Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supporting Information

Effects of Synthetic Methodology on Microporous Organic Hyper-Cross-Linked Polymers with Respect to Structural Porosity, Gas Uptake Performance and Fluorescence Properties

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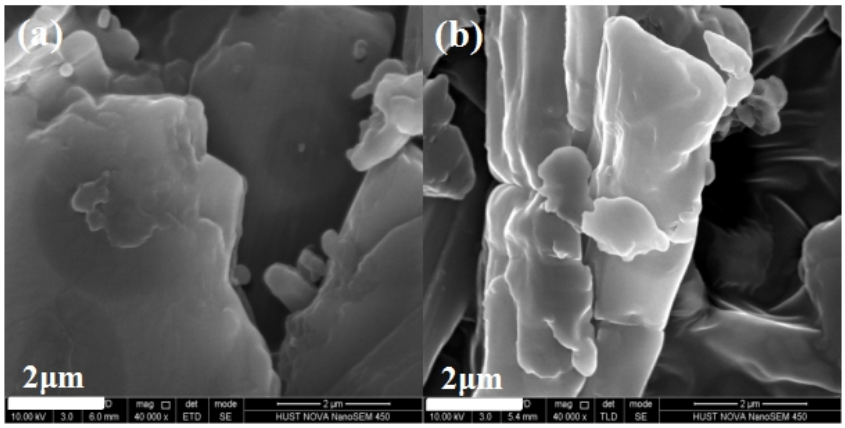

Figure S1. SEM images of (a) 1,4-diphenylbenzene, and (b) 1,3-diphenylbenzene at the same magnification (scale bars 2 µm).

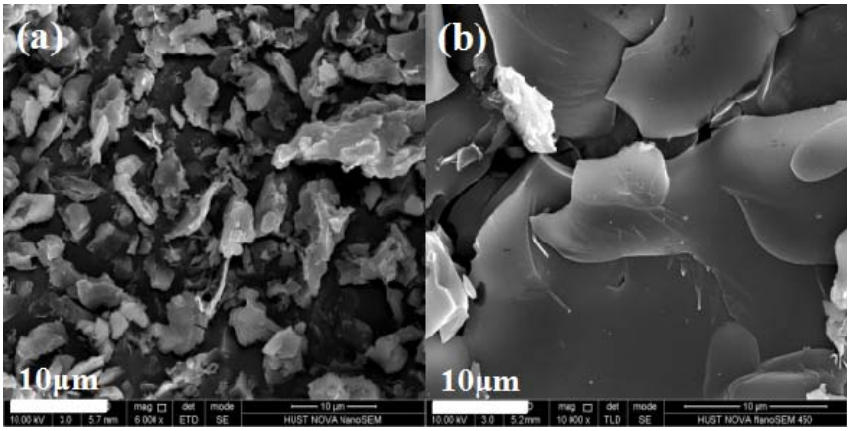

Figure S2. SEM images of (a) polymer **1**, and (b) polymer **2** at the same magnification (scale bars 10 µm).

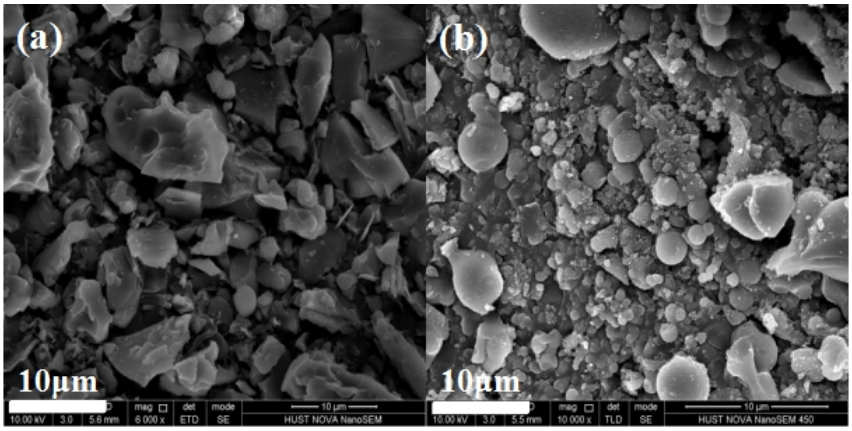

Figure S3. SEM images of (a) polymer **3**, and (b) polymer **4** at the same magnification (scale bars 10 µm).

