ChemISTry Colloquia

Metal–Organic Materials: From MOPs to MOFs and Meltable Materials

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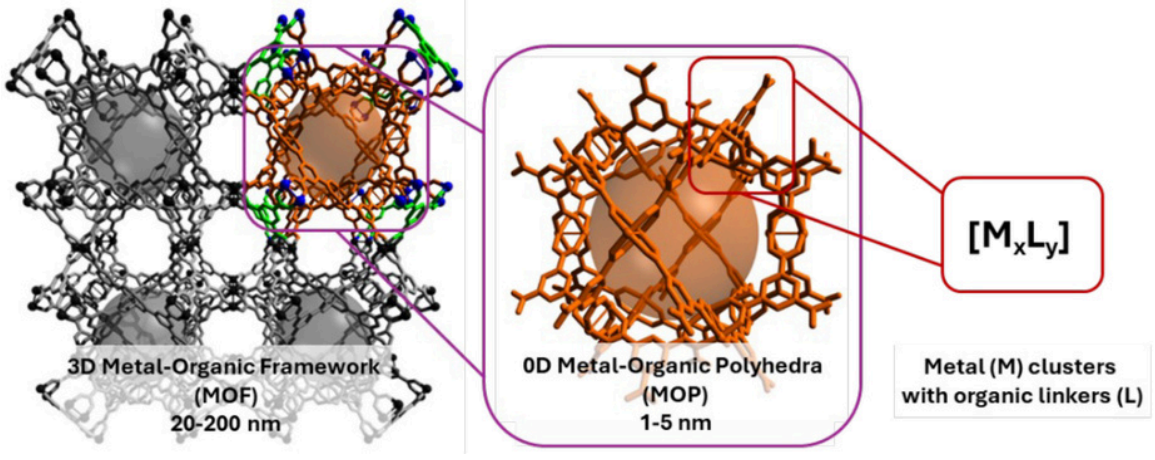
5 September 2024 Thursday **15:30**

Moonstone Room F

Metal–organic materials represent a cutting-edge category of functional materials wherein metal ions or clusters are intricately linked by organic ligands, creating a three-dimensional network structure. The ultimate strategy to shrink porous metal–organic materials down to the sub-5-nm scale is the isolation of single, zero-dimensional, discrete metal-organic polyhedra (MOP) units, which define the cavities in metal-organic frameworks (MOFs). These materials possess remarkable attributes such as a substantial surface area, customizable pore size and shape, and a diverse array of functional groups [1]. These qualities render them highly versatile across numerous applications, including gas storage and separation, (photo)catalysis, sensing, and drug delivery [2]. But, can we change the physical state of a metal-organic material retaining its porosity? Porous melts, porous liquids and porous glasses are all new and emerging classes of porous materials, which offer great opportunities due to their unique characteristics. Herein, a simple and straightforward way to produce a heteroleptic and heterometallic MOFs and MOPs as well as a new type of metal-organic material; a porous and meltable MOP will be presented [3].



[1] *Chem. Sci.* **2024**, *15*, 7992–7998; *Chem. Eur. J.* **2023**, *29*, e202301945.

[2] *ACS Appl. Mater. Interfaces* **2023**, *15*, 39523–39529; *Adv. Sci*. **2022**, *9*, 2104753.

[3] *J. Am. Chem. Soc.* **2024**, *11*, 7159–1764; *Chem. Commun.* **2023**, *59*, 3423–3426; *J. Am. Chem. Soc*. **2022**, *144*, 15745–15753.

Cornelia von Baeckmann is originally from Vienna, where she also conducted her chemistry studies. She performed her PhD investigations in the group of Prof. Kleitz in Vienna working on mesoporous silica nanoparticles including a research stay in the group of Prof. Lindén in Ulm (Germany). For the work presented in her PhD thesis she received three awards, including the Loschmidt Price in 2023. In 2021 she moved to Spain to the group of Prof. Maspoch as a postdoctoral researcher and received an Erwin-Schrödinger Fellowship by the Austrian Science Fund. She returned to Vienna in 2024 as an area leader within the group of Prof. Eder at TU Vienna focusing on the synthesis and reactivity of novel nano-sized molecular porous materials, including reticular materials (MOFs, COFs, and MOPs), delivery systems and phase-changing materials (i.e., porous liquids).