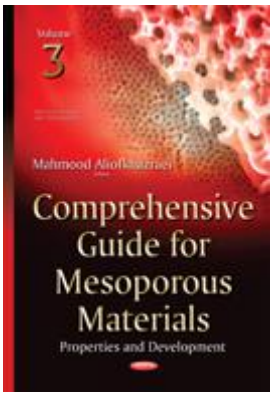
Comprehensive Guide for Mesoporous Materials, Volume 3: Properties and Development



Editors: Mahmood Aliofkhazraei (Tarbiat Modares University, Faculty of Engineering, Department of Materials Engineering)

Book Description:
This is the third volume of the four volume set of Comprehensive Guide for Mesoporous Materials, mainly discussing different properties and the development of mesoporous materials. Many applications for these materials have been recognized. Ultra precision methods also developed for commercialization of these materials. Like many nanostructured materials, mesoporous materials are also found in abundance in nature, such as in cell walls that are made of mesoporous membranes although they are much more complicated. During past decades in the oil industry, natural mesoporous materials known as zeolites are widely used. However, most of them are now produced artificially. (Imprint: Nova)

Chapter 4 - Mesoporous Acid Catalysts for Renewable Raw-material Conversion into Chemicals and Fuel (pp. 67-84)
Authors / Editors: (M. Caiado, J. Farinha, J.E. Castanheiro, Centro de Química de Évora, Departamento de Química, Universidade de Évora, Évora, Portugal)

Mesoporous catalysts, such as silica (PMOs, MCM-41, SBA-15) and activated carbons, have been used in heterogeneous catalysis, due to a combination of high surface areas and controlled pore sizes. These mesoporous materials have been used as catalyst in a wide range of chemical reactions. Due to environmental pressure and a decrease in fossil fuel sources, alternative fuel sources, such as biomass or renewable feedstock sources, have become increasingly popular. Traditionally, the biomass conversion is carried out over homogeneous catalysts. However, homogeneous catalysts have some disadvantages, such as difficulty in separations and the production of toxic waste. Solid catalysts can replace the homogeneous ones in order to make the processes simpler and more environmentally benign. Heterogeneous catalysts have been used in different reactions biomass conversion. In this work, the use of mesoporous acid catalysts (silica and activated carbons) for the biomass conversion into chemicals and fuel will be reviewed.

Chapter 5 - Mesoporous TiO2 as Efficient Photocatalysts and Solar Cells (pp. 85-122)
Authors / Editors: (Adel A. Ismail, Advanced Materials Department, Central Metallurgical R & D Institute, CMRDI, Helwan ,Cairo, Egypt, and others)

Chapter 6 - Porous Si Structures for Gas, Vapor and Liquid Sensing (pp. 123-146)
Authors / Editors: (V. A. Skryshevsky, Institute of High Technologies, Taras Shevchenko National University of Kyiv, Kyiv, Ukraine)

Chapter 7 - Hierarchical Zeolites: Preparation, Properties and Catalytic Applications (pp. 147-212)
Authors / Editors: (Ana P. Carvalho, Nelson Nunes, Angela Martins, Centro de Química e Bioquímica, Faculdade de Ciências, Universidade de Lisboa, Lisboa, Portugal, and others)

Chapter 8 - Novel Mesoporous Materials for Electrochemical Energy Storage (pp. 213-240)
Authors / Editors: (J. Santos-Peña, J. Ortiz-Bustos, S. G. Real, A. Benítez de la Torre, C. Medel4, J. Morales, M. Cruz, R. Trócoli, Laboratoire de Physicochimie des Matériaux et Electrolytes pour l'Energie, Campus de Grandmont, Université de Tours, Tours, France, and others)

Chapter 9 - Optical Properties of Mesoporous Silicon/Silicon Oxide and the Light Propagation in these Materials (pp. 241-270)
Authors / Editors: (Joël Charrier, Parastesh Pirasteh, Université européenne de Bretagne, CNRS FOTON, Lannion cedex, France)

Chapter 10 - Behavior of Unmodified MCM-41 towards Controlled Release of Pro-drug Molecule, Cysteine (pp. 271-284)
Authors / Editors: (Anjali Patel, Varsha Brahmkhatri, Department of Chemistry, Faculty of Science, M. S. University of Baroda, Vadodara, India)

Chapter 11 - Mesoporous Multivalent Transition Metal Oxides (pp. 285-314)
Authors / Editors: (V, Cr, Mn, Fe, and Co) in Catalysis (Altug S. Poyraz, Sourav Biswas, Eugene Kim, Yongtao Meng, Steven L. Suib, Department of Chemistry University of Connecticut, Storrs, Connecticut, USA, and others)

Chapter 12 - Nanocomposites Embedded by Mesoporous Materials (pp. 315-342)
Authors / Editors: (Chunfang Du, Yiguo Su, Zhiliang Liu, College of Chemistry and Chemical Engineering, Inner Mongolia University, Hohhot, Inner Mongolia, P. R. China)

Chapter 13 - On the Conception and Assessment of Mesopore Networks: Development of Computer Algorithms (pp. 343-370)
Authors / Editors: (Fernando Rojas-González, Salomón Cordero-Sánchez, Graciela Román-Alonso, Miguel Alfonso Castro-García, Manuel Aguilar-Cornejo, Jorge Matadamas Hernández, Universidad Autonóma Metropolitana, Unidad Iztapalapa, Departamento de Química, México D.F., Mexico, and others)

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