

Supporting Information for

## Hyper-Crosslinked Aromatic Polymers with Improved Microporosity for Enhanced CO<sub>2</sub>/N<sub>2</sub> and CO<sub>2</sub>/CH<sub>4</sub> Selectivity †

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## 1. FT-IR spectra of NOPs

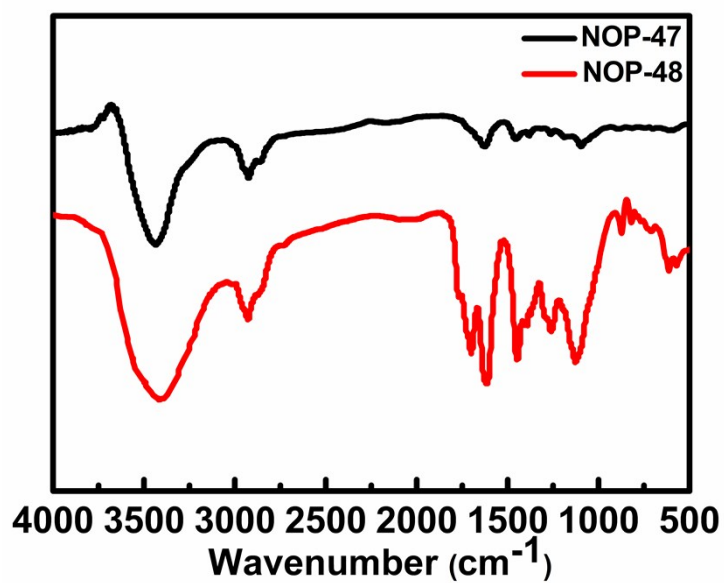


Fig.S1 FTIR spectra of NOPs.

## 2. Elemental analysis

Tab. S1 Elemental analysis data of the polymers

| Polymers | C (%) | H (%) |
|----------|-------|-------|
| NOP-47   | 80.38 | 4.69  |
| NOP-48   | 82.32 | 4.36  |

### 3. Powder X-ray diffraction patterns of NOPs

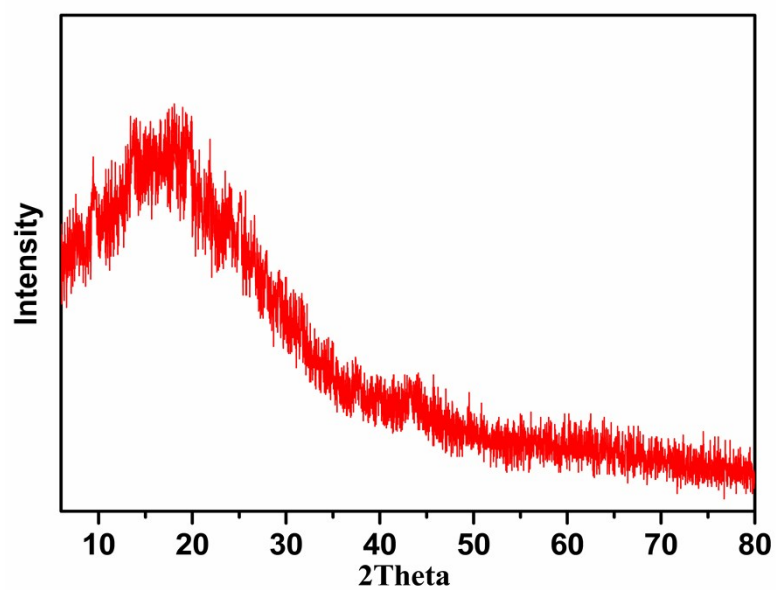


Fig.S2 PXRD spectrum of NOP-47.

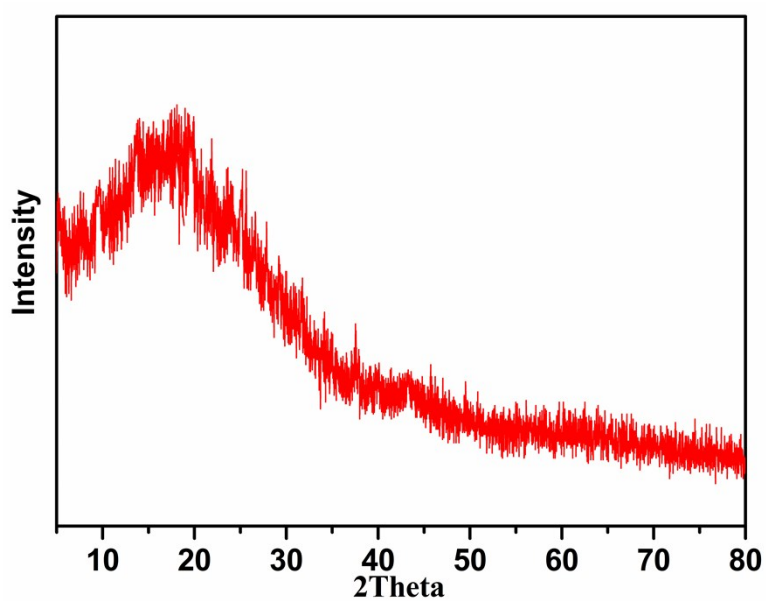


Fig.S3 PXRD spectrum of NOP-48.

