

## **LIGHT RESPONSIVE MEMBRANES FOR GAS SEPARATION**

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Recent developments in the field of coordinated porous materials (including metal organic frameworks and zeolitic imidazolate frameworks) have demonstrated that it is possible to tailor CO<sub>2</sub> sorbents that respond dynamically to illumination with UV and/or broadband light, such that they cyclically adsorb and desorb CO<sub>2</sub> according to the illumination state. This has been achieved via several routes, including through the use of light-responsive ligands, light-responsive guest molecules located within the pores, and via adsorption of a light-responsive dye.

Since the use of these materials as light-responsive sorbents is challenging (due to engineering constraints in providing unhindered gas and light access to as much of the sorbent as possible), it is highly desirable to incorporate them into thin polymeric membranes to create mixed-matrix membranes with light responsive properties. This could lead to membranes with switchable separation characteristics, or other desirable properties such as some form of self-cleaning or self-regeneration after pore blocking.

This presentation will unveil the recent developments in our lab as we develop these novel mixed-matrix membrane materials, including an overview of the light-responsive porous materials we have synthesised and characterised, the design and performance of our newest illuminated test cells for both flat sheet and hollow-fibre membranes (using a unique in-situ LED lighting arrangement to provide maximum illumination and simplify gas sealing).