

Template Processes: Material Science Tool, Analysis of Self-Organization, or just Art of Nature

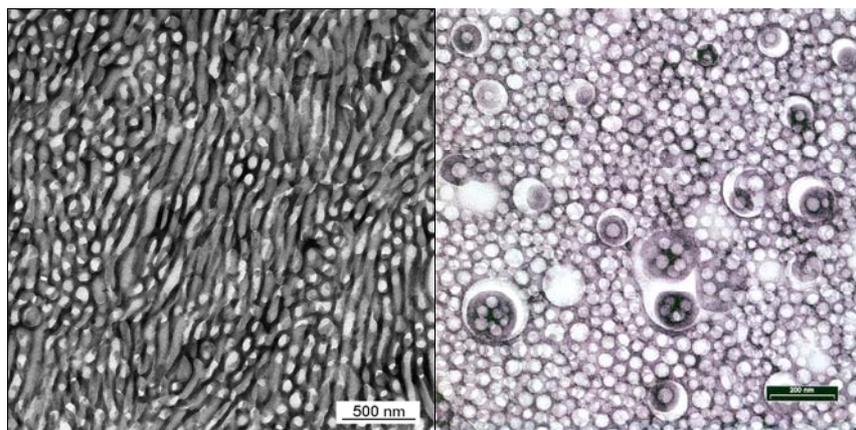
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In the past 15 years, scientists have learned to develop and use appropriate liquid crystalline phases of surfactant/hydropolymers and amphiphilic block copolymers (soft matter) as templates to generate inorganic films (hard matter) with controlled porosity on the nanometer scale. Such inorganic materials with nano-scale structural set-up and large specific surfaces had been not accessible before and may play important roles in sorption, catalysis, photoconversion, or piezo- and ferroelectric devices.

It will be shown that the techniques do not only produce materials, but are useful as an analytical tool to reveal finer structural details of the self assembly of surfactants, amphiphilic polymers and their lyotropic phases, and more complicated supramolecular self-organized phases in water. This includes previously unknown aspects of molecular behaviour, such as that fragile transition states and defect structures of self-assembly systems are caught by this nanocasting.

Many of those structures are aesthetically highly appealing, and the question “why” allows a discussion about the perception of beauty.



TEM –cuts of two mesoporous silicas obtained from block copolymer templates