

*CO₂ release from metal-organic frameworks triggered by external stimuli*Haiqing Li¹, Matthew Hill¹¹Department Of Chemical Engineering, Monash University, Clayton, Australia

E-mail: haiqing.li@monash.edu

Metal-organic frameworks (MOFs) have been extensively explored for highly efficient post-combustion CO₂ capture due to their exceptionally high internal surface area and rich structural diversity. However, the significant energy penalty for the regeneration of MOF adsorbents greatly limits their widespread applications. Large quantities of electrical energy (as much as 40% of the plant's capacity) are required to deliver the pressure or temperature changes required for vacuum or temperature swing adsorption processes.

As a result, there has been a recent surge of high quality research to adapt MOFs to be responsive to external stimuli such that they expel the adsorbed molecules at low energy cost and high efficiency. In this regard, we have developed a set of stimuli-responsive MOFs which not only have excellent CO₂ uptake capacity, but the adsorbed CO₂ also can be effectively released triggered by the external stimuli such as light, magnetic field, and their combination, denoted as light-induction swing adsorption (LISA) [1], magnetic induction swing adsorption (MISA) [2], and their combination (MaLISA) [3], respectively.

[1] Li, H.; Hill, M. R.; Doblin, C.; Lim, S.; Hill, A. J.; Falcaro, P. (2016). *Adv. Funct. Mater.*, 26, 4815.

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[3] Li H.; Sadiq, M. M.; Suzuki, K.; Doblin, C.; Lim, S.; Falcaro, P.; Hill, A. J.; Hill, M. R. (2016). *J. Mater. Chem. A*, 4, 18757.



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