Supporting Information

Exceptional gravimetric and volumetric hydrogen storage for densified zeolite templated carbons with high mechanical stability

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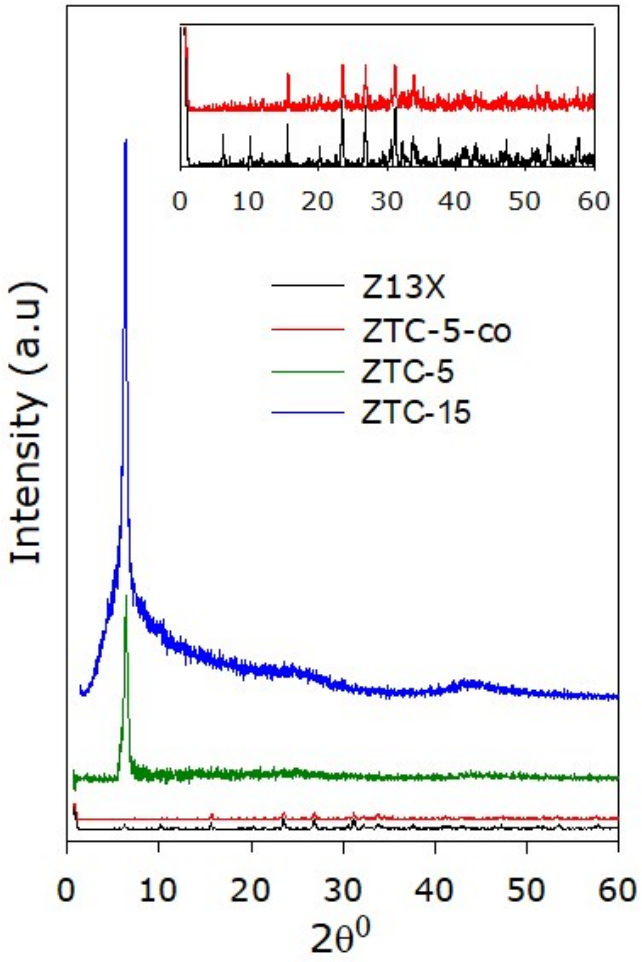
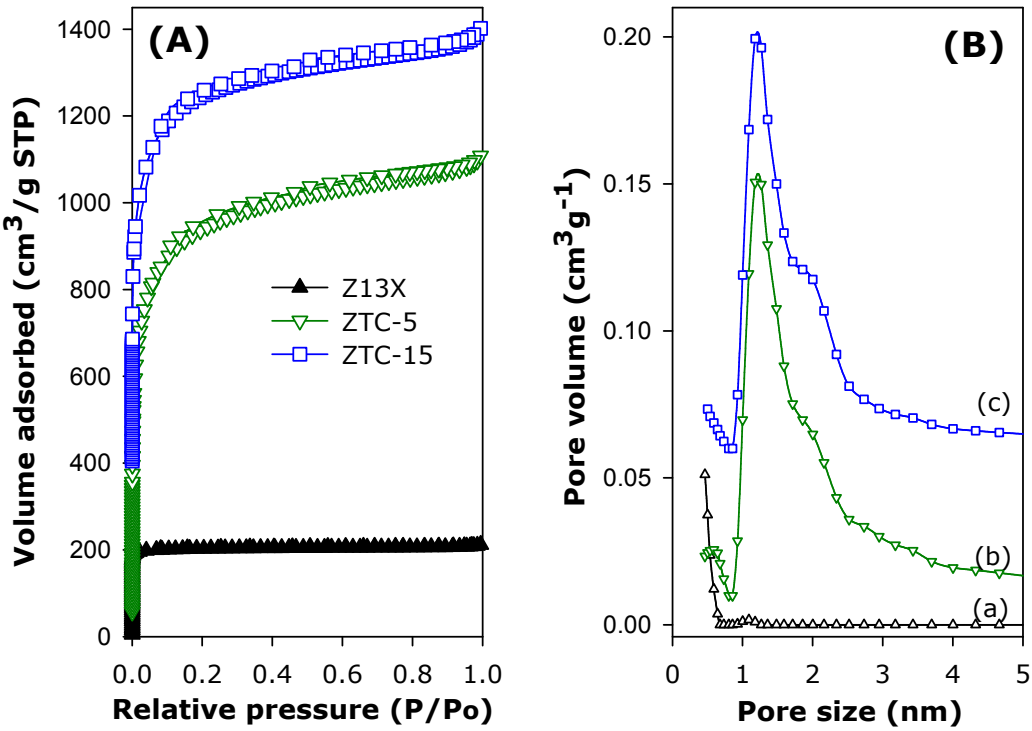
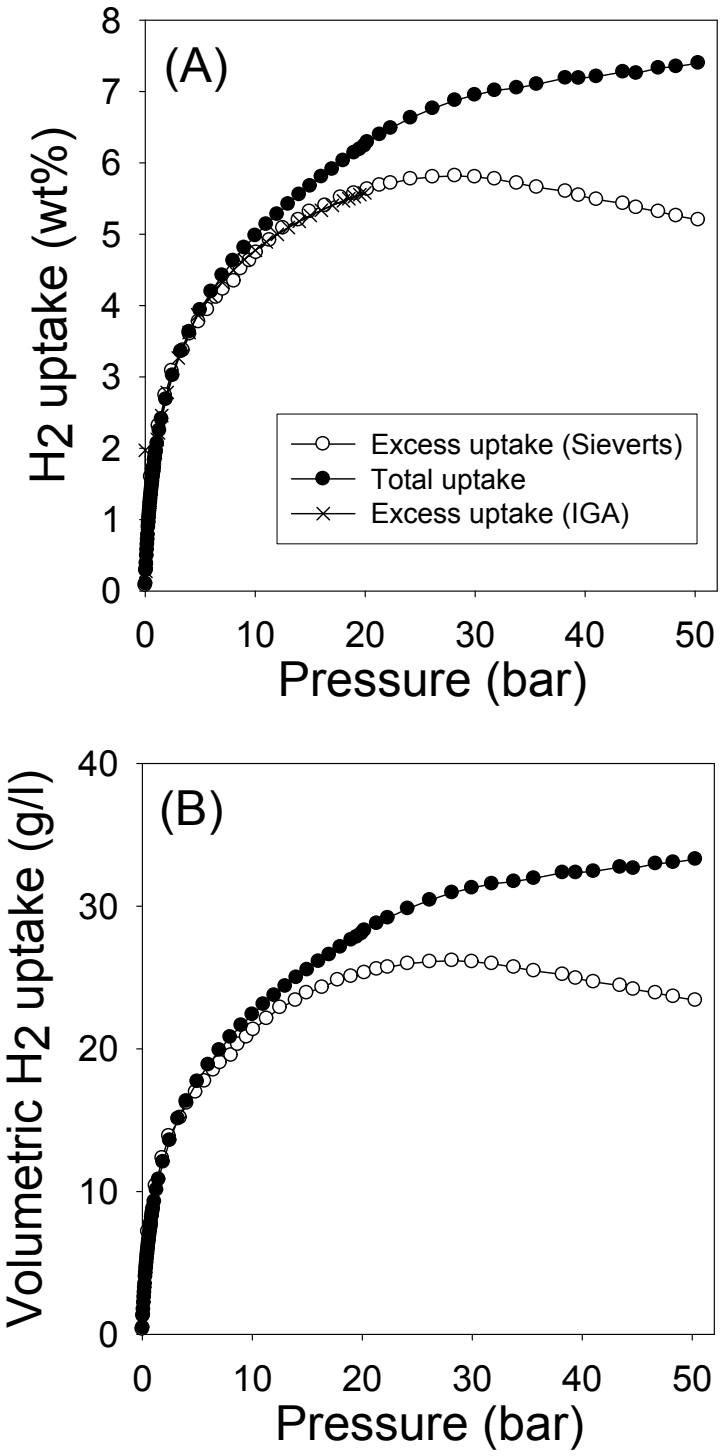


