

SEMINAR SERIES

HIGHLIGHTS IN ENERGY RESEARCH

26. 10. 2017, 10:30 - 11:30, ENERGYPOLIS Sion, 4th floor, Zeuzier room

Colloidal nanocrystals to store energy in chemical bonds

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Colloidal synthesis is a surfactant-assisted approach that has proven to be one of the most powerful solution-based method to tailor the size, the shape and the composition of nanocrystalline materials. This superior control afforded by colloidal chemistry, combined with the solution processability and the rich surface chemistry, provides access to atomically defined nanocrystals with an unprecedented tunability. The Laboratory of Nanochemistry for Energy at EPFL Valais develops synthetic route to colloidal nanocrystals and uses them as platforms to explore new concepts and to advance the knowledge in photo- and electro-catalysis. Our current focus is the conversion of water and CO₂ into useful chemical products. In this seminar, after a general introduction on colloidal chemistry, I will discuss our recent work on metal nanocrystals as electrocatalysts for CO₂ reduction and on quantum dots nanocomposites as light harvesting antennas.¹⁻³

1. C. Gadiyar, A. Loiudice, R. Buonsanti "Colloidal Nanocrystals for Photoelectrochemical and Photocatalytic Water Splitting" *J. Phys. D: Appl. Phys.* **2017**, 50, 074006.
2. A. Loiudice, P. Lobaccaro, E.A. Kamali, T. Thao, B.H. Hung, J.W. Ager, R. Buonsanti "Tailoring Cu nanocrystals towards C2 products in electrochemical CO₂ reduction" *Angew. Chem. Int. Ed.* **2016**, 55, 5789
3. A. Loiudice⁺, S. Saris⁺, E. Oveisi, D.T.L. Alexander, R. Buonsanti* "CsPbBr₃ QD/AlOx inorganic nanocomposites with exceptional stability in water, light and heat" *Angew. Chem. Int. Ed.* **2017**, 129, 10836.



CV: Prof. Raffaella Buonsanti

Raffaella Buonsanti is a tenure-track Assistant Professor in the Institute of Chemical Sciences and Engineering and head of the Laboratory of Nanochemistry for Energy at EPFL since November 2015.

She received her Master Degree in Chemistry from the University of Bari in 2006. In 2010, she graduated in Chemistry from the University of Salento working at the National Nanotechnology Laboratory (NNL, in Lecce-Italy). She continued her research as a postdoc at the Molecular Foundry, the Nanoscience Research Center at Lawrence Berkeley National Laboratory (LBNL). After two years as a postdoctoral researcher, she was promoted to Project Scientist in the Molecular Foundry. Then, from 2013 to 2015, she was a tenure-track staff scientist at LBNL where she started her own research program. At EPFL, Professor Buonsanti implements a highly interdisciplinary approach, spanning from Chemistry to Materials Science and Chemical Engineering, to address fundamental challenges in energy technologies. Through the core expertise in colloidal synthesis, her team develops novel approaches to complex materials to drive chemical transformations.