Electronic Supplementary Material (ESI) for Energy & Environmental Science

Supporting Information

A Perfluorinated Covalent Triazine-based Framework for Highly Selective and Water-tolerant CO_2 Capture

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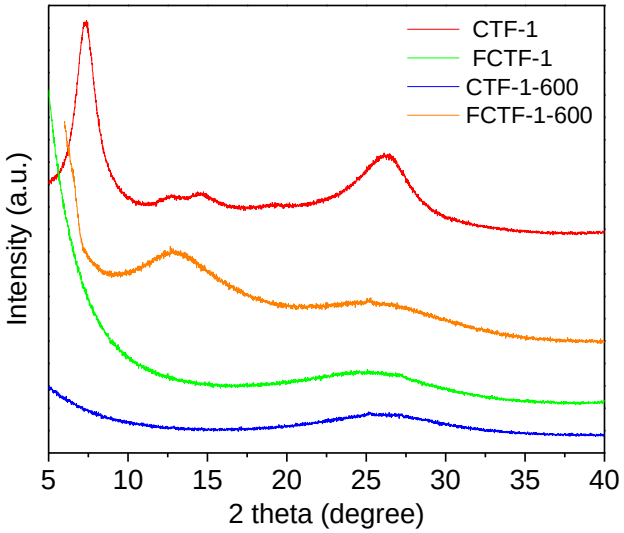

Figure S1. X-ray diffraction patterns of various sorbents.

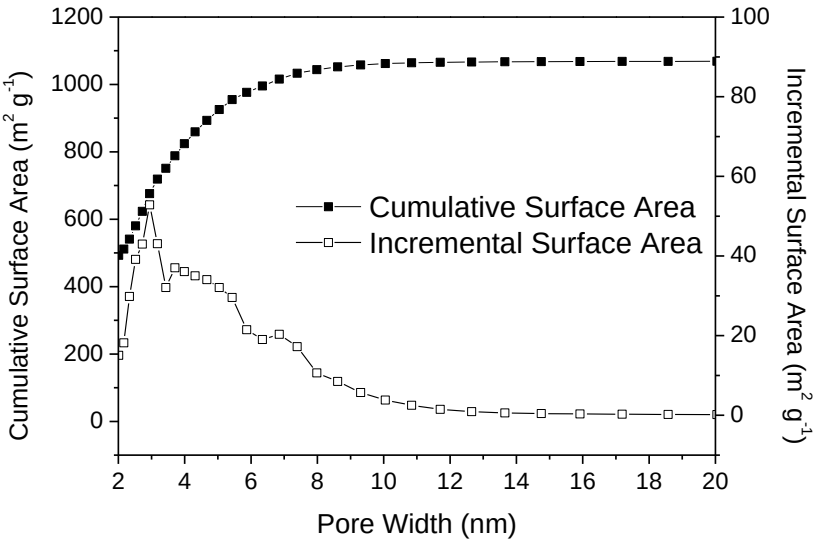

Figure S2. Pore size distribution curve of CTF-1-600 in the mesopore range.