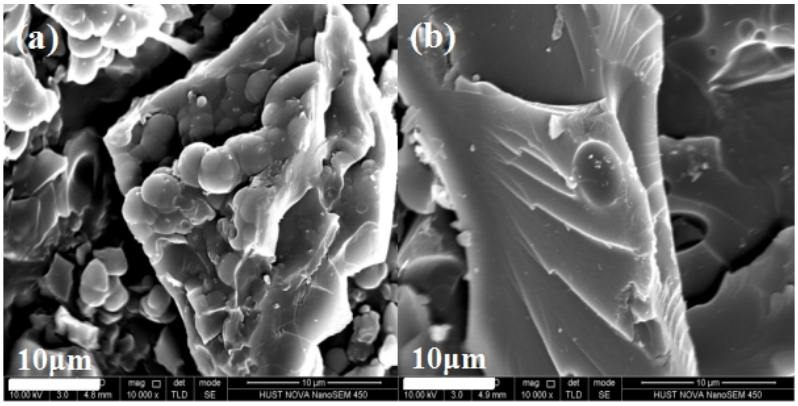

Figure S4. SEM images of (a) polymer **5**, and (b) polymer **6** at the same magnification (scale bars 10 µm).

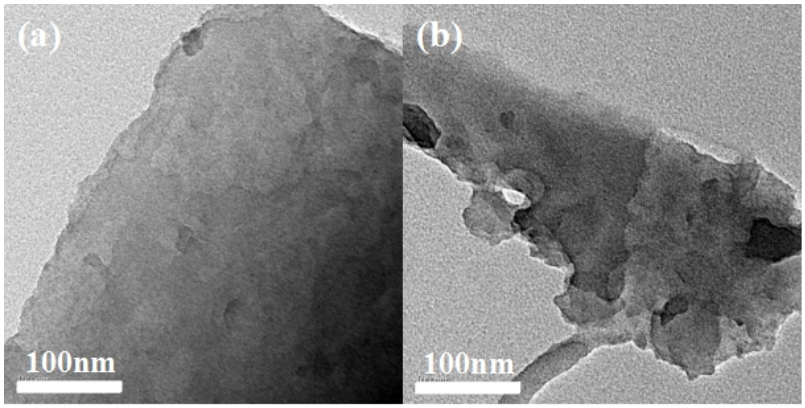

Figure S5. TEM images of (a) polymer **1**, and (b) polymer **2** at the same magnification (scale bars 100 nm).

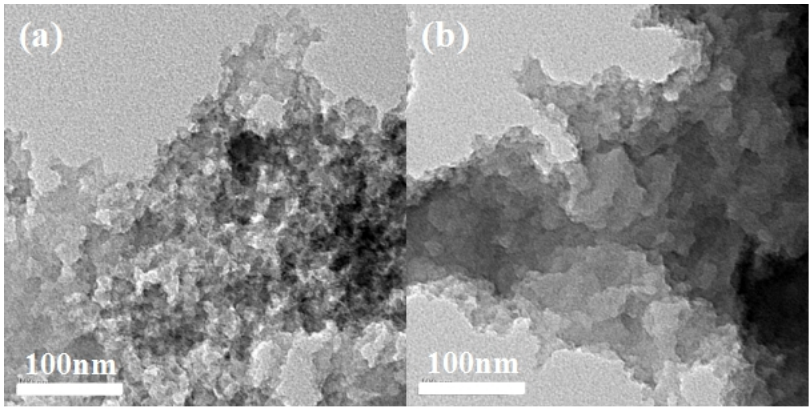

Figure S6. TEM images of (a) polymer **3**, and (b) polymer **4** at the same magnification (scale bars 100 nm).

