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Metal Oxide-Based Nanostructures for Energy and Environmental Applications

Abstract
The current trend in various energy applications, ranging from batteries to electrolizers, lays in the control of physicochemical and morphological properties of materials and their interfaces. Just to give some peculiar examples, due to their insulating nature (e.g. LiFePO4) or their dramatic volume changes (e.g. Si) many materials have been disregarded for decades in battery applications. Nowadays, through nanostructuring and surface coating, LiFePO4 and Si have become among the most promising materials for the next generation batteries that might power our cars. Nanostructuring gave also a new hope to technologies that were discarded such as Li-Air and Li-S. During this seminar, recent strategies for metal oxide synthesis and nanostructuring targeting energy and environmental applications will be discussed. We will see that nowadays colloidal chemistry allows a control in terms of composition, crystalline structure, morphology and nanostructuration that would have been unimaginable just 10 years ago.

Biography
Nicola Pinna studied physical chemistry at the Université Pierre et Marie Curie (Paris). He received his Ph.D. in 2001, and in 2002, he moved to the Fritz Haber Institute of the Max Planck Society (Berlin). In 2003, he joined the Max Planck Institute of Colloids and Interfaces (Potsdam). In 2005, he moved to the Martin Luther University, Halle-Wittenberg, as an Assistant Professor of Inorganic Chemistry. From March 2006 to June 2012 he was researcher at the Department of Chemistry and CICECO of the University of Aveiro and from September 2009 to June 2012 he was also Assistant Professor at the school of chemical and biological engineering Seoul National University in the framework of the world class university project founded by the National Research Foundation of Korea. In July 2012 he joined the Department of Chemistry of the Humboldt University in Berlin. In 2011 he was ranked among the top 100 materials scientists of the past decade by impact. His research activity is focused on the development of novel routes to nanostructured materials, their characterization, and the study of their physical properties.