

PhD student – Tailored low-dimensional hybrid perovskites

Job description

Recently, hybrid organic-inorganic perovskites (HOIPs) have received significant research attention mainly because of their use as active layer in perovskite solar cells (PSC). HOIPs can be prepared spanning the whole range of dimensionalities: 3D, 2D, 1D and 0D. This results in a class of hybrid materials with highly tunable compositions, structures and properties. After the rise of the 3D HOIPs for use in PSCs, the lower-dimensional 2D hybrids are currently receiving increased attention. These 2D HOIPs consist of an organic layer, sandwiched between inorganic layers (templates), which relates to their generally enhanced material stability compared to the 3D HOIPs and on the other hand to their much higher degree of compositional flexibility. In order to establish structure-property relationships and improve solar cell devices, especially used as flexible thin films, we need to elucidate the exact structures of these 2D HOIPs. However, crystallization of these systems shows structural diversity, depending on the crystallization methods, thin film deposition techniques, solvents, etc. used. Therefore, it is within the ambition of this project to unravel all details of the crystallization process and enable a deep understanding of the fundamental triggers of the growth mechanism acting on the formation of these 2D HOIPs.

You will be involved in the development of HOIP thin film crystallization approaches, speciation by UV-Vis, XAS and EXAFS spectroscopy, as well as determination of the resulting HOIP structures by single-crystal X-ray diffraction (in-house and synchrotron).

The project is funded by the Research Foundation Flanders and is a collaboration between Ghent University (XStruct; prof. Kristof Van Hecke), UHasselt and UMONS.

<https://www.xstruct.ugent.be>

We can offer a funded PhD position for a period of four years in total, subject to meeting the requirements and deadlines set out by the supervisors and the doctoral school, with **expected starting date of 01/10/2023** or later if needed.

Profile of the candidate

- Master degree in Chemistry or Physics or Chemical Engineering or equivalent. For diplomas awarded outside the European Union, a certificate of equivalence (NARIC) must be submitted. The degree requirements need to be fulfilled at the start of your appointment.
- Background or prior experience with crystallization and (single-crystal) X-ray diffraction and absorption spectroscopy (XAS, EXAFS) is beneficial.
- Highly interested in academic research.
- Participation in extra trainings, schools,... is beneficial.
- Excellent (B2 level) communication skills in English (oral and written). A TOEFL-test (or alternative) is required, except for Flemish students or students with min. 60 ECTS credits of courses taught and examined in English.
- Ability to perform in-depth and critical data analysis.
- Willingness to work at interdisciplinary boundaries, in close collaboration with the other project members.

- Team player with a strong sense of autonomy and responsibility, able to commit to timing and milestones set forward in the research project.

How to apply

Please submit the following documents to Kristof.VanHecke@UGent.be **no later than June 30st 2023**:

- Motivation letter describing why you should be considered for this position
- Detailed CV, including transcripts of B.Sc. and M.Sc. courses and grades
- Master thesis
- Name and contact details of three relevant references (e.g. promoters or supervisors B.Sc. and/or M.Sc. trajectories), that can be contacted.

All documents should be in PDF format and written in English. Only short-listed applicants will be contacted for an interview.