

## ***In situ* small angle X-ray scattering to reveal the formation of materials for nanoenergetics.**

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Simultaneous Small and Wide Angle X-ray Scattering (SWAXS) on both, bulk as well on surfaces, is used as standard tool for the structural characterization of materials used in nanoenergetics. Based on some exemplary investigations, this presentation should highlight the use and the information content obtained by using this method. The focus will lay on *in situ* experiments using synchrotron radiation, which reveals simultaneously the supramolecular and atomic structure of the investigated nanomaterials.

The presented topics will cover:

- (i) *in situ* characterization of mesoporous thin films, which find application as low dielectric material in the electronic industry or as photovoltaic materials used in a Grätzel cell [1]
- (ii) *in situ* grazing incidence study of the formation of Copper zinc tin sulfide ( $\text{Cu}_2\text{ZnSnS}_4$ , CZTS), which is very promising solar absorber material with a high optical absorption coefficient and an ideal band gap for photovoltaic applications. [2]
- (iii) *in situ*, real-time combined SWAXS investigation during the colloidal synthesis of zinc sulfide nanoparticles, which have potential applications in photonic crystals, photovoltaics and optoelectronic devices [3]

### **References**

- [1] Malfatti, L. *et al.* Mesostructured self-assembled titania films for photovoltaic applications. *Microporous Mesoporous Mater.* **88**, 304-311 (2006).
- [2] Fischereder, A. *et al.* Investigation of  $\text{Cu}_2\text{ZnSnS}_4$  formation from metal salts and thioacetamide. *Chem. Mater.* **22**, 3399-3406 (2010).
- [3] J. Novák, T. Rath, A. Pein, A. Fischereder, W. Haas, H. Amenitsch, F. Hofer, G. Trimmel, *in preparation*