

Helmholtz Call for Chinese Applicants Interested in Running for CSC 2021 Fellowship

- Helmholtz Centre:** Forschungszentrum Jülich GmbH – www.fz-juelich.de
- Department/Institute:** Institute of Energy and Climate Research, Photovoltaics (IEK-5)
https://fz-juelich.de/iek/iek-5/EN/Home/home_node.html
- Supervising scientist:** Prof. Dr. Uwe Rau/Dr. Kaining Ding
- University for registration or for a future degree:** RWTH Aachen
- Research Field:** Photovoltaic
- Position open for:** **PhD Student x** **Sandwich PhD Student** □
- Title of the research:** Doped Zinc oxides fabricated by PECVD and their stability in the application of silicon heterojunction solar cells

More description of research topic:

Transparent conductive oxide (TCO) layers are placed on the both sides of silicon heterojunction (SHJ) solar cells and have important functions of lateral conduction, contact formation, anti-reflection and back reflection. Currently, the most often used TCO is sputtered Tin-doped Indium oxide (ITO). This project deals with developing plasma enhanced chemical deposition (PECVD) process for indium-free Al or B-doped Zinc oxide (AZO or BZO) as a substitute of sputtered ITO in SHJ solar cells, in order to eliminate the indium concern and possible sputter damage. Different combination of gas precursors will be tested, optoelectronic quality of deposited films will be characterized. In addition, when applied on SHJ solar cells, their stability will be revealed compared with other sputtered TCOs, such as AZO, ITO and Titanium-doped Indium oxide (ITiO). In particular, the evolution of TCO film quality, solar cell and module performance after damp heat and potential induced degradation experiments will be systematically investigated. Development of new methods such as applying transparent capping layers on the top of TCOs to improve cell stability might be needed in this respect. A successful PhD thesis will be defended at RWTH Aachen.

Specific requirements:

- Excellent knowledge in electrical and optical phenomena in semiconductors.
- Laboratory experience on vapor deposition or sputter techniques.
- Experience with fabrication and/or characterization of Si wafer-based PV.
- Knowhow in silicon heterojunction solar cell preferred.
- Very good English skills.

Working Place: Forschungszentrum Jülich, Germany (near Cologne)

Earliest Start: September 2021

Language Requirement: Very good knowledge of English language, written and spoken. German language courses are organised in the context of our in-house training program and are free of charge.

Name and Address of the Supervisor: Prof. Dr. Uwe Rau, Research Centre Jülich, Institute of Energy and Climate Research (IEK-5), 52425 Jülich, Germany;
u.rau@fz-juelich.de