Supporting Figure S1. Powder XRD patterns of zeolite templated carbons (ZTC-5 and ZTC-15) prepared at variable heating ramp rate (5 and 15 °C/min, respectively). Patterns for the zeolite/carbon composite (ZTC-5-co) and zeolite 13X (Z13X) are also shown.



Supporting Figure S2. Nitrogen sorption isotherms (A) and pore size distribution (PSD) curves (B) for (a) zeolite 13X, and zeolitetemplated carbons (b) ZTC-5 and (c) ZTC-15. For clarity, the isotherm of ZTC-15 is offset (y-axis) by 400 cm^3/g, and the PSD curves (b) and (c) are offset (y-axis) by 0.01 and 0.06 cm^3/g respectively.

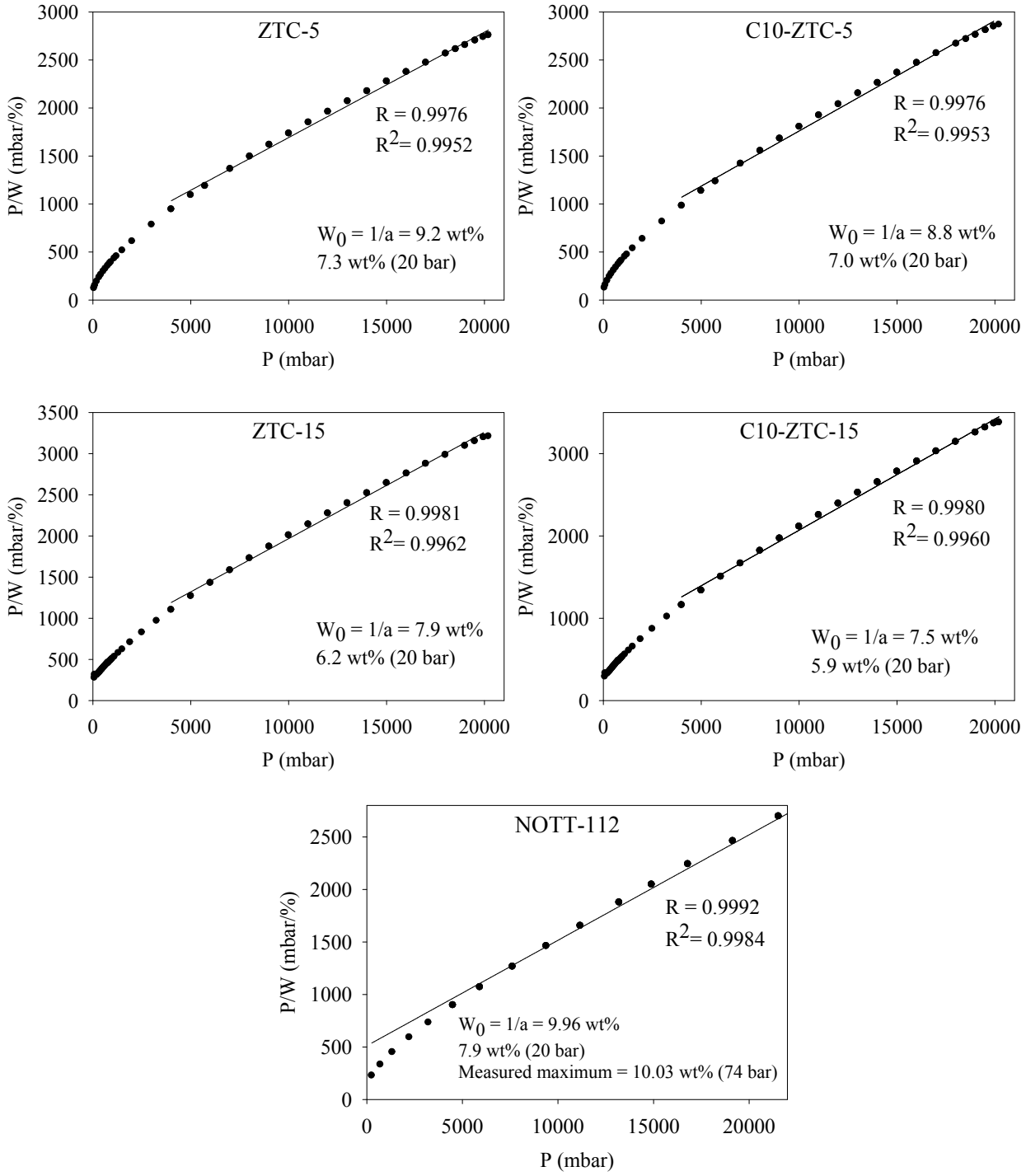


Supporting Figure S3. Gravimetric (A) and volumetric (B) excess and total hydrogen uptake isotherms at -196 ^{o}C and up to 50 bar for a representative zeolite templated carbon. The gravimetric hydrogen uptake obtained from IGA measurements is shown in (A).

Langmuir plots were used to estimate the maximum uptake of supercritical hydrogen (at -196 °C).

$$\frac{P}{W} = \frac{1}{W_0} P + \frac{1}{W_0 \bullet K} \qquad\qquad W_0 = \frac{1}{a}$$

W is degree of adsorption at a pressure of P, W_0 is the saturated adsorption and K is a coefficient.



Supporting Figure S4. Langmuir plots for determining maximum hydrogen uptake of zeolite-templated carbons (ZTC-5 and ZTC-15) and metal organic framework NOTT-112.