Supporting Information

Hierarchically porous carbons from an emulsion-templated, urea-based deep eutectic

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S-1. Void size distributions

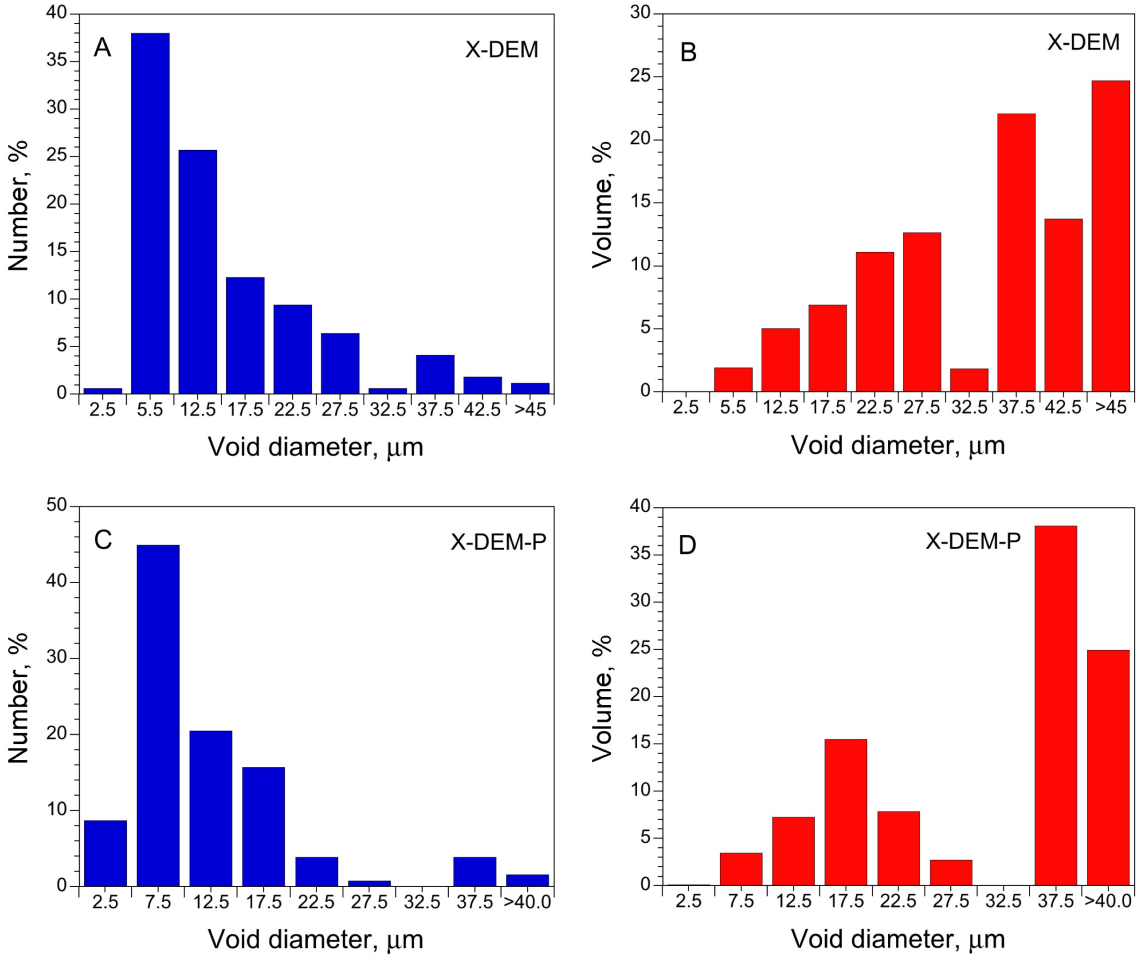

Figure S-1. Void diameter distributions from: (A,B) X-DEM; (C,D) X-DEM-P. (A,C) number-based distribution; (B,D) volume-based distribution.