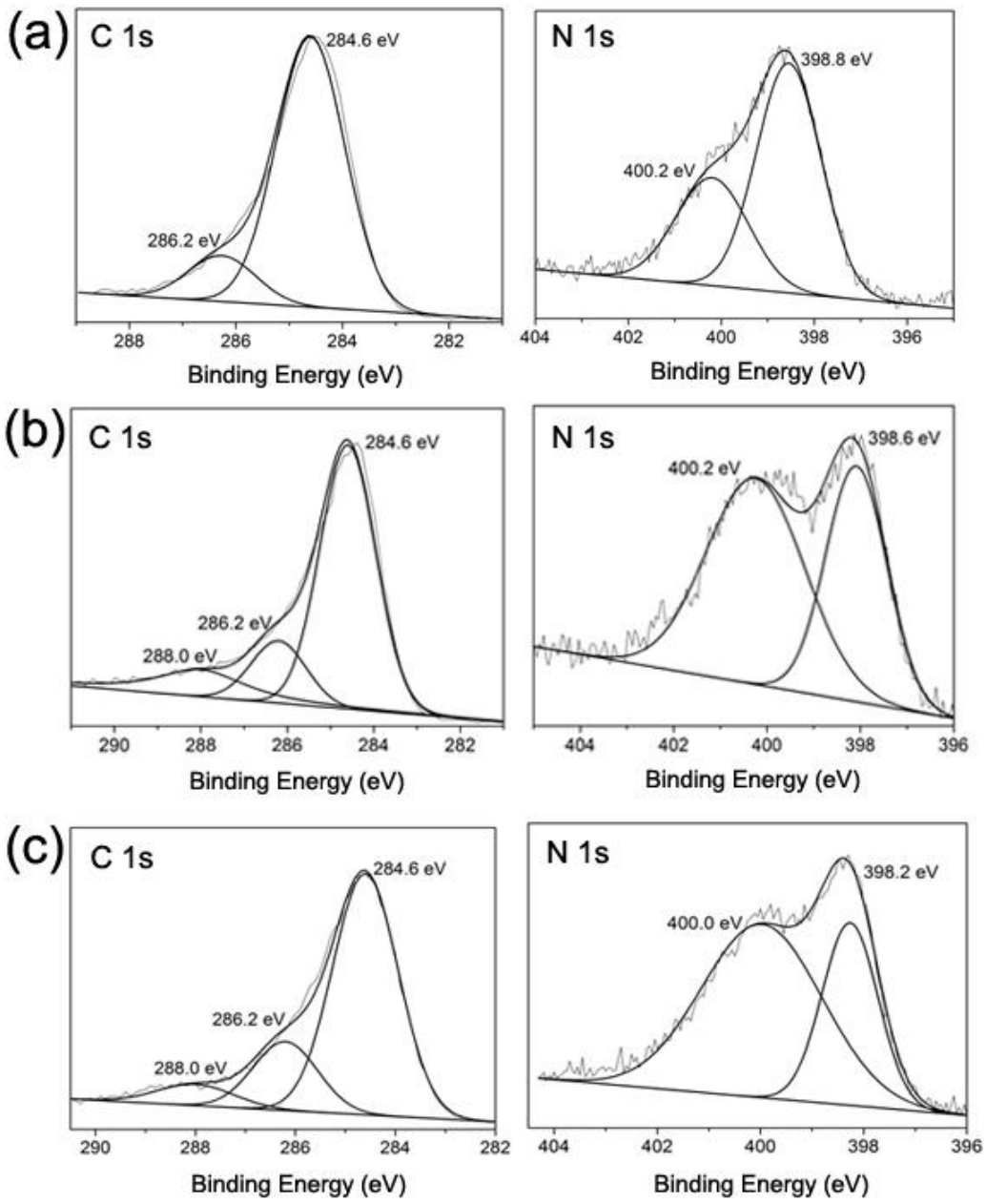

Figure S3. C1s and N1s XPS spectra of (a) CTF-1, (b) CTF-1-600, and (c) FCTF-1-600.

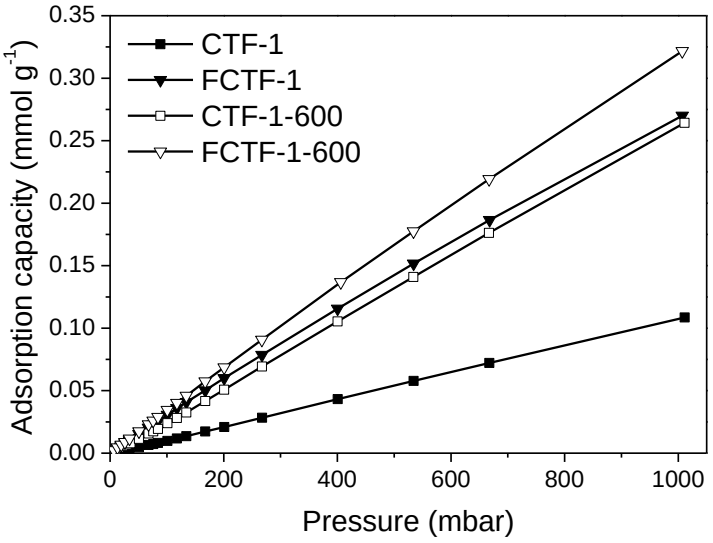

Figure S4. N_2 adsorption isotherms at 298 K of various sorbents.

CO_2/N_2 selectivity calculation by the ideal adsorption solution theory (IAST)

The experimental adsorption isotherms were firstly fitted using the single-site Langmuir model:

$$q_i = q_{i,sat} \frac{b_i p_i}{1 + b_i p_i}$$

where

b_i = Langmuir constant, Pa^{-1}

p_i = bulk gas phase pressure of species i, Pa

q_i = molar loading of species i, mmol g^{-1}

$q_{i,sat}$ = saturation capacity of species i, mmol g^{-1}

According to the ideal adsorption solution theory (IAST) proposed by Myers and Prausnitz,[1] the adsorption selectivity, S_{ads}, for binary mixtures of **1** and **2**, is defined as

$$S_{ads} = \frac{q_1 / q_2}{p_1 / p_2}$$

In this study, selectivity calculations were carried out for CO_2/N_2 binary mixtures with N_2 molar fraction ranging from 70% to 100%, which is typical composition range of flue gases.