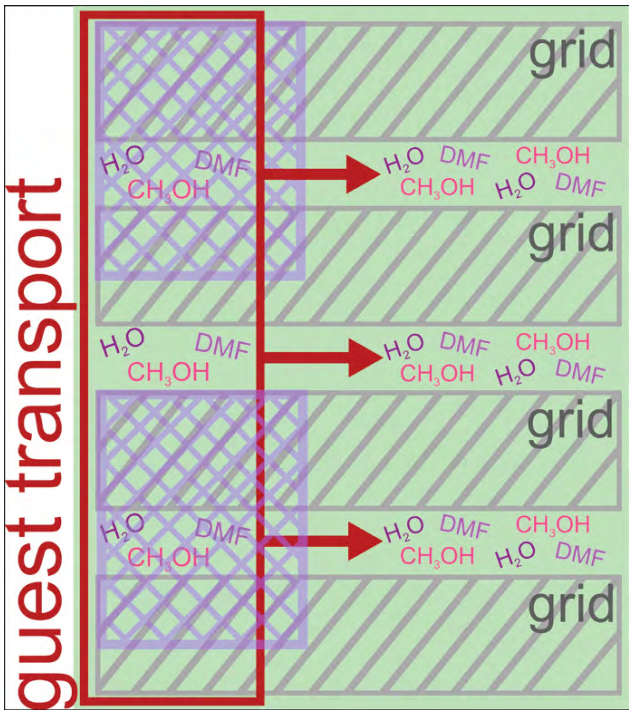

References:

[1] Cairns, A. B. & Goodwin, A. L. (2015). Phys. Chem. Chem. Phys. 17, 20449–20465.
[2] Coudert, F. X. (2015). Chem. Mater. 27, 1905–1916.
[3] Sobczak, S. & Katrusiak, A. (2018). Cryst. Growth Des. 18, 1082–1089.

Keywords: metal-organic framework, high-pressure, volume compression, amorphization

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A novel bismuth-containing metal-organic framework: the first example of a flexible bismuth MOF

Erik Svensson Grape[1], Hongyi Xu[1], Ocean Cheung[2], A. Ken Inge[1]

1. Department of Materials and Environmental Chemistry, Stockholm University, Stockholm, Sweden
2. Division for Nanotechnology and Functional Materials, Department of Engineering Sciences, The Ångström Laboratory, Uppsala University, Uppsala, Sweden

email: erik.grape@mmk.su.se

Despite the large number of published metal-organic frameworks (MOFs), only a handful of microporous structures which contain bismuth have been published so far [1, 2]. Unlike coordination polymers synthesized from other metal cations, bismuth cations have rather high coordination numbers and unusual coordination geometries, leading to highly unpredictable and unique structures. Additionally, bismuth is interesting for potential pharmaceutical applications as it has been shown to be biologically active and potentially a future aid in relieving problems with multi-resistant bacterial strains [3].

In order to achieve a better understanding of the chemistry of bismuth in inorganic-organic hybrid structures, four new bismuth-containing structures have been synthesized. The reagents used where bismuth and a tritopic organic linker. One of the acquired phases proved to be a porous metal-organic framework, which undergoes reversible structural changes upon activation of the framework, thus being the first example of a flexible bismuth MOF. The structures were solved using single crystal X-ray diffraction (SCXRD), X-ray powder diffraction (XRPD) and continuous rotation electron diffraction (ED). Continuous rotation ED may greatly aid in the characterization of microcrystalline materials, which are often acquired when synthesizing bismuth-containing compounds. The structural changes occurring have been inferred from Rietveld refinement against XRPD data and will be discussed extensively.

References:

[1] Feyand, M. et al. (2012). Angew. Chem. Int. Ed., 51, 10373-10376.
[2] Savage, M., et al. (2014). Chem. Eur. J., 20, 8024–8029.
[3] Wang, R. et al. (2018). Nat. Comm. 2018, 9, 439.

Keywords: metal-organic frameworks, Rietveld refinement, hydrothermal synthesis