S-2. NMR spectra

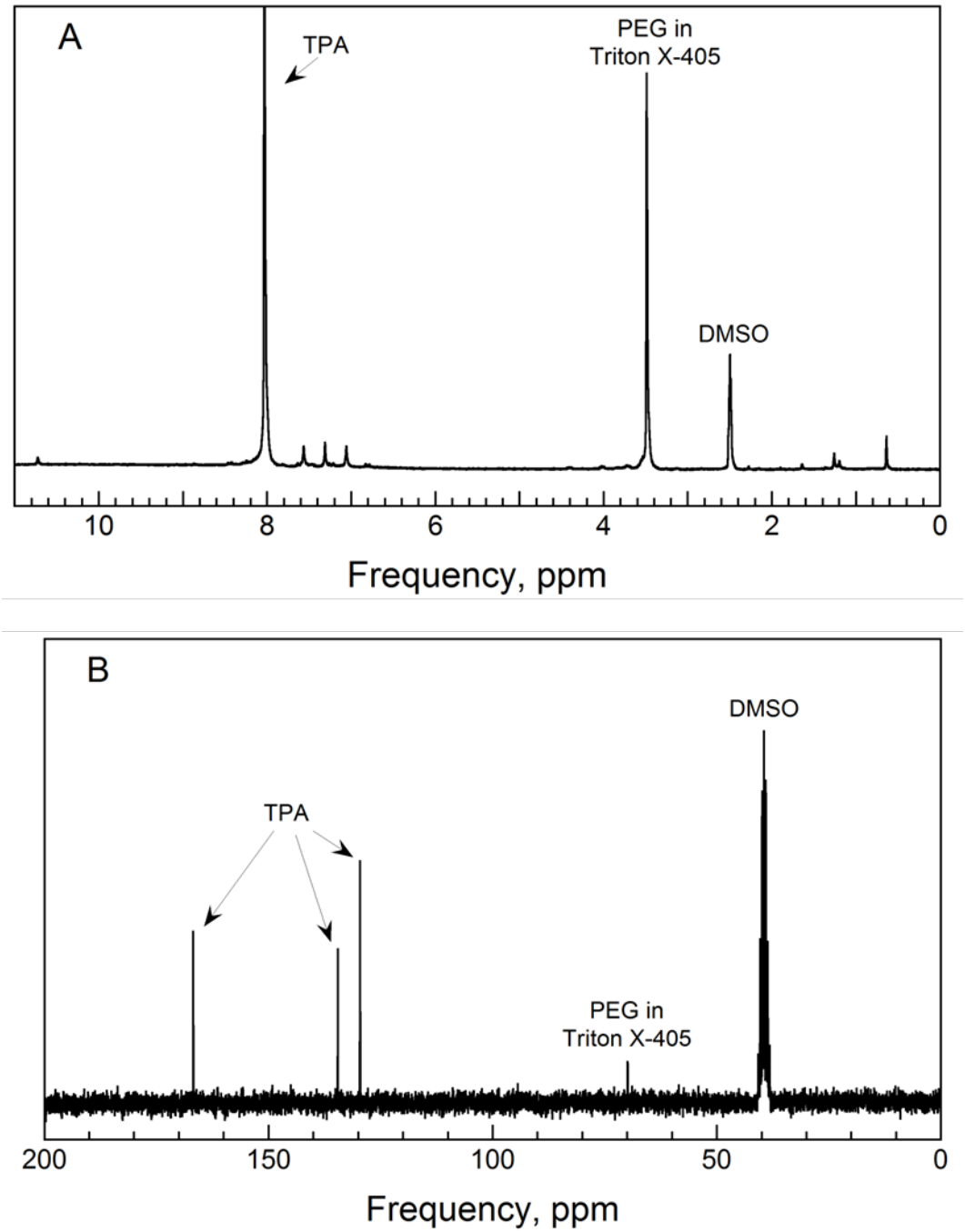

Figure S-2. NMR spectra from X-DEM in d_6-DMSO: (A) ^{1}H NMR; (B) ^{13}C NMR.

S-3. Sorption measurements

S-3.1. Characterization

A Toluidine Blue O dye adsorption isotherm in batch mode was generated by placing 15 mg of the carbon materials (m_{Carbon}) in glass vials followed by the addition of 20 mL dye solution ($V_{Solution}$) with different initial concentrations (c_0 = 75, 150, 300, 600, 800 mg L^{-1}) without pH control. Following equilibration by shaking for 24 h, the concentration of dye in the solution (c_e) was measured by UV-VIS spectroscopy (Shimadzu UV-2600) at the dye absorption maximum (λ = 595 nm). The solutions from the initial concentrations of 600 and 800 mL were diluted with water to one twentieth. The amounts of dye adsorbed by the carbon following equilibration (q_e) were calculated using **Equation S-1**.

