



PhD Program between the Freie Universität Berlin (FUB) and the China Scholarship Council (CSC)

**Open PhD Position at Freie Universität Berlin,
offered only to Chinese CSC scholarship candidates 2025**

Department/Institute: | Dept. of Physics |

Subject area: | Renewable fuels |

Name of Supervisor: | Holger Dau (FUB) & Marcel Risch (HZB) |

Number of open PhD positions: | 1-fulltime |

Type of the PhD Study: | Full-time |

Project title: | Operando Spectroscopy for Renewable Fuels |

PhD Project description:

The sustainable production of non-fossil fuels is of high importance in the worldwide endeavor to limit global climate change. Here we focus on increased energetic efficiency of the electrically driven splitting of water into electrons, protons and O₂ (oxygen evolution reaction, OER), which is essential in any technically attractive scheme for renewable fuel production. We approach knowledge-guided optimization of OER electrocatalyst materials by state-of-the-art operando spectroscopy. Electrocatalytic operation of the material is combined with simultaneous X-ray absorption spectroscopy (XAS), which provides insight into decisive structures and processes at the atomic level.

The project is well suited for students who want to enter the rapidly expanding field of sustainable fuel production with a focus on state-of-the-art electrocatalytic operando spectroscopy (rather than material synthesis). Risch et al recently identified time-resolved experiments as a key endeavor of the field ([doi: 10.1002/anie.202211949](https://doi.org/10.1002/anie.202211949)). In this project, you explore new protocols for time-resolved experiments and apply these to catalyst materials of high interest. You will work in the laboratories of ERC grant recipient Dr. Marcel Risch at the Helmholtz Zentrum Berlin with XAS experiments the Berlin synchrotron radiation source (BESSY II), co-supervised by Holger Dau at the Physics Department of the FU Berlin. (See Google Scholar for an overview of the research activities of [Marcel Risch](#) and [Holger Dau](#).)

Language requirements:

- ENGLISH - IELTS: 6,5 oder TOEFL: 95 ibt

Academic requirements:

Research experience in spectroscopy, electrocatalysis or synchrotron experiments is favorable. A master's degree in physics, physical or inorganic chemistry, material science, or a related study program is required.

Information of the professor or research group leader (website, awards etc.):

Dr. Marcel Risch

Electrocatalysis of oxygen by earth-abundant oxides

<https://scholar.google.com/citations?user=GiYeBaAAAAAJ&hl=en>

Awards: Fellow Young Academy of Europe, ERC Starting Grant, Hans-Jürgen Engell Prize (ISE)

Prof. Holger Dau

Interdisciplinary investigation of OER and the CO₂ reduction reaction, in biological and inorganic systems.

<https://scholar.google.com/citations?user=3PIQMO4AAAAJ&hl=en>

Selected engagements: Principal investigator in Cluster of Excellence "UniSysCat"; working group of German Academies of Sciences on Artificial Photosynthesis:

<https://en.acatech.de/publication/artificial-photosynthesis-state-of-research-scientific-technological-challenges-and-perspectives/>

Please note:

In a first step, the complete application should be uploaded to the online portal (<https://fuberlin.moveon4.de/form/60acfece5d328710e40bdbd5/eng>) for evaluation by January 15th, 2025.