#### 4. Morphology analysis of NOP-47

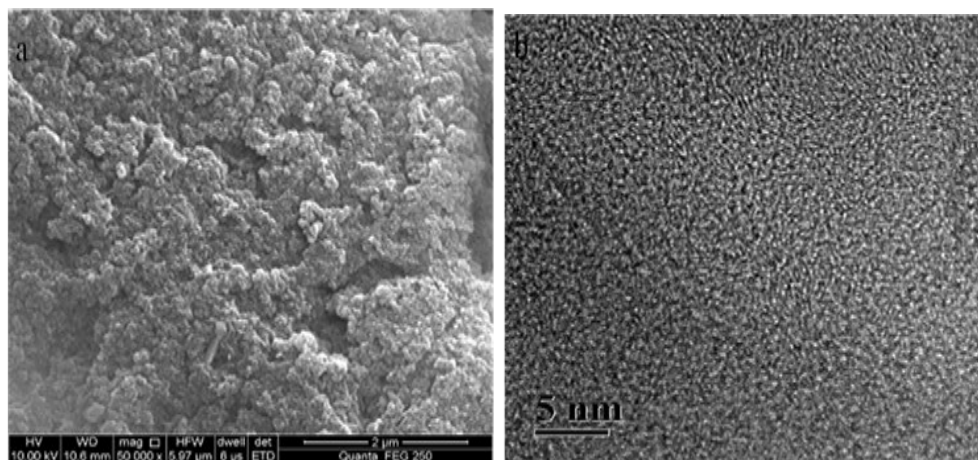


Fig.S4 Typical SEM image (a) and TEM image (b) of NOP-47

#### 5. TGA curves of NOPs

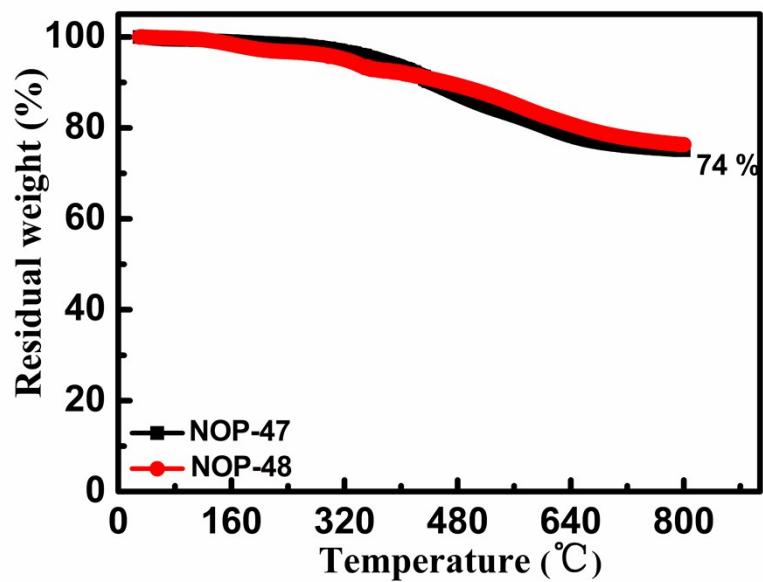


Fig.S5 TGA plots of NOPs under nitrogen atmosphere.

## 6. High-pressure methane adsorption curves for NOPs

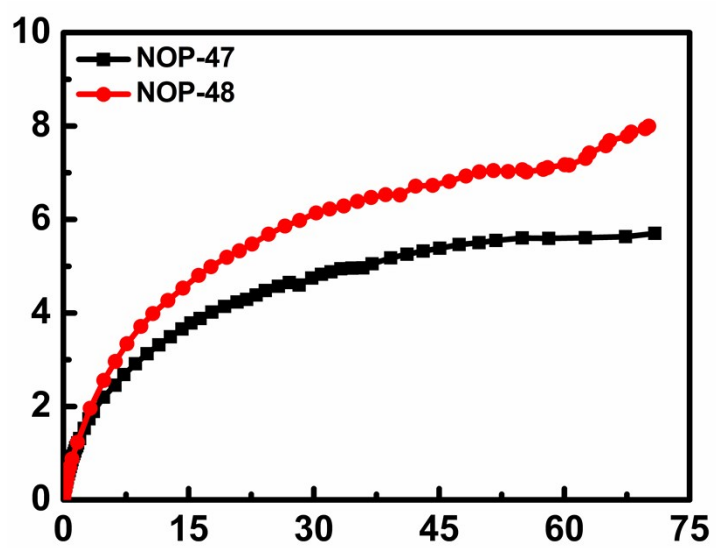


Fig.S6 CH<sub>4</sub> adsorption curves for NOPs at 298 K.

