

PhD course Prof. Jan-Dierk Grunwaldt (6-16 June, 2022)

Title: Heterogeneous catalysis in environmental and energy related catalysis: From basic to advanced characterization using synchrotron radiation

Abstract:

Heterogeneous catalysts are widely applied both in environmental and sustainable chemistry. For reducing CO₂-emissions we have to produce chemicals in future from biomass or/and from solar/wind energy. Many routes already exist, but the feedstock is different. Hence, new catalytic processes are to be developed – many of the processes involving heterogeneous catalysts. For a rational design of such catalytic materials a detailed understanding is required on all length scales. Nowadays a broad toolbox of characterization methods exists. However, this is not sufficient: We also need to understand in detail how the structure of the materials is under working conditions. Thereby especially X-ray based methods have found strong attention and advanced operando tools are presently developed at the synchrotron.

Contents workshop:

The course gives a view on this timely topic and structures as follows:

1. Role of heterogeneous catalysis in environmental and sustainable chemistry
2. Future view on the feedstocks available for the chemical industry
3. Rational design of catalysts: theory, synthesis understanding
4. Characterization toolbox and X-ray absorption spectroscopy as unique tool at synchrotron radiation sources
5. Operando spectroscopy of catalysts in emission control, CO₂-hydrogenation and electrocatalysis
6. Advanced spectroscopic tools at synchrotron radiation sources

Time schedule:**Course**

Monday 6. June, 2022	14.30-17.00	Aula F
Tuesday 14. June, 2022	14.30- 16.30	Aula D
Thursday 16. June 2022	09.00-11.30	Aula N

Discussion with PhD students

Friday 17. June 2022	14.00-17.00	Aula P
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