# A Twist in the Tale: Characterising the Structural Response of MOFs to Adsorption

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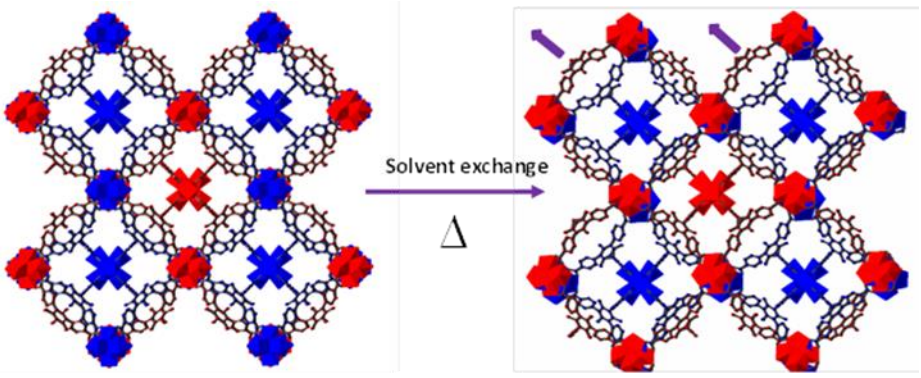
Our understanding of MOFs as porous crystalline materials is only complete when we include a description of their dynamic response to the uptake of molecules. This can best be achieved by adopting a multi-technique approach, where spectroscopies and modelling are performed to complement in situ diffraction studies. I will give examples of adsorption-related structural changes from work on our own phosphonate, imidazolate and carboxylate MOFs that vary from reconstructive phase transitions, through marked linker rotations and breathing phenomena to subtle tilts that give rise to cooperative adsorption, and which are observed over a wide pressure range.[1-3] I will also describe an example of the adsorption-induced relative movement of interpenetrated lattices for a novel zirconium MOF (see figure below), the structural characterisation of which highlights some topical challenges.[4] This structural adaptability of MOFs has important consequences for their applications, so I will show for our examples some of the potential implications of the structural changes.

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