

# SOFT CHEMISTRY BASED ROUTES TO NANOSTRUCTURED INORGANIC AND HYBRID O-I MATERIALS

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Hybrid nano-composites materials can be obtained either through hydrolysis and condensation reactions of functional metal alkoxides or chlorides or through the assembly of well defined nanobuilding blocks. The properties that can be expected for such materials of course depend on the chemical nature of their components but also on the extend and the nature of their interface. This interface can also be tuned with or without templates to built nano-structured hybrids or even nanostructured metallic oxides. The control of the surface properties of the inorganic nano-building bricks by using nucleophilic groups carried by texturing agents triggers the obtention of a given nano-phase. Considerable effort is being currently directed to the obtention of nanostructured oxides. The use of ordered lyotropic phases as templating agents (surfactants, organogels, bio-polymers), leading to a mesoscopically ordered hybrid precursor allow the obtention of long-range nanostructured hybrid or metal oxide phases shaped as bulks or films. Some examples concerning the design of inorganic and hybrid materials with mesoscopically ordered phases will be presented together with some of our results concerning materials having hierarchical structures. Hybrid Mesoporous sensors, photocatalysts and catalysts, and new mesoporous films made of nanocrystalline multimetallic metal oxides will be also described.

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