

Electronic Supporting Information for

Humidity-induced CO₂ capture enhancement in

Mg-CUK-1

Mónica Sagastuy-Breña,^{a†} Paulo G. M. Mileo,^{b†} Elí Sánchez-González,^a Joseph E. Reynolds III,^c Tamara Jurado-Vázquez,^a Jorge Balmaseda,^a Eduardo González-Zamora,^d Sabine Devautour-Vinot,^b Simon M. Humphrey,^{c,} Guillaume Maurin^{b,*} and Ilich A. Ibarra^{a,*}*

^aLaboratorio de Fisicoquímica y Reactividad de Superficies (LaFReS), Instituto de Investigaciones en Materiales, Universidad Nacional Autónoma de México, Circuito Exterior s/n, CU, Del. Coyoacán, 04510, Ciudad de México, Mexico.

^bInstitut Charles Gerhardt Montpellier, UMR-5253, Université de Montpellier, CNRS, ENSCM, Place E. Bataillon, 34095 Montpellier cedex 05, France.

^cDepartment of Chemistry, The University of Texas at Austin, Welch Hall 2.204, 105 East 24th St., Stop A5300, Austin, Texas 78712-1224, United States.

^dDepartamento de Química, Universidad Autónoma Metropolitana-Iztapalapa, San Rafael Atlixco 186, Col. Vicentina, Iztapalapa, C. P. 09340, Ciudad de México, Mexico.

[†]These authors contributed equally to this work.

1. Characterisation of Mg-CUK-1

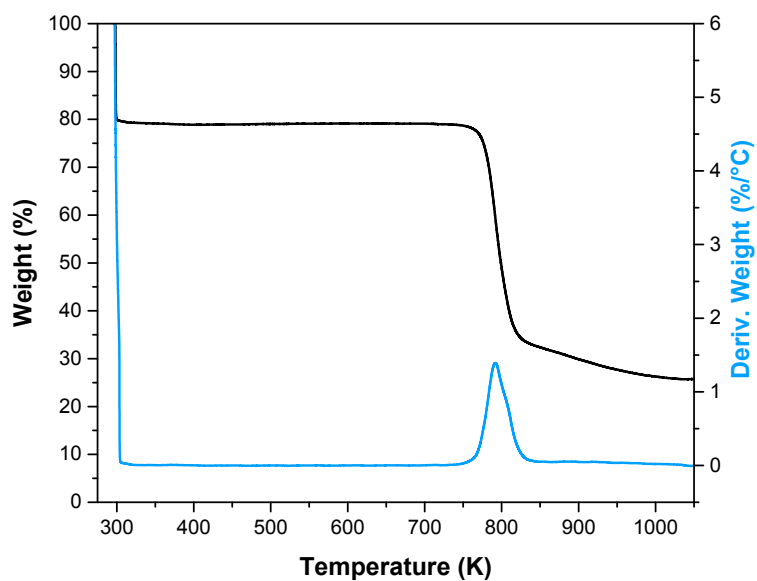


Fig. S1. Thermogravimetric analysis profile of Mg-CUK-1 as synthesised, under N₂ atmosphere.

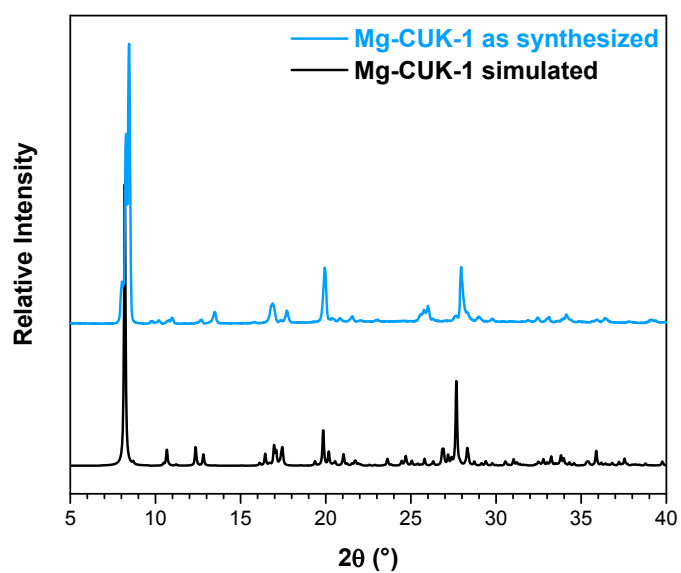


Fig. S2. PXRD pattern of Mg-CUK-1 as synthesised.

