

## Cu@COMOC-4, a bimetallic Metal-Organic Framework for the size selective epoxidation of cycloalkenes.

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A gallium 2,2'-bipyridine-5,5'-dicarboxylate, Ga(OH)(bpydc), denoted as COMOC-4 (COMOC = Center for Ordered Materials, Organometallics and Catalysis, Ghent University), has been synthesized *via* both solvothermal and microwave synthesis procedures. The bipyridine linkers of this open MOF with a MIL-253[1] topology are ideal anchors to graft metal complexes for advanced heterogeneous catalysis. In this work, we use CuCl<sub>2</sub> as a model system to create a size selective epoxidation catalyst. It will tether to the bipyridine linker as shown in Figure 1.

We use cyclohexene, cyclooctene and cyclododecene in the liquid phase as the substrates for the epoxidation and a pure copper bipyridine complex: CuCl<sub>2</sub>(L<sub>1</sub>) (L<sub>1</sub>= dimethyl [2,2'-bipyridine]-5,5'-dicarboxylate) as the benchmark homogeneous catalyst. As the mentioned alkenes have molecular dimensions of 5.0 Å, 5.7 Å and 7.6 Å respectively, the pore entrance of our MOF-system has a diameter of ~10.1 Å, diffusion limitations can result in a profound size selectivity. Details of the size selective epoxidation will be unraveled and we will moreover show that the catalyst is highly stable and recyclable.

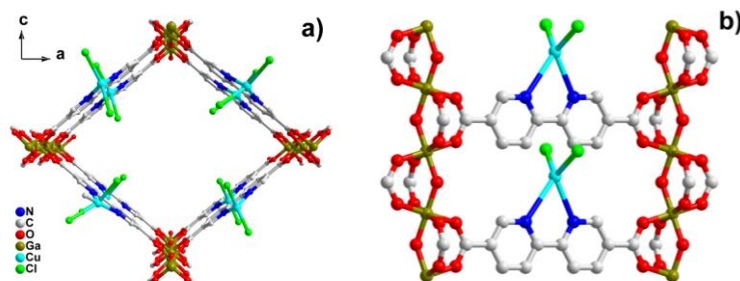


Figure 1. Representative structure CuCl<sub>2</sub> incorporated COMOC-4 framework; a) in view from *b* axis; b) the channel wall of connected {GaO<sub>6</sub>} chains, linked through the bpydc<sup>2-</sup> ligand with CuCl<sub>2</sub> at open N sites.

[1] Bloch, E. D.; Britt, D.; Lee, C.; Doonan, C. J.; Uribe-Romo, F. J.; Furukawa, H.; Long, J. R.; Yaghi, O. M. J. *Am. Chem. Soc.*, 132(2010), 14382.

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