Effect of Metal-Ligand Ratio on the CO₂ Adsorption Properties of Cu-BTC Metal-Organic Frameworks

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Table S1. Textural properties of the Cu-BTC samples prepared in the presence of Mg salt.

Samples	Sbet (m²/g)	V _{total} (cm ³ /g)	V _{micro} (cm ³ /g)	Cu ²⁺ -BTC ratio
Cu-BTC	1415	0.66	0.61	1.81
Mg 20%- Cu-BTC	1480	0.70	0.65	1.45
Mg 40%- Cu-BTC	1549	0.73	0.69	1.09
Mg 60%- Cu-BTC	1426	0.66	0.63	0.72

S_{BET}: Specific surface area calculated by using the BET equation in the range of $P/P_0 = 0.05 \sim 0.2$; V_{total}: Total pore volume calculated based on the nitrogen adsorption amount at $P/P_0=0.99$; V_{micro}: Micropore volume calculated from the cumulative pore volume curve obtained by the 2D-NLDFT method up to pore width of 2 nm.

Sampler	CO ₂ uptake at 0°C	CO ₂ uptake at 25°C
Samples	(mmol/g)	(mmol/g)
Cu-BTC	8.59	4.74
Mg 20%- Cu-BTC	8.75	4.85
Mg 40%- Cu-BTC	9.31	5.15
Mg 60%- Cu-BTC	8.70	4.80

Table S2. CO₂ adsorption uptakes at 1 bar for the Cu-BTC samples prepared in the presence of Mg salt.

Table S3. CO₂/N₂ selectivity for Cu-BTC and Cu-BTC (60%) at 0°C.

Samples	CO ₂ /N ₂ selectivity	
Cu-BTC	23.4	
Cu-BTC (60%)	26.4	



Figure S1.XRD patterns of the Cu-BTC samples prepared in the presence of Mg salt: Mg 20%-Cu-BTC, Mg 40%-Cu-BTC and Mg 60%-Cu-BTC.



Figure S2.SEM images of (a) Cu-BTC; (b) Mg 20%-Cu-BTC;(c) Mg 40%-Cu-BTC; and (d) Mg 60%-Cu-BTC.



Figure S3. TGA profiles obtained for the Cu-BTC samples prepared in the presence of Mg salt: Mg 20%-Cu-BTC, Mg 40%-Cu-BTC and Mg 60%-Cu-BTC.



Figure S4. N₂ adsorption isotherms measured for the Cu-BTC samples prepared in the presence of Mg salt: Mg 20%-Cu-BTC, Mg 40%-Cu-BTC and Mg 60%-Cu-BTC.



Figure S5. CO₂ adsorption isotherms measured for the Cu-BTC samples prepared in the presence of Mg salt: Mg 20%-Cu-BTC, Mg 40%-Cu-BTC and Mg 60%-Cu-BTC at (a) 0 °C and (b) 25°C.



Figure S6. EDS spectra of the Cu-BTC samples prepared in the presence of Mg salt: (a) Mg 20%-Cu-BTC, (b) Mg 40%-Cu-BTC and (c) Mg 60%-Cu-BTC.



Figure S7. TGA profiles measured for the Cu-BTC, Cu-BTC (80%), Cu-BTC (60%), and Cu-BTC (40%) samples in flowing air.



Figure S8. CO₂ and N₂ adsorption isotherms measured at 0°C for the Cu-BTC and Cu-BTC (60%) samples.



Figure S9. CO₂ uptakes measured for Cu-BTC (60%) at 0 °C and 1 bar over four adsorption-desorption cycles. (Note: Before measurement of each cycle, the sample was degassed at 200 °C for 2 hours. The values of measured CO₂ uptakes at 0 °C and 1 bar are: 9.33 mmol g⁻¹, 9.28 mmol g⁻¹,9.38 mmol g⁻¹,9.34 mmol g⁻¹ for 1st, 2nd, 3rd and 4th cycle, respectively.)