Supporting Information for

Hyper-Crosslinked Aromatic Polymers with Improved Microporosity for Enhanced CO$_2$/N$_2$ and CO$_2$/CH$_4$ Selectivity †


Content

1. FT-IR spectra of NOPs.................................................................2
2. Elemental analysis....................................................................2
3. Powder X-ray diffraction patterns of NOPs.................................3
4. Morphology analysis of NOP-47 ..............................................4
5. TGA curves of NOPs ...............................................................4
6. High-pressure methane adsorption curves for NOPs ..................5
7. Selective gas adsorption for NOPs..........................................6
1. FT-IR spectra of NOPs

![FTIR spectra of NOPs](image)

**Fig. S1** FTIR spectra of NOPs.

2. Elemental analysis

<table>
<thead>
<tr>
<th>Polymers</th>
<th>C (%)</th>
<th>H (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOP-47</td>
<td>80.38</td>
<td>4.69</td>
</tr>
<tr>
<td>NOP-48</td>
<td>82.32</td>
<td>4.36</td>
</tr>
</tbody>
</table>

**Tab. S1** Elemental analysis data of the polymers
3. Powder X-ray diffraction patterns of NOPs

![Fig. S2 PXRD spectrum of NOP-47.](image1)

![Fig. S3 PXRD spectrum of NOP-48.](image2)
4. Morphology analysis of NOP-47

Fig.S4 Typical SEM image (a) and TEM image (b) of NOP-47

5. TGA curves of NOPs

Fig.S5 TGA plots of NOPs under nitrogen atmosphere.
6. High-pressure methane adsorption curves for NOPs

Fig. S6 CH₄ adsorption curves for NOPs at 298 K.
7. Selective gas adsorption for NOPs

**Fig. S7** CO$_2$ and N$_2$ adsorption isotherms of NOPs at 298 K.

**Fig. S8** CO$_2$ and CH$_4$ adsorption isotherms of NOPs at 298 K.
Fig.S9 IAST method for CO$_2$ over CH$_4$ selectivities for NOPs at 298 K