Contribution ID: **95** Type: **not specified**

Synthesis, characterisation and application of neutral and ionic metal-organic frameworks

Metal-organic frameworks (MOFs) are modular porous materials synthesized from metal cluster nodes and organic linkers that connect these nodes. These materials have been an object of extensive study for the past two decades, since their ultrahigh porosity (up to 90% free volume) and enormous internal surface areas (extending beyond 6000 m^2/g) make them interesting for potential applications in clean energy, most significantly as storage media for gases such as hydrogen and carbon dioxide. Additional applications in thin-films devices, catalysis, and biomedical imaging are increasingly gaining importance owing to incorporation of new functionalities by varying both the organic and inorganic components of MOFs structures.

Two of the most important features of MOFs is the versatility and flexibility in their synthesis, enabling the creation of MOF-type materials incorporating multiple ligands. The synthesis of mixed ligand MOFs holds immense significance, particularly in the realm of heterogeneous catalysis. In our ongoing project, we have successfully developed around 20 novel 2D MOFs and 5 ionic MOFs (iMOFs), utilising trimesic acid and imidazole derivatives. However, the synthesis process requires further refinement, and the comprehensive characterization of these compounds remains a challenging task.

In this project, the students will help us to improve and/or scale the synthesis of both types of MOFs. Additionally, they will characterise the product of the synthesis by single crystal XRD, FTIR, and UV-vis. Finally, we will perform the ionic exchange in the iMOFs, using ionic drugs.

Group

FS-SCS

Project Category

A2. Molecular sciences

Special Qualifications

DESY Site

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