

Abstract of Presentation

Name:

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Presentation Title:

Advances in Magnetic Nanoparticles and Metal Clusters

Abstract :

Research in our laboratory is focussed on the following research lines:

1. Preparation of monodisperse magnetic nanoparticles (NPs). In our lab, a large number of soft-techniques are available to produce nanoparticles. An example is the microemulsion technique which is a powerful method to prepare simple metallic and oxide NPs, as well as, core-shell and “onion-like” NPs. Although microemulsions cannot be considered as real templates, they constitute an elegant technique, which can provide a very good control of the final particle size.
2. Synthesis and properties of metal clusters. Metal clusters are nowadays a very important topic due to their unusual properties, such as, fluorescence, catalytic, magnetic, etc. We are involved in the development of novel synthetic methods and the study of their electronic, optical and magnetic properties, including both collective and individual behaviours.
3. Novel nanomaterials for electrocatalysis. Novel materials, such as metal clusters and mixed-metal cluster and nanoparticles are being studied for their applications in the electrocatalysis of alcohol oxidation and oxygen reduction. This research involves also the use of such materials for bio-electrocatalytic applications.
4. Synthesis and properties of rare earth-based oxides. Our group has a long tradition in the synthesis and the study of properties of rare earth-based oxides, like spinels, perovskites, etc. Study of 1D, 2D and 3D transitions in different kind of compounds, (quantum phase transitions, Perierls and spin-Peierls transitions, Mott-Hubbart transitions, etc) is one of the major issues dealt with in our lab.