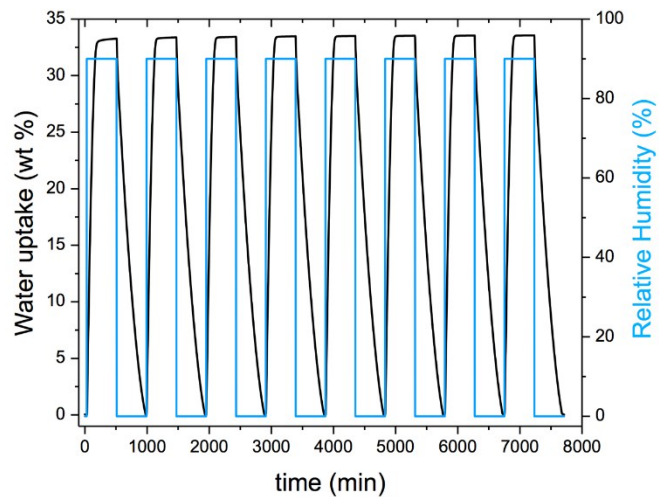


Fig. S3. Water adsorption-desorption stability of Mg-CUK-1 after 8 cycles performed from % P/P_0 0 to 90 at 303K.

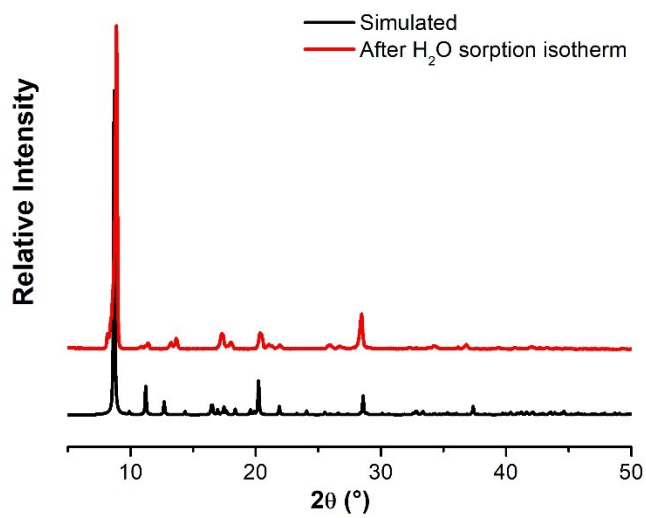


Fig. S4. PXRD pattern of Mg-CUK-1 after H₂O sorption isotherm.

2. Kinetic CO₂ uptake experiments of Mg-CUK-1 at different relative humidities

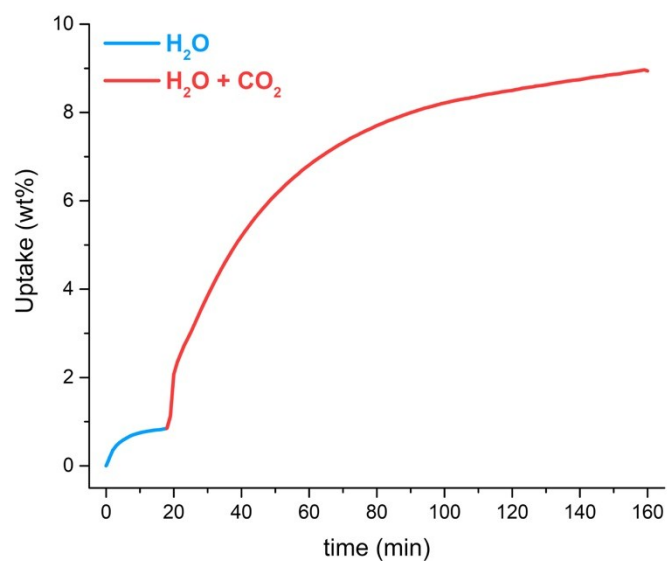


Fig. S5. Kinetic CO₂ uptake experiments carried out at 18 %RH at 303 K; H₂O (blue line) and H₂O+CO₂ (red line).

Table S1. H₂O+CO₂ capture cycling experiments on Mg-CUK-1. Activation (373 K for 1h and under a N₂ gas flow) of the same sample was performed before starting each cycle.

Cycle	H ₂ O+CO ₂ Uptake (wt%, kinetic experiments)
1	8.5
2	8.4
3	8.6
4	8.5
5	8.4