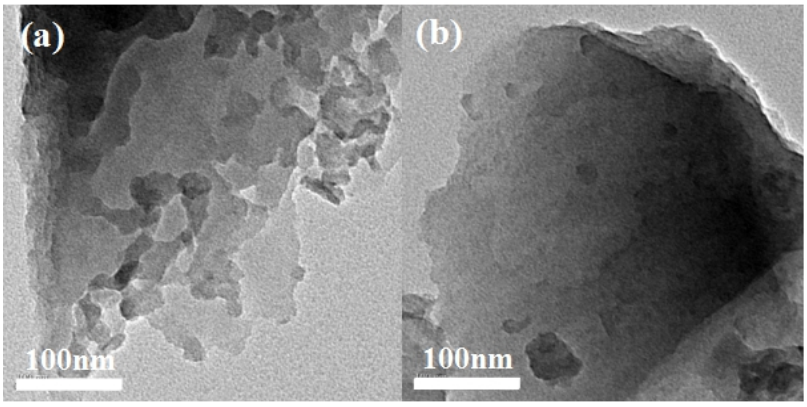

Figure S7. TEM images of (a) polymer **5**, and (b) polymer **6** at the same magnification (scale bars 100 nm).

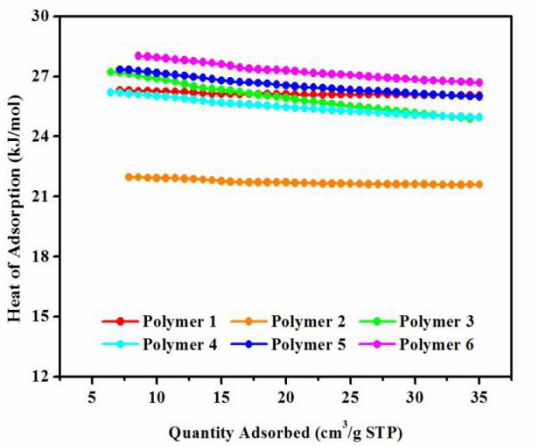

Figure S8. Isosteric heat of adsorption for CO_2 at different CO_2 loadings.

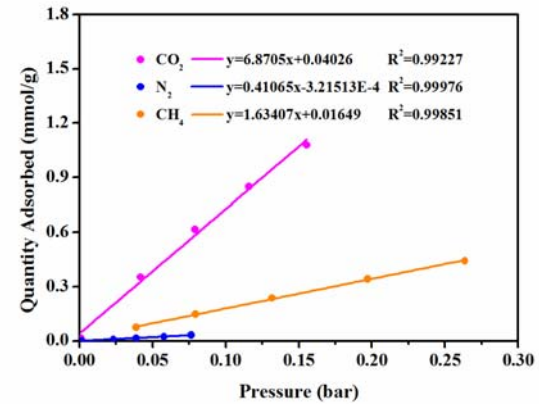

Figure S9. Adsorption selectivity of CO_2/N_2 and CO_2/CH_4 for polymer **1** calculated using Henry's law initial slope method according to the adsorption isotherms of CO_2 (pink), N_2 (blue), and CH_4 (orange) at 273.15 K and a low pressure coverage of less than 0.3 bar.

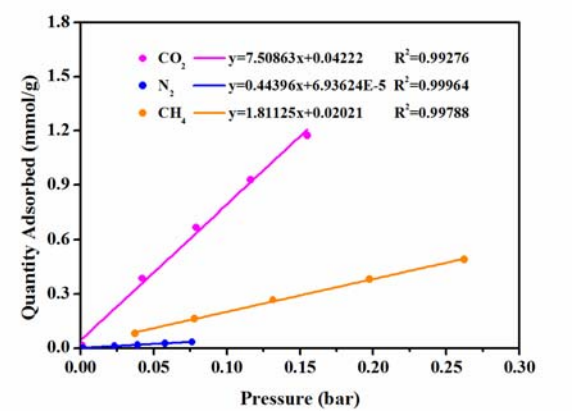

Figure S10. Adsorption selectivity of CO_2/N_2 and CO_2/CH_4 for polymer **2** calculated using Henry's law initial slope method according to the adsorption isotherms of CO_2 (pink), N_2 (blue), and CH_4 (orange) at 273.15 K and a low pressure coverage of less than 0.3 bar.