## 7. Selective gas adsorption for NOPs

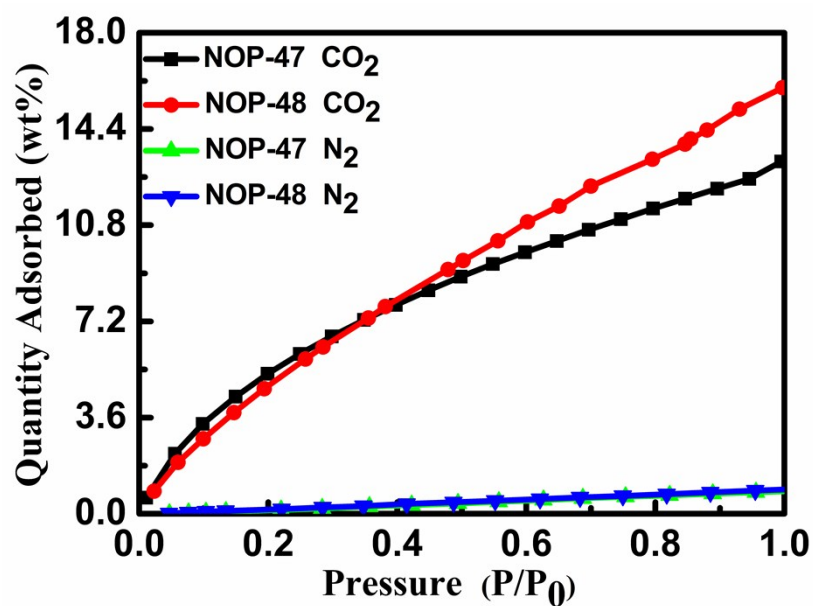


Fig.S7 CO<sub>2</sub> and N<sub>2</sub> adsorption isotherms of NOPs at 298 K.

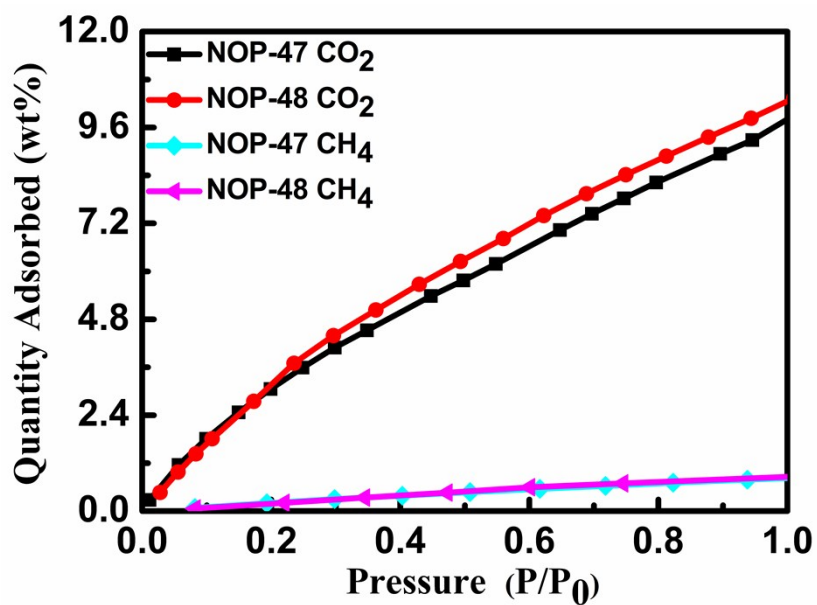


Fig.S8 CO<sub>2</sub> and CH<sub>4</sub> adsorption isotherms of NOPs at 298 K.

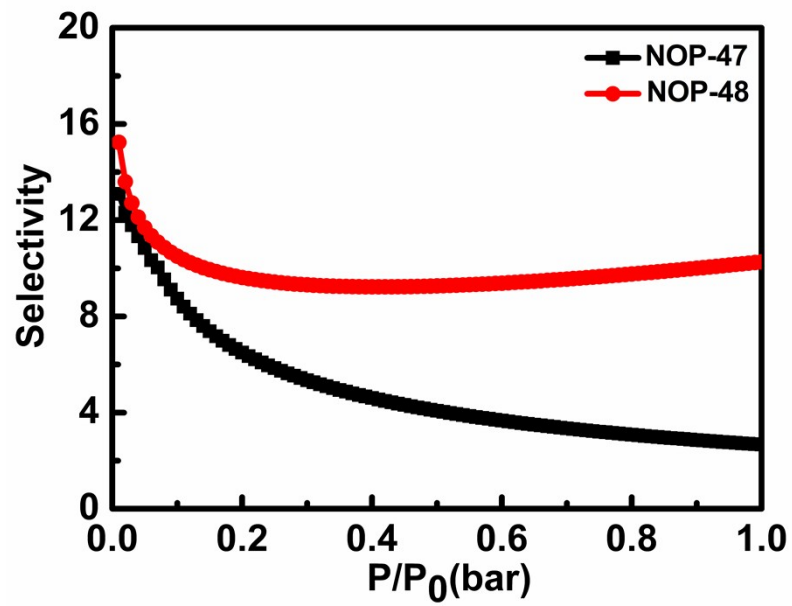


Fig.S9 IAST method for CO<sub>2</sub> over CH<sub>4</sub> selectivities for NOPs at 298 K