Open position for LMU-CSC scholarship candidates 2027

Department/Institute: Department of Chemistry, Physical Chemistry (Faculty of Chemistry and Pharmacy)

Subject area: Physical Chemistry / Materials Chemistry – metal halide perovskite semiconductors

Name of supervisor: Dr. Erkan Aydin

Number of open position: 1

Project title: Photostability and halide segregation in wide-bandgap mixed-halide perovskites (>1.68 eV)

Project description:

Mixed iodide–bromide perovskites allow the bandgap to be tuned continuously above 1.68 eV. Under illumination, however, many of these compositions are not stable: the halides demix into iodide-rich and bromide-rich domains, which lowers the effective bandgap and increases non-radiative losses. Despite intense research, the microscopic origin of this light-induced phase segregation, and why some compositions resist it while others do not, remains under debate.

This project addresses the underlying chemistry and physics. The doctoral researcher will prepare compositionally controlled thin films and systematically vary the A-site cation mixture, the halide ratio, lattice strain and surface/grain-boundary chemistry. Phase behaviour and ion migration will be followed with in situ photoluminescence, X-ray diffraction, UV-vis absorption and time-resolved spectroscopy, and correlated with defect densities and quasi-Fermi-level splitting.

Simple solar cells serve only as a test platform to verify how material-level findings translate into device-relevant parameters; the focus is on understanding, not on device optimization. The expected outcome is a set of design rules linking composition and microstructure to photostability in wide-bandgap perovskites.

Project time plan: Both models are possible.

- Full Doctoral Study-Model: 36 or 48 months
- Sandwich-Model: 12 or 24 months

Language requirements: English: IELTS Academic 6.5 (no module below 6.0) or TOEFL iBT 95. German is not required.

Academic requirements:

- Research-oriented Master's degree (completed or in progress) in chemistry, physics, materials science or a closely related field.
- Bachelor's and Master's degree with a score of 80 or above in the Chinese grading system.
- Solid background in physical chemistry, solid-state chemistry or semiconductor physics; hands-on experience with thin-film preparation or optical/structural characterization is an advantage.
- Curiosity about fundamental structure–property questions, careful experimental work, and the ability to work in an international team.
- Formal eligibility according to the LMU-CSC program (citizen of the PR of China, age limit 35 years).

Contact information of supervisor:

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To applicants:

➢**please attach resume and research motivation letter**