

Zeolites and mesoporous materials for energy-related applications

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The seminar will deal with the synthesis of different inorganic materials using sol-gel chemistry. A brief introduction of the sol-gel chemistry approach will be provided, together with a detailed explanation of the type of inorganic materials that can be synthesized, the most important methods employed in their characterization and also the wide range of applications that they cover nowadays.

Sol-gel chemistry is typically used in combination with molecular and supramolecular templates, especially surfactants, to produce a wide variety of porous metal oxides.¹ Both soft templates, such as surfactant and polymers and hard templates such as carbon and metal oxides and carbonates which can be burned-off or easily dissolved at a certain pH, have being extensively used to introduce controlled mesoporosity in a wide variety of solids.¹ This is a simple and versatile strategy able to produce very complex and interconnected porous structures.² Regarding the porous texture of these solids, they can be studied by a combination of different techniques such as, physical adsorption, mercury porosimetry, X-Ray diffraction or electronic microscopy, with each technique allowing the study of the porosity in a particular range.³ Finally, special attention will be paid to important applications of porous inorganic materials in the energy field which in the last years have become countless.⁴



Figura: The development of controlled mesoporosity unlocks new opportunities in energy technologies.

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