



2020 HGF – OCPC – Programme

for the involvement of postdocs in bilateral collaboration projects

Title of the project:

Synthesis and Characterization of Porous mesomorphic organosilica- PMOs

Helmholtz Centre, division/group:

Deutsches Elektronen-Synchrotron DESY

Project leader:

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Description of the project (max. 1 page):

Synthesis and Characterization of Porous mesomorphic organosilica- PMOs

PMOs and derivatives are promising materials for gas or liquid separation and/or storage[1]. Due to the wide range of synthesis possible, the pursue of the highest efficiency for such uses is still ongoing. In this project we intend to verify the effect on the structure evolution of NaY, an aluminosilicate sol with a composition of $a\text{Na}_2\text{O}-b\text{Al}_2\text{O}_3-\text{SiO}_2-\text{cH}_2\text{O}$, with three sols impregnated with dimethylhexadecyl[3-(trimethoxysilyl)propyl] ammonium chloride (TPHAC) into the aluminosilicate using different $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratios in the formation of the zeolite sol

We shall study these materials using FT-IR, XRD, SEM, TEM and synchrotron radiation small-and-wide angle X-ray scattering (SAXS-WAXS). With this combination of analytical methods we hope to get insight into the mechanism of the nucleation process, the final particle size and shape, the pore diameter and the overall crystallographic structure and lattice size of the crystals formed. Additionally we want see the effects on the time necessary for the chemical reaction to take place.

Upon the results obtained we shall proceed with the project to investigate the formation of PMOs using nonionic surfactants with long polar head groups. We can expect a longer leg time for the formation of the zeolite, however with significant smaller dispersity for the pore size.

[1]. V. Rebbin, A. Rothkirch, N. Ohta, T. Hikima, S. S. Funari, *Langmuir* 2014, **30**, 1900–1905.



Description of existing or sought Chinese collaboration partner institute (max. half page):

Required qualification of the post-doc:

- PhD in Physics or Chemistry
- Experience with X-rays and simple chemistry laboratory procedures
- Additional skills in basic software programming, able to work with SAXS, FTIR and ability to both work independently and interacting constructively in a group
- Language requirement: Good English read and writing is essential