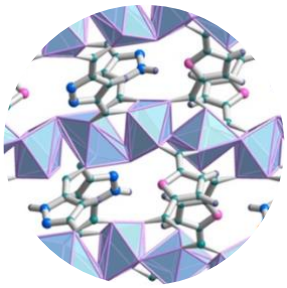
Master Thesis

On the

Impact of guest molecules in metal-organic frameworks for water harvesting applications

Project:

Climate change-induced draughts and floodings are an increasing problem worldwide. Metal-organic frameworks (MOFs) are a promising class of materials for harvesting large quantities of water from the atmosphere.[1,2] While the development of for water collection has been progressing rapidly, the design of analytical platforms for in situ and operando characterization is still in its early stages. Our lab recently introduced MOSAIC, a tool based on multimodal imaging and spectroscopy[3], for material characterization and live monitoring of guest molecules in individual particles. We are now using MOSAIC to study the sorption behavior of water and other molecules in space and time, and understand their uptake mechanism in particular towards atmospheric water harvesting.

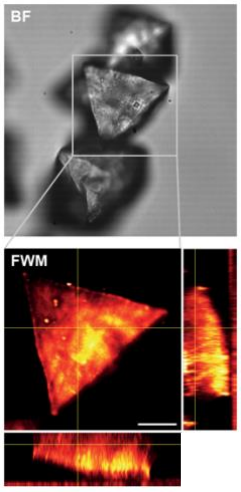


MOF-303

Qualification:

We are searching for candidates with:

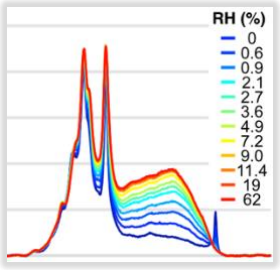
- *Background in inorganic / physical chemistry or physics*
- *Interest in optical spectroscopy techniques and imaging*
- *Prior experience in programming (Matlab / LabView) is an asset*



Bright-field and CARS image of MOF-801 crystals.

Our offer:

We offer a multi-disciplinary and collaborative environment for working with advanced imaging and spectroscopy on the next generation of MOFs. This is your opportunity to join our team in developing an automated gas exchange system to evaluate the in-situ sorption performance of novel AWH materials.



Water uptake

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Literature:

(1) *Fuchs et. al, Adv. Mater. 2022* (2) *Fuchs et al., JACS. 2023* (3) *Baumgartner et al., Adv. Mater. 2025*