

HELMHOLTZ RESEARCH FOR
GRAND CHALLENGES

Position Profile for Chinese Applicants running for 2019 Helmholtz – OCPC – Program

PART A (Info about the Position)

Title of the project:

In situ transmission electron microscopy of metal-support interactions in nanoscale catalyst particles

Helmholtz Centre and institute:

Forschungszentrum Jülich
Ernst Ruska-Centre for Microscopy and Spectroscopy with Electrons

Project leader:

Prof. Dr. Rafal E. Dunin-Borkowski

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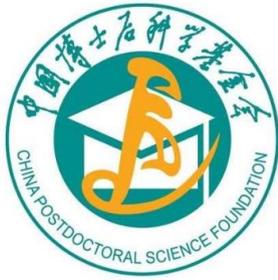
Web-address:

www.er-c.org, <http://www.fz-juelich.de/er-c/EN/>

Description of the project (max. half page):

Charge transfer between supported metallic nanoparticles and their underlying supports are known to strongly influence catalytic behavior through 'metal-support interaction' effects. During this project, *in situ* measurements of crystal structure, electronic structure and charge transfer between nanoparticles and supports will be performed as a function of specimen temperature using a wide range of advanced transmission electron microscopy techniques, including aberration corrected imaging, electron tomography and off-axis electron holography, both in high vacuum and in the presence of reactive gases. There will be a primary focus on studies of metallic nanoparticles on TiO₂ and CeO₂ supports. The project will involve the development of techniques for charge density measurement from electron optical phase images recorded using electron holography. Strategies for mitigating the effects of electron-beam-induced charging during the experiments will also be addressed. The results will provide new insight into the design and synthesis of catalyst materials.

Required qualification of the post-doc:



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- PhD in materials science, physics, chemistry or a related discipline
- Experience with advanced transmission electron microscopy
- Additional skills in electromagnetism or catalysis