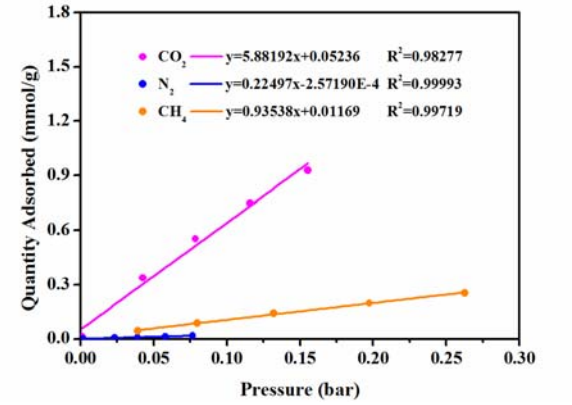

Figure S11. Adsorption selectivity of CO_2/N_2 and CO_2/CH_4 for polymer **3** calculated using Henry's law initial slope method according to the adsorption isotherms of CO_2 (pink), N_2 (blue), and CH_4 (orange) at 273.15 K and a low pressure coverage of less than 0.3 bar.

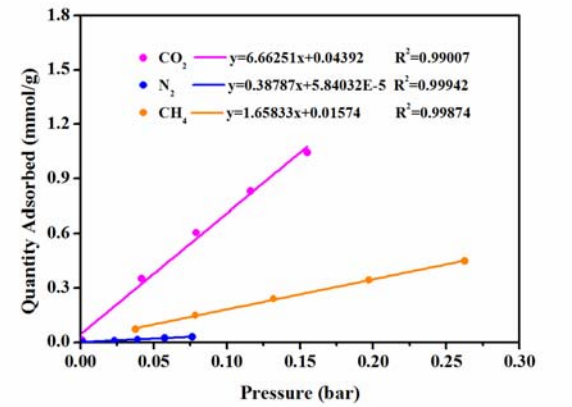

Figure S12. Adsorption selectivity of CO_2/N_2 and CO_2/CH_4 for polymer **4** calculated using Henry's law initial slope method according to the adsorption isotherms of CO_2 (pink), N_2 (blue), and CH_4 (orange) at 273.15 K and a low pressure coverage of less than 0.3 bar.

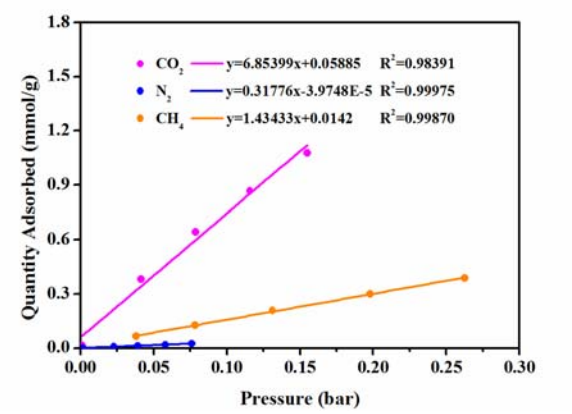

Figure S13. Adsorption selectivity of CO_2/N_2 and CO_2/CH_4 for polymer **5** calculated using Henry's law initial slope method according to the adsorption isotherms of CO_2 (pink), N_2 (blue), and CH_4 (orange) at 273.15 K and a low pressure coverage of less than 0.3 bar.

