

Invitation to the PhoenixD Colloquium

Monday, 11th January 2021, 10.00 – 12.00 via WebEx
<https://uni-hannover.webex.com/meet/plenum>

„Additive Manufacturing – Current Challenges related to Materials Engineering“

Uni.-Prof. Dr.-Ing. Thomas Niendorf

Institut für Werkstoffkunde, Universität Kassel

Even if additive manufacturing (AM) techniques are already widely used in numerous fields, many challenges still prevail. For reliable and safe application, it is very important to establish process-microstructure-property relationships for the materials processed. Thus, materials engineering is a key discipline for the future development of AM. Based on a review of results related to direct microstructure design and structural integrity of metallic alloys processed by several AM techniques, the present paper will introduce and discuss current limitations and future prospects of metal AM. The importance of material development for AM will be underlined and recent success stories will shed light on potential pathways towards novel alloys.

„Synthesis, Properties and Applications of Nanocrystals in Materials and Life Sciences“

Prof. Dr. Horst Weller

Institut für Physikalische Chemie, Universität Hamburg & Fraunhofer Zentrum für Angewandte Nanotechnologie

Although colloidal nanocrystals of many different materials can be synthesized in high quality in respect of size, shape and crystallinity, our understanding of their formation and the involved chemical reactions is still rather poor. We will present detailed studies on nucleation and growth as well as ion exchange processes in nanocrystals. These include mass spectrometric, optical, electron microscopic and x-ray synchrotron experiments.

Almost all applications of nanocrystals require the control of surface properties in respect of solubility, miscibility, biocompatibility, passivation of surface states as well as electronic and magnetic interaction with the environment. We will show various examples for ligand exchange and encapsulation of quantum dots, plasmonic and magnetic nanocrystals and will report on applications as high-performance ceramics, for display and lighting, electrocatalysis as well as for biolabeling and drug delivery.