Contribution ID: **217** Type: **Talk (17 + 3 min)**

Transport properties of H2 confined in carbide-derived carbons with different pore shapes and sizes

Thursday, 23 March 2023 12:10 (20 minutes)

Carbide-derived carbons (CDC) are porous carbon materials with widely different properties like pore size distribution or graphitization [1]. In this study, quasi-elastic neutron scattering method was used to investigate the hydrogen diffusion in the well-defined pores of three distinct CDC materials [2]. Namely, the predominant shape of pores of the studied CDCs had been shown to be different as well as the respective pore size distributions [2]. Two of the studied materials were mostly microporous, while the third mostly mesoporous. Using a combined approach of gas adsorption methods and in-situ quasi-elastic neutron scattering, some interesting insights were gained on the relation of local adsorbent structure and the molecular behaviour of confined hydrogen. It was shown that sub-nanometer pores of spherical and cylindrical shape strongly limit the diffusion of H_2. However, a much weaker adsorption was seen in mainly mesoporous CDC, resulting in higher H_2 mobility in that adsorbent. This demonstrates, that tailoring the pore structure of carbon materials can have a large effect on their H_2 storage capability.
Refs.
[1] Härmas, R.; Palm, R. et al. Carbon 2019, 155, 122–128, doi:10.1016/j.carbon.2019.08.041.
[2] Härmas, R.; Palm, R.; et al. C 2021, 7, 29, doi:10.3390/c7010029.
[3] Kurig, H.; Russina, et al. Carbon 2016, 100, 617–624, doi:10.1016/j.carbon.2016.01.061.

Primary authors: HÄRMAS, Riinu (University of Tartu); Dr PALM, Rasmus (University of Tartu)

Co-authors: Dr RUSSINA, Margarita (Helmholtz Zentrum Berlin); Dr KURIG, Heisi; Dr GRZIMEK, Veronika (Helmholtz Zentrum Berlin); Dr HÄRK, Eneli (Helmholtz Zentrum Berlin); Ms KOPPEL, Miriam (University of Tartu); Dr TALLO, Indrek; Dr PAALO, Maarja (University of Tartu); Dr OLL, Ove (University of Tartu); Dr EMBS, Jan (Paul Scherrer Institute); Prof. LUST, Enn (University of Tartu)

Presenter: HÄRMAS, Riinu (University of Tartu)

Session Classification: Structure & Dynamics

Track Classification: Chemistry of Materials (Structure and Spectroscopy)