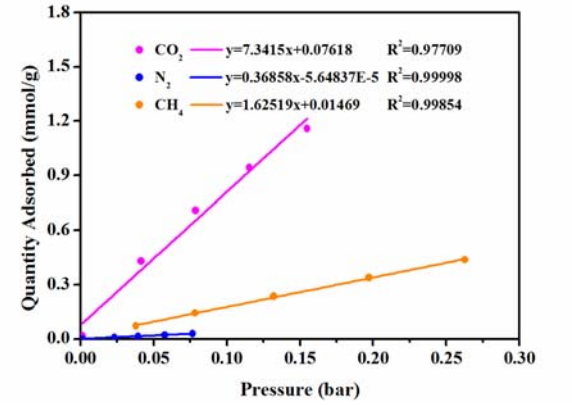

Figure S14. Adsorption selectivity of CO_2/N_2 and CO_2/CH_4 for polymer **6** calculated using Henry's law initial slope method according to the adsorption isotherms of CO_2 (pink), N_2 (blue), and CH_4 (orange) at 273.15 K and a low pressure coverage of less than 0.3 bar.

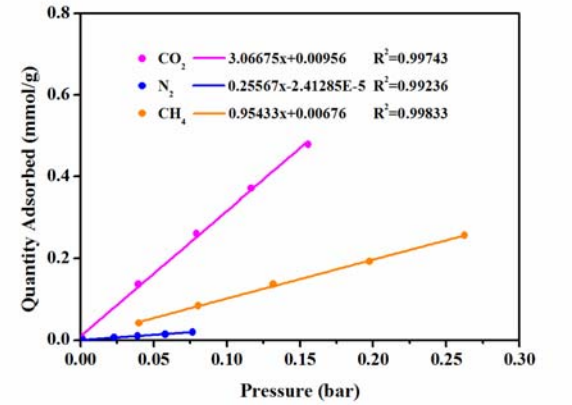

Figure S15. Adsorption selectivity of CO_2/N_2 and CO_2/CH_4 for polymer **1** calculated using Henry's law initial slope method according to the adsorption isotherms of CO_2 (pink), N_2 (blue), and CH_4 (orange) at 298.15 K and a low pressure coverage of less than 0.3 bar.

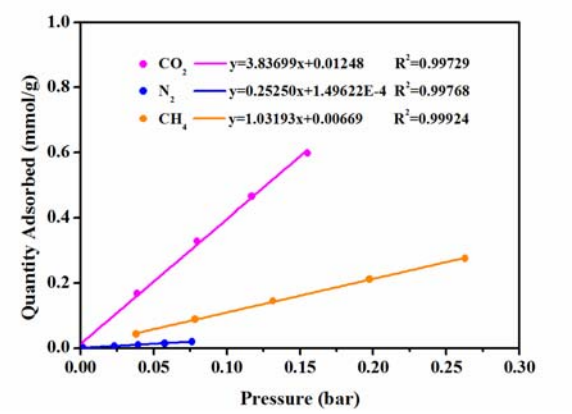

Figure S16. Adsorption selectivity of CO_2/N_2 and CO_2/CH_4 for polymer **2** calculated using Henry's law initial slope method according to the adsorption isotherms of CO_2 (pink), N_2 (blue), and CH_4 (orange) at 298.15 K and a low pressure coverage of less than 0.3 bar.

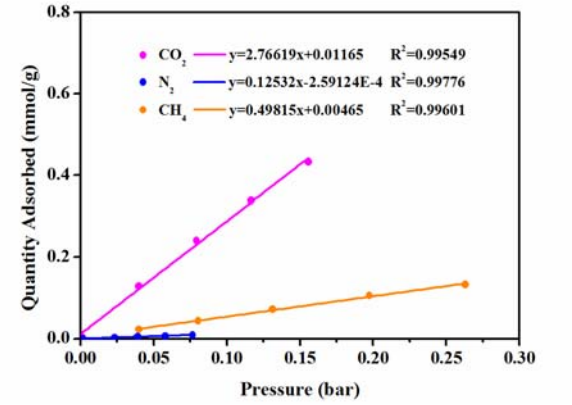

Figure S17. Adsorption selectivity of CO_2/N_2 and CO_2/CH_4 for polymer **3** calculated using Henry's law initial slope method according to the adsorption isotherms of CO_2 (pink), N_2 (blue), and CH_4 (orange) at 298.15 K and a low pressure coverage of less than 0.3 bar.

