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 zeolite templated 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 °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).

\[
\frac{P}{W} = \frac{1}{W_0} P + \frac{1}{W_0 \cdot K} \quad W_0 = \frac{1}{a}
\]

\(W\) 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.