Scientific Achievement

A structure–activity relationship was elucidated for cooperative CO₂ adsorption in the metal–organic frameworks Mg₂(4,4′-dioxidobiphenyl-3,3′-dicarboxylate)(diamine)₂.

Significance and Impact

Cooperative adsorbents can be designed with properties precisely tailored to target CO₂ separations with partial pressures ranging from <1 mbar to >1 bar.

Research Details

– Nine diamine-appended frameworks were synthesized and characterized to determine the effect of the appended diamine on switch-like CO₂ adsorption.

– Structural nuances governing cooperativity were uncovered through in situ single-crystal X-ray diffraction.


Work was performed at UC Berkeley and the Advanced Light Source.