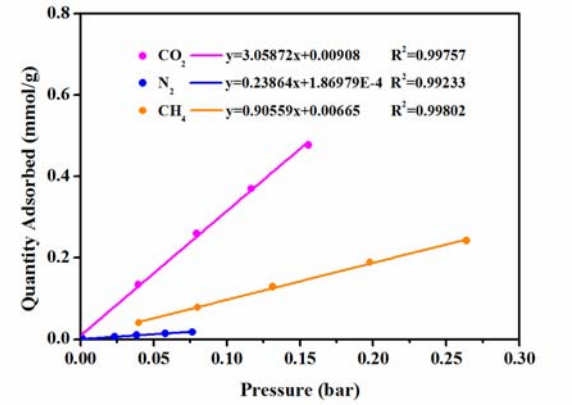

Figure S18. Adsorption selectivity of CO_2/N_2 and CO_2/CH_4 for polymer **4** calculated using Henry's law initial slope method according to the adsorption isotherms of CO_2 (pink), N_2 (blue), and CH_4 (orange) at 298.15 K and a low pressure coverage of less than 0.3 bar.

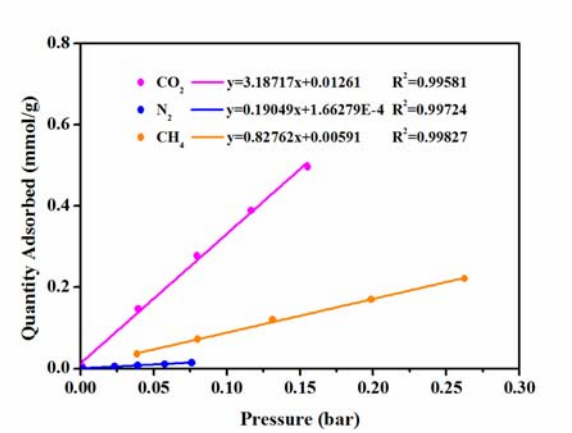

Figure S19. Adsorption selectivity of CO_2/N_2 and CO_2/CH_4 for polymer **5** calculated using Henry's law initial slope method according to the adsorption isotherms of CO_2 (pink), N_2 (blue), and CH_4 (orange) at 298.15 K and a low pressure coverage of less than 0.3 bar.

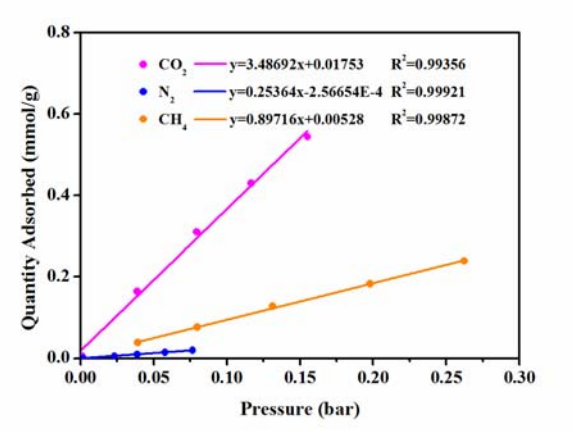

Figure S20. Adsorption selectivity of CO_2/N_2 and CO_2/CH_4 for polymer **6** calculated using Henry's law initial slope method according to the adsorption isotherms of CO_2 (pink), N_2 (blue), and CH_4 (orange) at 298.15 K and a low pressure coverage of less than 0.3 bar.

$$\textbf{Yield \%} = \frac{\mathbf{m_1\ (g)}}{\mathbf{m_2\ (g)}} \times \mathbf{100\%}$$

Where m_1 is the weight of polymers **1**, **3**, and **5** measured after drying in a vacuum oven at 70 °C for 24 h, m_2 is the weight of monomer 1, 4-diphenylbenzene; and m_1 is the weight of polymers **2**, **4**, and **6** measured after drying in a vacuum oven at 70 °C for 24 h, m_2 is the weight of monomer 1, 3-diphenylbenzene.

Equation S1 The yield estimation of polymer materials from polymer **1** to polymer **6**.