

The emergent relationship between solvent-free chemistry, crystal engineering and mineralogy

Tomislav Friščić, Igor Huskić

Department of Chemistry, McGill University, 801 Sherbrooke St. W. H3A 0B8 Montreal, Canada.
tomislav.friscic@mcgill.ca

The structural characterization and discovery of new minerals with metal-organic framework (MOF) structures (Fig. 1) has challenged the view of MOFs as purely synthetic materials.[1] Almost simultaneously, the increasing popularity of solvent-free synthetic techniques, including mechanochemistry and geochemically-inspired "accelerated aging"[2] has enabled a cleaner, more environmentally-friendly synthesis of MOFs from mineral-like feedstocks. These recent developments highlight the previously unknown relationships between geology and MOF chemistry.[3]

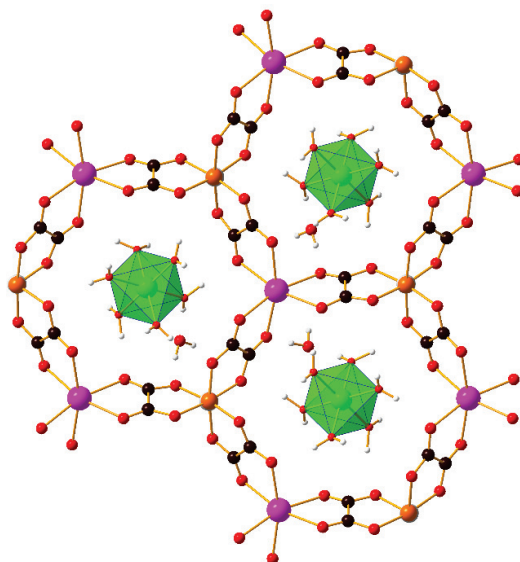


Fig. 1. Fragment of the structure of stepanovite, a naturally-occurring MOF mineral.[1]

This presentation will outline the selected examples of MOF structures found in minerals, noting their functional properties such as proton conductivity.[4] At the same time, we will also describe the emergent geologically-inspired approaches to MOF synthesis, as a means to highlight how the emergent application of geomimetic concepts in MOF chemistry can lead to advances in the design and synthesis of MOFs.

References

- [1] Huskić, I. *et al.* (2016) *Science Adv.*, **2**, e1600621
- [2] Mottillo, C. & Friščić, T. (2017) *Molecules*, **22**, 144.
- [3] Huskić, I. & Friščić, T. (2018) *Acta Crystallogr. B*, **74**, 539-559.
- [4] Huskić, I. *et al.* (2019) *Chem. Sci.*, doi:10.1039/C8SC05088K