

## MS31-P12 | DYNAMIC, BREATHING, WATER-STABLE, MIXED-LIGAND ZN(II) METAL-ORGANIC FRAMEWORKS WITH DIFFERING WATER AND VAPOUR SORPTION PROPERTIES

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Metal-organic frameworks (MOFs) consist of 1-periodic, 2-periodic or 3-periodic metal-organic coordination networks and have attracted widespread attention for their porosity and potential applications in separation chemistry, catalysis, molecular sensing and gas storage.[1] Firstly, we report a partially-fluorinated, 2-periodic MOF,  $[Zn(hfipbb)(bpt)]_n \cdot n(C_3H_7NO)_2 \cdot n(H_2O)$  where  $H_2hfipbb$  = 4,4'-(hexafluoroisopropylidene)bis(benzoic acid) and  $bpt$  = 4-amino-3,5-bis(4-pyridyl)-1,2,4-triazole. This framework undergoes single-crystal-to-single-crystal in solvent exchange with ethanol, dichloromethane and diacetamide, respectively. The solvent-induced 'breathing' of the 2-periodic frameworks results in potential void spaces varying from 15.2-35.4%. In addition, we report the synthesis of a pair of isorecticular mixed-ligand MOFs,  $[Zn(\mu_2-ia)(\mu_2-bpe)]_n \cdot nDMF$  and  $[Zn(\mu_2-mia)(\mu_2-bpe)]_n \cdot n(C_3H_7NO)$ , where  $ia$  = isophthalate,  $mia$  = 5-methoxyisophthalate and  $bpe$  = 1,2-bis(4-pyridyl)ethane. Both structures exhibit entanglement of a pair of neighbouring frameworks to form 2-periodic, 2D bilayers. Despite a lower void space, one of the activated MOFs exhibits significantly higher sorption of carbon dioxide at 195 K, illustrating that small changes in functional groups, even in structurally similar MOFs, may have a large effect on sorption properties.

[1] Zhou, H.; Long, J. R.; Yaghi, O. M. Introduction to Metal-Organic Frameworks. *Chem. Rev.* **2012**, *112*, 673-674.

[2] Chatterjee, N. and Oliver, C.L., *Cryst. Growth Des.* **2018**, *18*, 7570–7578.

[3] Gcwensa, N., Chatterjee, N., Oliver, C.L., *Inorg. Chem.* **2019**, *58*, 2080–2088.