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: Metal Aerogels and their Applications

Authors: Alexander Eychmüller

Presenting author: Alexander Eychmüller

Institution (Presenter): TU Dresden, Physical Chemistry

ABSTRACT (Space limited to 2200 characters)

The focus of my presentation will be laid on gels and aerogels manufactured from a variety of different metal nanoparticles. These “New inorganic aerogels”[1] carry an enormous potential for applications. This is largely related to their extremely low density and high porosity providing access to the capacious inner surface of the interconnected nanoobjects they consist of.
This will be exemplified with electrocatalytic applications of metal aerogels. An example is the recently developed facile strategy for the controllable synthesis of nanoparticle-based bimetallic Pt-Ni aerogels with high surface area and large porosity, which act as highly active and stable catalysts for the Oxygen Reduction Reaction in Polymer Electrolyte Fuel Cell cathodes.[2] For gaining highest performance of these catalysts the surface chemistry[3] as well as the formation mechanisms have to be studied and tuned.[4]
I will conclude my presentation with remarks on a set of very recent findings such as self-healing of metal gels and the formation of 2D-metal meshes.[5] The latter display ligament sizes of 4 - 9 nm which is also the thickness of the meshes, surface coverages between 0.25 and 0.5, and fractal dimensions of 1.4 - 1.7. Those structures hold promise in various fields like sensors, electrodes, electrocatalysis, neural implants (stretchable electrodes), and fractal antennas.

References

1- Ziegler C, Wolf A, Liu W, Herrmann A-K, Gaponik N, Eychmüller A (2017) Angew. Chem. Int. Ed. 56: 9745-9755

2- Henning S, Ishikawa H, Kühn L, Herranz J, Müller E, Eychmüller A, Schmidt TJ (2017) Angew. Chem. Int. Ed. 56: 10707-10710

3- Fan X, Zerebecki S, Du R, Hübner R, Marzum G, Jiang, G, Hu Y, Barcikowki S.,Reichenberger S, Eychmüller A (2020) Angew. Chem. Int. Ed. 59: 5706-5711

4- Du R, Wang J, Wang Y, Hübner R, Fan X, Senkovska I, Hu Y, Kaskel S, Eychmüller A (2020) Nat. Comm. 11: 1590

5- Hiekel K, Jungblut S, Georgi M, Eychmüller A (2020) Angew. Chem. Int. Ed. 59: 12148-12154