# Supplementary Materials

## Rational Fabrication of Polyhedral Oligomeric Silsesquioxane-Based Porous Organic Polymers Sustainably Used for Selective $CO_2$ Adsorption

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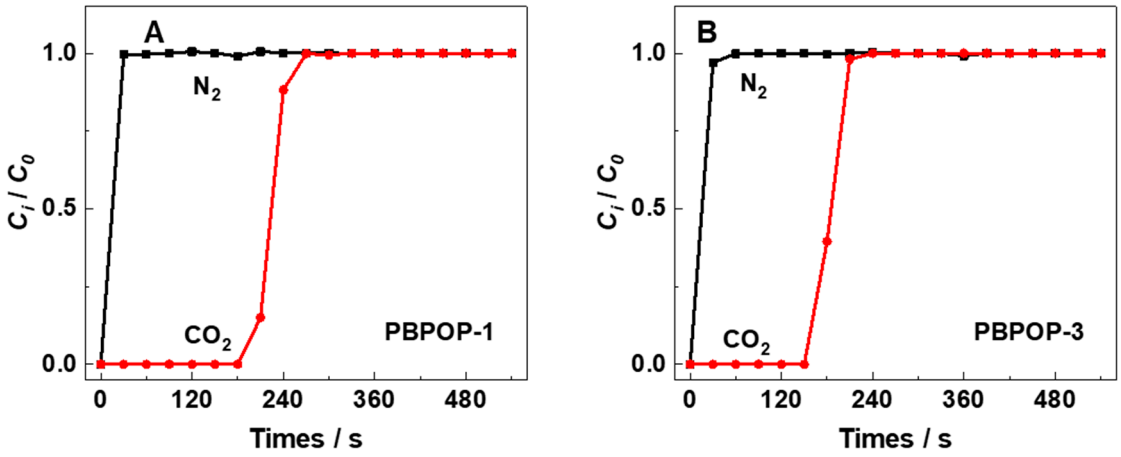
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**Table S1** Fitting parameters of adsorption isotherms of PBPOPs

| Adsorbents | Adsorbate | $T$ (K) | $q_c$ (mmol·g$^{-1}$) | $k_c$ (bar$^{-1}$) | $q_i$ (mmol·g$^{-1}$) | $ki$ (bar$^{-1}$) | $R^2$ |
|---|---|---|---|---|---|---|---|
| PBPOP-1 | $CO_2$ | 273 | 3.20589 | 0.38912 | 0.55022 | 6.10716 | 0.99998 |
| | | 298 | 0.27679 | 2.86665 | 3.12616 | 0.24333 | 1 |
| | $CH_4$ | 273 | 0.61956 | 0.52668 | 0.61956 | 0.52668 | 0.99989 |
| | | 298 | 0.07414 | 1.48428 | 1.19974 | 0.21075 | 1 |
| | $N_2$ | 273 | 0.03575 | 0.72883 | 0.03575 | 0.7286 | 0.98053 |
| | | 298 | 0.03056 | 0.35694 | 0.03056 | 0.3571 | 0.98786 |
| PBPOP-2 | $CO_2$ | 273 | 0.6264 | 4.33391 | 5.47374 | 0.31518 | 0.99999 |
| | | 298 | 4.49411 | 0.2459 | 0.348 | 2.62922 | 1 |
| | $CH_4$ | 273 | 1.04872 | 0.39378 | 1.04872 | 0.39378 | 0.99996 |
| | | 298 | 3.56251 | 0.06971 | 0.27485 | 0.72704 | 0.99999 |
| | $N_2$ | 273 | 0.04053 | 2.87047 | 0.04053 | 2.87047 | 0.99274 |
| | | 298 | 4.22966 | 0.00367 | 4.22966 | 0.00367 | 0.99613 |
| PBPOP-3 | $CO_2$ | 273 | 0.6264 | 4.33391 | 5.47374 | 0.31518 | 0.99999 |
| | | 298 | 4.49411 | 0.2459 | 0.348 | 2.62922 | 1 |
| | $CH_4$ | 273 | 1.04872 | 0.39378 | 1.04872 | 0.39378 | 0.99996 |
| | | 298 | 3.56251 | 0.06971 | 0.27485 | 0.72704 | 0.99999 |
| | $N_2$ | 273 | 0.04053 | 2.87047 | 0.04053 | 2.87047 | 0.99274 |
| | | 298 | 4.22966 | 0.00367 | 4.22966 | 0.00367 | 0.99613 |




**Figurer S1.** Dynamic breakthrough curves of the (A) PBPOP-1 and (B) PBPOP-3 for $CO_2/N_2$ (15: 85/ *v*: *v*) mixture.

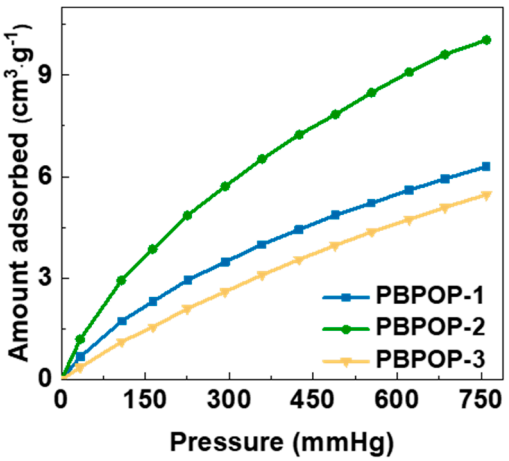



**Figure S2.** $CO_2$ adsorption isotherms of PBPOPs at 323 K.