From nanoparticles synthesis in solution to functional devices – a perspective based on in situ synchrotron studies

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Over the past years we have developed various approaches to fabricate materials with sophisticated chemical and structural complexity. We have focused on synthesis in non-aqueous solution since this approach is not limited to one particular class of materials. Thus, it gives us flexibility to tailor the composition and properties of materials in respect to the application. In this talk, I will present how X-ray synchrotron methods, far from merely providing new tools, are extending the ways we study, understand and design such complex structures. Particularly, combination of spectroscopic and scattering methods and rapid data acquisition help to uncover the complex chemical world behind the synthesis of functional materials. It gives complementary information about chemical reaction in solution and nucleation, growth and crystal phase transition of nanoparticles.[1-2]

Moreover, I will discuss how the possibility to select with high-energy resolution the incident and emission X-ray energies offers unprecedented site selectivity and give access to determine structure – function relationship of electrochemical materials. [3,4,5]


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Prof. Dr. Dorota Koziej did her undergraduate work at the Silesian University of Technology, Poland. In 2006 she obtained a joint doctoral degree from the Eberhard-Karls University in Tübingen, Germany and Silesian University of Technology, Poland. She did her postdoctoral work at ETH Zürich (Prof. M. Niederberger) in Switzerland and Harvard University (Prof. D. Weitz) in the US. Since 08/2017 Dorota has been appointed W2 Professor for Experimental Physics, Institute for Nanostructure and Solid State Physics and Associate Professor in Physical Chemistry at the University of Hamburg. She is a nano-science and synchrotron methods enthusiast.