

### Flexible Zeolites and MOFs as Adsorbents and Catalysts

Paul A. Wright\*

EaStCHEM School of Chemistry, University of St Andrews  
(paw2@st-andrews.ac.uk\*)

Metal organic frameworks exhibit strong dynamic and breathing effects and structural changes in response to changes in temperature, activation through solvent removal and as a response to adsorption. I will discuss the effect of such behaviour on adsorptive and catalytic properties of MOFs, via consideration of the structural effects we have observed by XRD and solid-state NMR spectroscopy. The structural effects we have observed in metal phosphonate and scandium carboxylate MOFs include linker reorientation and rotation; framework breathing and also solvent loss and ligand exchange at metal sites.<sup>1-4</sup> Aluminosilicate zeolites are more typically thought of as rigid structures, but they also exhibit important flexibility that influences their adsorption behaviour. Zeolite Rho and related structures reveal complex framework responses and cation gating that control adsorption uptake of CO<sub>2</sub> and CO<sub>2</sub>/hydrocarbon selectivity.<sup>5,6</sup> Cation gating (rather than molecular sieving) can be an important new way to introduce selectivity into important gas separations in zeolites.