

As one of the largest employers in Tyrol the University of Innsbruck offers a diverse and exciting field of activity for employees with various educational and occupational backgrounds. The University of Innsbruck welcomes personnel diversity and is committed to the principle of equal opportunity.

The Nanostructured Model Catalyst group at the Institute of Physical Chemistry offers up to three

PhD position (20 h/ week)

employments for the planned duration of 3 years within a current FWF (Austrian Science Foundation) project “Optimization of Carbon Chemistry in the Dry Reforming of Methane”. Positions are to be filled anytime.

Responsibilities

- **Preparation and characterization of bulk intermetallic compounds on Ni- and Pd-basis**
- **Design and conduction of experiments in methane dry reforming to unravel the role of reactive carbon**
- **Use of a wide portfolio of ex situ and in situ structural and spectroscopic characterization techniques at the Institute of Physical Chemistry and at cooperation partners (in situ Electron Microscopy and in situ Raman Spectroscopy @ FZ Jülich and in situ X-ray diffraction at Petra III and the Advanced Light Source synchrotron facilities) in the framework of short-term scientific missions**
- **Potential supervision of Bachelor and Master students**
- **Manuscript drafting and presentation of results at scientific conferences and meetings**
- **We expect contribution to teaching (assistance in physico-chemical lab courses and/or lectures)**

Required qualifications

- **Finished master degree in Physical or Inorganic Chemistry, Materials Science, Mineralogy, Chemical Engineering or Physics**
- **Knowledge of catalytic processes and a basic understanding of common characterization techniques (e.g., X-ray diffraction or X-ray photoelectron spectroscopy...) is appreciated**
- **Autonomous and responsible work practice, high motivation**
- **Ability to work in a team**
- **Advanced skills in written/spoken English**

Job Profile

The PhD positions focus on the synthesis, characterization and catalytic performance testing of promising intermetallic compound materials on Ni- and Pd-basis and is connected to the in situ/operando experimental assessment and fundamental understanding of reactive carbon intermediates in different branches of the methane dry reforming network. In depth understanding of carbon reactivity and coke suppression will enable you a focused, knowledge-based design of methane dry reforming catalysts with long-term stable activity and thermochemical stability.

The central focus of the project is the direct correlation of the in situ/ operando determined reactivity of different carbon species with catalytic methane dry reforming activity. By exploiting the controlled in situ decomposition of selected intermetallic compounds towards active metal-oxide interfaces, you will be able to quantify the reactivity of carbon bound in variable oxidation states between carbides and oxy-carbonates, including the suppression and re-mobilization of coke. The influence of material-specific redox chemistry, involving the elementary carbon-forming and -converting reactions within the dry reforming network, will be scrutinized.

To accomplish these tasks, you will rely on an exclusive portfolio of in situ and operando characterization methods capable of operation under close-to-technological conditions. This includes in situ/operando structural (X-ray diffraction, electron microscopy, Raman spectroscopy) and surface chemical characterization (X-ray photoelectron spectroscopy and FT-Infrared Spectroscopy), as well as integral quantification of carbon (thermo-gravimetry). You will complement this characterization with kinetic reactor studies of important reactions within the dry reforming network and with theoretical assessment of the observed carbon reactivity trends.

The description associated with this job duty and requirements can be found at: www.uibk.ac.at/universitaet/profile-wiss-personal/drittmittelangestellte

Salary

The minimum gross salary (stipulated by Collective Agreement) for this position is € 1569 per month (14 times). Depending on the level of involvement in teaching, this salary can be upgraded.

Application

If you are interested, please send your application to simon.penner@uibk.ac.at