Electronic Supplementary Information

Acid-base directed supramolecular isomers of isophthalate based MOFs for CO$_2$
adsorption and transformation

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Experiments and Instruments.

**Ligand Synthesis:** 20 mmol of 5-aminoisophthalic acid, 10 mmol of 1,4,5,8-naphthalenetetracarboxylate dianhydride and five drops of N,N-dimethylformamide were added to a mortar and ground together with a pestle before a purple powder was heated at 180 ºC for four hours to achieve a similar yield of H₄L.¹

**MOF Synthesis:** Cu(NO₃)₂·2.5H₂O (11.6 mg, 0.05 mmol) and H₄L (14.8 mg, 0.025 mmol) heated to 80 ºC for up to 48 h. TFA was added from 5 to 40 µL to perform the acid controlled syntheses and pyridine (0.05 mmol) was added for the base controlled synthesis.

Measurements from 4000-400 cm⁻¹ were taken on a Perkin Elmer FT-IR Spectrometer Spectrum Two (UATR Two) with 4 cm⁻¹ resolution. TA Instruments TGA Q50 was used to record thermal gravimetric analysis (TGA) data from room temperature to 800 ºC at a 10 ºC/min rate. Gas adsorption measurements were performed using a Micromeritics ASAP 2020 surface area analyzer to collect N₂ (surface area measurement at 77 K) and CO₂ isotherms at 273 K and 298 K, using high purity gas. Powder X-ray diffraction (PXRD) data was collected at room temperature using a Bruker D8 Advance theta-2theta diffractometer with copper radiation (Cu Kα, λ = 1.5406 Å) operating at 40 kV and 40 mA and a secondary monochromator; whereby samples were measured between 3° and 25° at 0.5 second/step and step size of 0.01°.
Fig. S1. Infrared spectra of $[\text{Cu}_2\text{L}]_n \text{nbo}$ and $\text{lvt}$.

Fig. S2. TGA plots of $[\text{Cu}_2\text{L}]_n \text{nbo}$ and $\text{lvt}$. 
**Fig. S3.** CO$_2$ sorption isotherms for [Cu$_2$L]$_n$ nbo and lvt.

**Fig. S4.** N$_2$ sorption isotherms for [Cu$_2$L]$_n$ nbo and lvt.

**Fig. S5.** PXRD patterns after catalyzing propylene oxide into propylene carbonate. High
background due to low loading (<5 mg) of MOF along with pipetted reagents.

Reference:

1. J. A. Perman, A. J. Cairns, L. Wojtas, M. Eddaoudi and M. J. Zaworotko,
   CrystEngComm, 2011, 13, 3130