Electronic Supplementary Information

Hybrid Networks Constructed from Tetrahedral Silicon-Centered Precursors and Cubic POSS-Based Building Blocks via Heck Reaction:

Porosity, Gas Sorption, and Luminescence

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**Henry’s Law selectivity of CO₂ over CH₄ in HPP-5 at 298 K**

A nice fitting of CO₂ and CH₄ isotherms has been calculated based on Toth isotherm model.¹,²

\[
q = q_{\text{sat}} \frac{b^{1/\alpha} P}{\left(1 + b^{1/\alpha}\right)^{1/t}}
\]

where \(q\) is the uptake in mmol g⁻¹, \(q_{\text{sat}}\) is the saturation uptake in mmol g⁻¹, \(P\) is the pressure in torr, \(t\) and \(b\) are parameters which are specific for adsorbent pairs.

The Henry law constant \(K\), quantifies the extent of the adsorption of a given adsorbate by a solid. The magnitude of \(K\) depends on the properties of both adsorbate and solid. For the Toth isotherm, the Henry law constant is defined by the following equation:

\[
K = \lim_{P \to 0} \left( \frac{dq}{dP} \right) = b^{1/\alpha} q_{\text{sat}}
\]

Finally, the Henry’s Law selectivity \(S_{\alpha/\beta}\) of gas \(\alpha\) over \(\beta\) is given by the following equation:

\[
S_{\alpha/\beta} = \frac{K_{\alpha}}{K_{\beta}}
\]
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**References**
