

Special Issue

Microporous and Mesoporous Materials and Their Derived Hybrids as Systems for Controlled Release

Message from the Guest Editors

In recent decades, a diversity of materials such as polymers, ceramics, and semiconductors have been used as controlled release systems. Among the most versatile materials, microporous and mesoporous materials stand out due to their high surface areas and tailorabile surface chemistry. Depending on the size and surface functionalization of the pores, increased or sustained controlled release of a loaded molecule can be obtained. Moreover, if these micro- and mesoporous materials are inorganic, hybrids can be synthetized through a combination with organic compounds such as biopolymers. Engineered hybrid materials exhibit new advantageous chemical and physical characteristics, which are not exhibited by the individual constituents. Particularly, improved control over drug release kinetics, enhanced stability in different media, and selective release can be achieved by gating the pores with responsive molecules. Microporous- and mesoporous-based materials and their derived hybrids work for several molecules such as drugs, proteins, genes, fertilizers, nutrients, salts, and other biologically active agents.

Guest Editors

Dr. Jacobo Hernández Montelongo

Departamento de Ciencias Matemáticas y Físicas, Facultad de Ingeniería, Universidad Católica de Temuco, Temuco, La Araucanía, Chile

Dr. Miguel Manso Silván

Departamento de Física Aplicada, Facultad de Ciencias, Universidad Autónoma de Madrid, Cantoblanco, Madrid, Spain

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Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
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Prof. Dr. Patrick J. Sinko

Ernest Mario School of Pharmacy, Rutgers, The State University of New Jersey, William Levine Hall, Room 225C, 160 Frelinghuysen Road, Piscataway, NJ 08854-8020, USA

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