Equation S-1.

$$\boldsymbol{q_e = \frac{(c_0 - c_e)V_{Solution}}{m_{Carbon}}}$$

The time-resolved adsorption behavior in batch mode was evaluated by placing 15 mg of adsorbent in glass vials followed by adding 15 mL of a dye solution at a concentration of 300 mg L^{-1}. After shaking for different times, the dye concentrations (c_t) were measured using UV-VIS absorption. The amounts of dye adsorbed by the carbon at specific times (q_t) were calculated using **Equation S-2**.

Equation S-2.

$$\boldsymbol{q_t = \frac{(c_0 - c_t)V_{Solution}}{m_{Carbon}}}$$

In addition, dye adsorption under flow mode was evaluated using 20 mg of the carbon materials (sieved to particle sizes below 250 µm) placed in a 2.5 mL adsorption column (MobiTec). The column was connected to the flow cell in the UV-VIS instrument

with a tube system. Dye solution with an initial concentration of 300 mg L^{-1} was pumped through the column at a speed of 13.5 mL min^{-1} and the UV-VIS spectra (transmittance vs. time) were recorded. Dye desorption in flow mode was evaluated following the adsorption experiment using 13.5 mL min^{-1} of flowing water.

S-3.2. Results

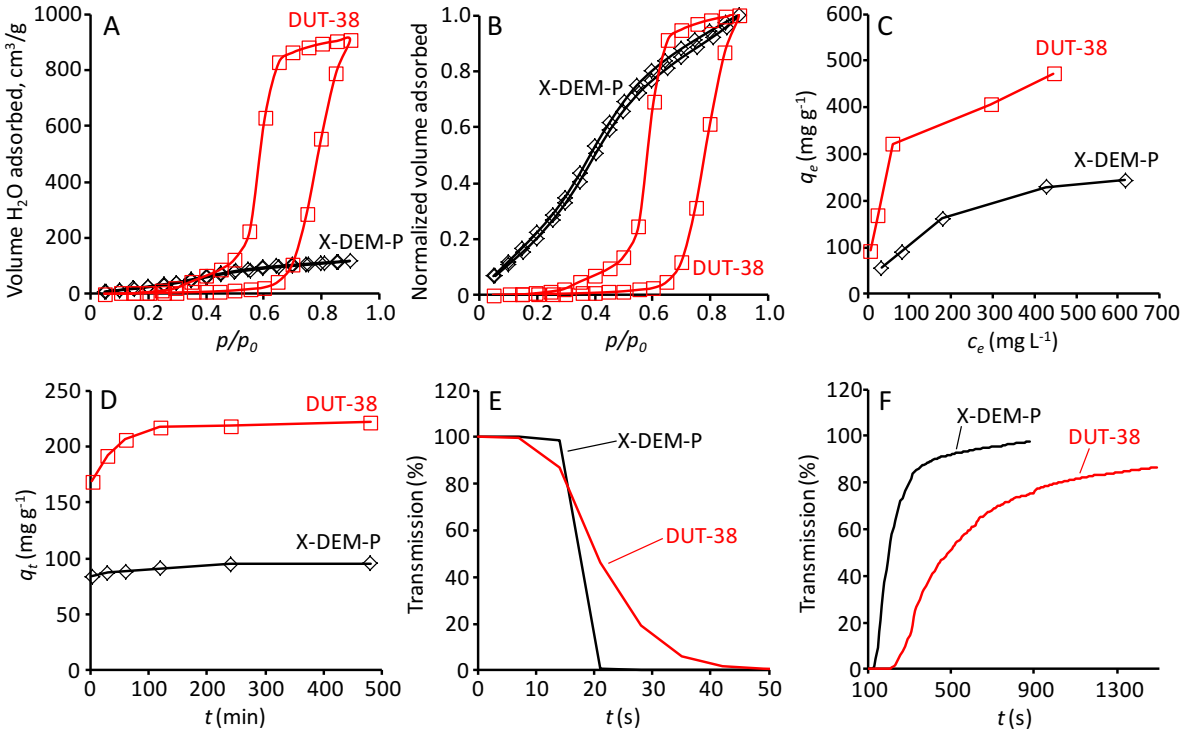

Figure S-3. Water vapor physisorption measured at 298 K: (A) isotherms; (B) isotherms normalized to the water uptake. Toluidine Blue O adsorption at room temperature starting from a dye solution with a concentration of 300 mg L^{-1}: (C) isotherms; (D) time-resolved adsorption capacity. Transmittance vs. time curves of dye under dynamic conditions (breakthrough mode): (E) adsorption; (F) desorption.