

Tailoring Functional Porous Polymer Materials with Controlled Pore Morphology

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ABSTRACT

This lecture examines the scope and limitations of three different approaches toward porous organic materials and nanocomposites with controlled pore morphology and surface functionality at different length scales. The first approach relies on the synthesis of diblock copolymers with functional groups at the junction between both blocks, followed by their macroscopic orientation, and the subsequent selective removal of the sacrificial minority block to afford ordered nanoporous materials with channels lined with chemically accessible functionalities (*e.g.*, COOH, SO₃H, SH, COH). The second strategy entails the preparation of biocompatible doubly porous crosslinked polymer materials through the double porogen templating approach. Finally, biofunctional 3-D macroporous scaffolds based on biodegradable polyesters have been engineered by electrospinning in combination with electrospraying to generate nanofibrous biomaterials as tissue engineering scaffolds or wound dressings. The potentialities afforded by these novel approaches will be addressed, and some typical applications of the resulting functional porous materials will be illustrated.

BIOGRAPHY

Prof. Daniel Grande is a CNRS research director at Charles Sadron Institute (ICS) in Strasbourg where he moved in January 2024 to hold the position of director of the Institute. Before his present position, he acted as the director of the ICMPE in Thiais for the period 2020-2023. He has been serving as the president of the soft matter section of the National Council for Scientific Research since 2021. He received his Ph.D. degree in polymer chemistry from the University of Bordeaux (France) and the University of Coahuila (Mexico) in 1998, and then he spent about two years at Emory University (Atlanta, USA) as a NIH post-doctoral fellow. He is the (co-) author of about 160 peer-reviewed publications in international journals, 47 proceedings, 18 book chapters, 2 books, and 14 patents in the field of polymer chemistry and polymeric materials science.

