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Synthesis of Biomorphic Zeolite Honeycomb Monoliths with 16000 Cells per Square Inch

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1. Setup

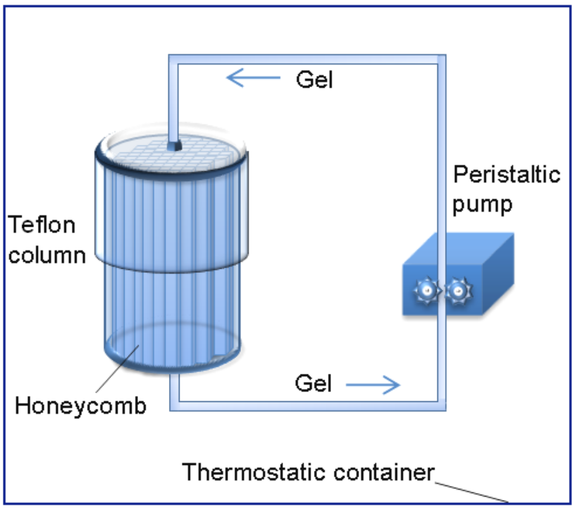

Figure S1. A schematic diagram of the setup for flow coating with forced gel circulation.

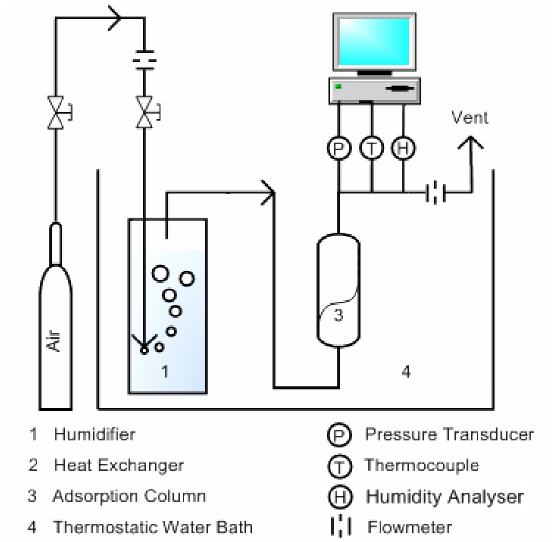

Figure S2. A schematic diagram of the setup for water breakthrough experiment.

2. Characterization

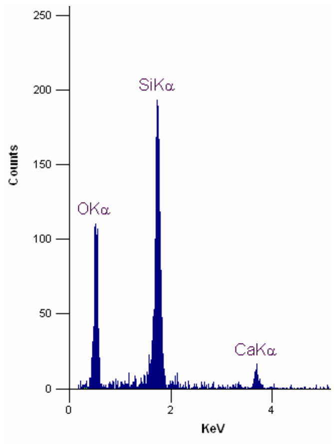

Figure S3. A representative energy-dispersive X-ray (EDX) spectrum of nano-silicalite coated cuttlebone honeycomb.

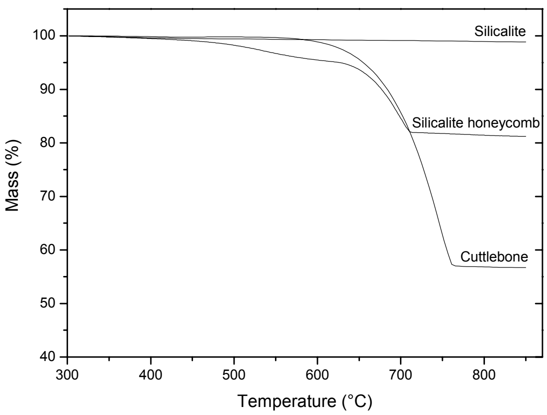

Figure S4. TGA result of the silicalite honeycomb and its parent materials. For clarity purpose, mass loss due to desorption of structural water below 300 °C were not graphed.

3. Dimensionless time

As a number of operational conditions will influence the breakthrough time, e.g. flow rate, column size etc, dimensionless time has been introduced to make breakthrough results of adsorbents with totally different morphologies comparable, which is expressed as follows:

$$\tau = \frac{F_s t}{A \varepsilon L} \tag{S1}$$

where, τ is the dimensionless time (-), F_s the superficial flow rate (m^3/s), t the time (s), ε the voidage (-), A the cross area of the column (m^2) and L the length of the column (m). For the silicalite honeycomb, $\varepsilon = 0.831$.