Hamburg University of Technology (TUHH)
Institute of Thermal Separation Processes -V8-
Eissendorfer Str. 38, DE-21073 Hamburg

Please fill out the form with the corresponding data for your abstract and send it to: aerogelconference@tuhh.de

In the E-mail you may include other files (e.g. Word, PDF or images).

Abstract Formulary

Presentation type: **Oral** ✔ **Poster** ☐

Title: Universal and versatile polymer coating strategy to aerogelate various nanocrystal building blocks

Authors: Irene Morales, Franziska Lübkemann, Christoph Wesemann, Nadja C. Bigall

Presenting author: Irene Morales

Institution (Presenter): Institute of Physical Chemistry and Electrochemistry - Leibniz Universität Hannover

ABSTRACT (Space limited to 2200 characters)

Nanocrystal-based hydrogels and aerogels are self-supported, ultralight and porous 3D architectures made using inorganic nanoparticles as building blocks. Typically, the synthesis of high quality nanocrystals takes place in organic media, being necessary to perform a phase transfer to water to obtain the hydrogels thereof. This water transfer usually involves the exchange of ligands, which can lead to changes in the nanoparticle surface and therefore to modifications in the nanoscopic properties of the initial nanocrystals, and the procedure to do that differs from one nanocrystal system to another.

With the aim to find a universal gelation procedure and to avoid the ligand exchange, in this work we use a versatile amphiphilic polymer coating strategy to hydrogelate and aerogelate semiconducting, plasmonic and magnetic nanoparticles with different sizes and shapes. The hydrophilic backbone of the polymer provides solubility in aqueous media while the hidrophobic side chains intercalate in between the nanocrystal ligands. After that, to cause the destabilization and subsequent gelation of the colloidal polymer coated nanocrystals, divalent cations are used to facilitate the crosslinking. We show that, by using this approach, it is possible to obtain highly porous hydrogels and aerogels which preserve the properties of their building blocks. As the polymer coating is performed before the gelation, this pathway is applicable for a myriad of nanocrystals. Moreover, the polymer used is highly tunable, being able to further functionalize it with different molecules, for example, for sensing applications.