The Warsaw Doctoral School in Natural and Biomedical Sciences and the Institute of High Pressure Physics PAS cordially invites you to a **SPOTLIGHT TALK**

Chemical Vapor Synthesis of Nanocrystalline Oxides for Heterogeneous Catalysis

(2nd lecture)

given by

Prof. Markus Winterer

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on 5th April 2024, 10:00

at the IHPP PAS New Technologies Building, Al. Prymasa Tysiąclecia 98
Duration: 60 min + more

and online via Zoom:
https://us02web.zoom.us/j/81198524559?pwd=NzlobVJUTTJ4WVgwdHhueFdwTHRvZz09

All Warsaw-4-Phd students (and others) are very welcome!

Abstract of the talk:

Heterogenous catalysis is probably the application of nanoscaled materials with the highest economic impact and instrumental in the solution of the energy and climate challenge. Oxides, especially complex oxides, are interesting functional materials for heterogenous catalysis. The property 'catalytic activity' is depending on certain particle characteristics (structural features such as primary particle size, fractal dimension, morphology, type and degree of agglomeration) which are directly measurable without additional processing steps.

In this presentation we will show how chemical vapor synthesis (CVS) can be used to generate nanocrystalline oxide particles including complex oxides and how we can control and determine the particle characteristics relevant for heterogenous catalysis [1]. Photocatalytic water splitting using TiO_2 and Ga_2O_3 [2] and thermal oxidation of organic molecules by spinels and perovskites [3, 4] are used as examples.

[1] M. Winterer, *Discovering paths to optimized nanoparticle characteristics*, Chem. Eng. Sci. **186** (2018) 135-141

[2] S. Lukic, J. Menze, P. Weide, G. W. Busser, M. Winterer, and M. Muhler, *Decoupling the Effects of High Crystallinity and Surface Area on the Photocatalytic Overall Water Splitting over ß-Ga_2O_3 nanoparticles by Chemical Vapor Synthesis*, ChemSusChem **10** (2017) 4190 – 4197

[3] J. Geiss, T. Falk, S. Ognjanovic, S. Anke, B. Peng, M. Muhler, and M. Winterer, *Atom Pair Frequencies as a Quantitative Structure–Activity Relationship for Catalytic 2-Propanol Oxidation over Nanocrystalline Cobalt–Iron–Spinel*, J. Phys. Chem. C **126** (2022) 10346−10358

[4] J. Geiss, J., Bueker, J., Schulte, J., Peng, B., Muhler, M., Winterer, M., *$LaCo_{1-x}Fe_xO_3$ Nanoparticles in Cyclohexene Oxidation*, J. Phys. Chem. C **127** (2023) 5029–5038