

Advances in design and modeling of porous materials

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This special issue of the *European Physical Journal Special Topics* is dedicated to selected papers from the symposium “High surface area porous and granular materials” organized in the frame of the conference “Matériaux 2014”, held on November 24–28, 2014 in Montpellier, France.

Porous materials and granular materials gather a wide variety of heterogeneous, isotropic or anisotropic media made of inorganic, organic or hybrid solid skeletons, with open or closed porosity, and pore sizes ranging from the centimeter scale to the sub-nanometer scale. Their technological and industrial applications cover numerous areas from building and civil engineering to microelectronics, including also metallurgy, chemistry, health, waste water and gas effluent treatment. Many emerging processes related to environmental protection and sustainable development also rely on this class of materials. Their functional properties are related to specific transfer mechanisms (matter, heat, radiation, electrical charge), to pore surface chemistry (exchange, adsorption, heterogeneous catalysis) and to retention inside confined volumes (storage, separation, exchange, controlled release). The development of innovative synthesis, shaping, characterization and modeling approaches enables the design of advanced materials with enhanced functional performance. The papers collected in this special issue offer a good overview of the state-of-the-art and science of these complex media.

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