

# **Supporting Information**

## **Carboxyl-, Hydroxyl- and Nitro-Functionalized Porous Polyaminals for Highly Selective CO<sub>2</sub> Capture**

Biao Zhang<sup>a,b</sup>, Jun Yan<sup>a</sup>, Guiyang Li<sup>a,c</sup> and Zhonggang Wang<sup>a\*</sup>

<sup>a</sup> Department of Polymer Science and Materials, School of Chemical Engineering, Dalian University of Technology, Dalian 116024, China

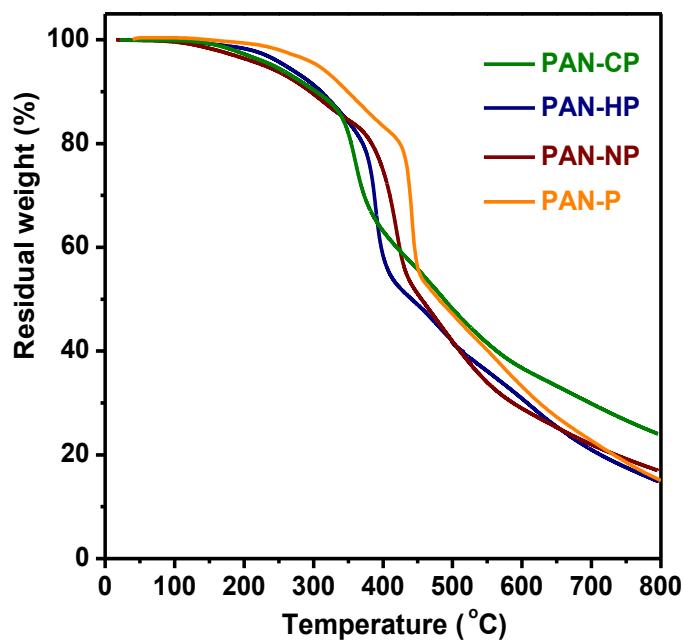
<sup>b</sup> Key Laboratory of Low Dimensional Materials and Application Technology of Ministry of Education, School of Materials Science and Engineering, Xiangtan University, Xiangtan 411105, China.

<sup>c</sup> Aerospace Research Institute of Materials & Processing Technology, Beijing 100076, China

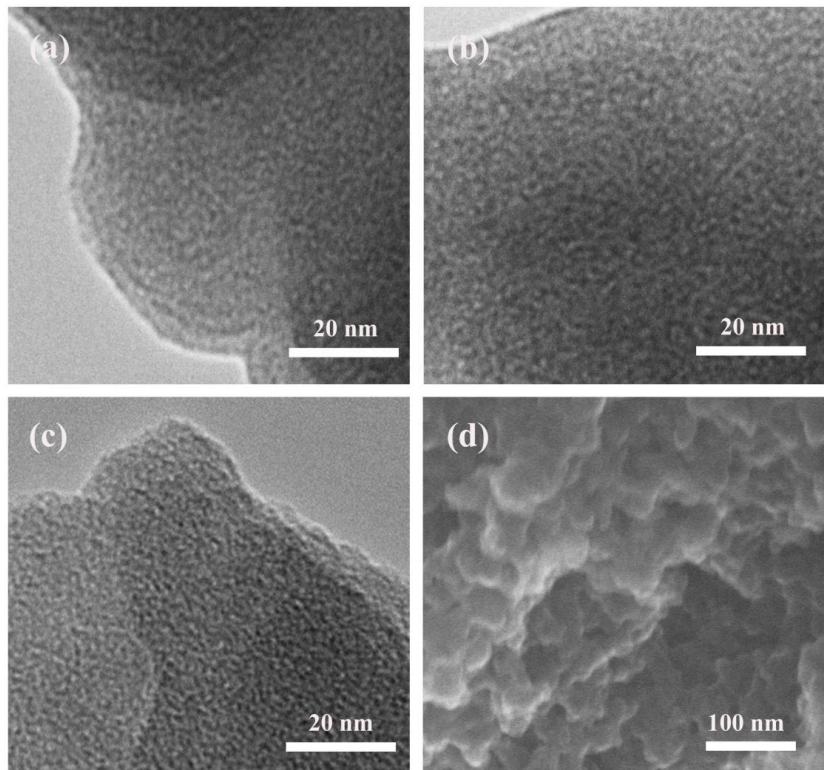
Email: zgwang@dlut.edu.cn<sup>\*</sup>

**Table S1.** Elemental composition of PANs measured by XPS method.

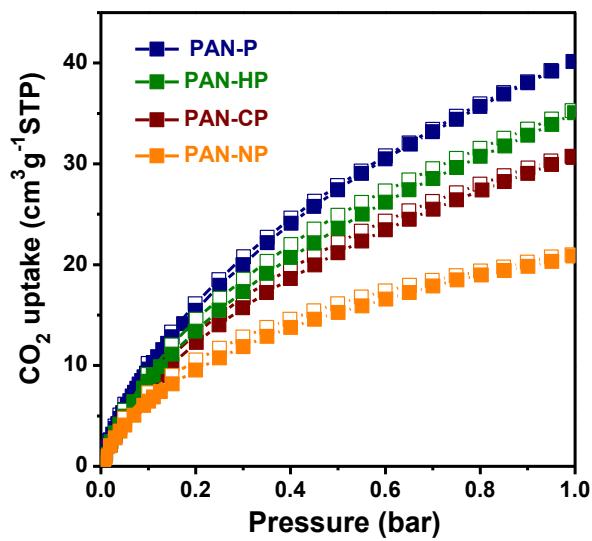
Samples	C	N	O	N/C	O/C
PAN-P	74.37	25.63	0	0.35	0
PAN-CP	68.61	11.58	19.81	0.17	0.29
PAN-HP	70.39	19.82	9.79	0.28	0.14
PAN-NP	57.14	22.67	20.19	0.40	0.35



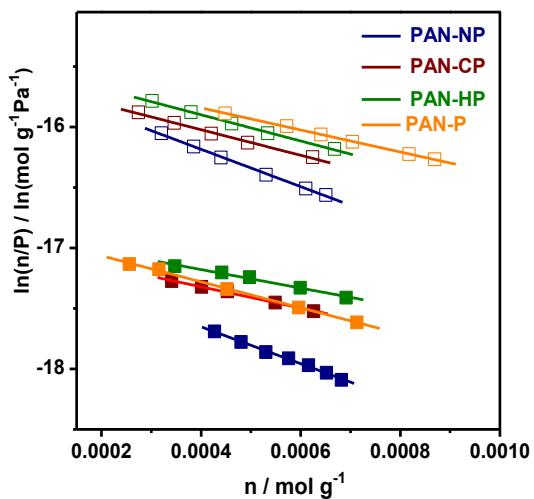
**Figure S1.** TGA curves of PAN-P, PAN-CP, PCN-HP and PAN-NP.



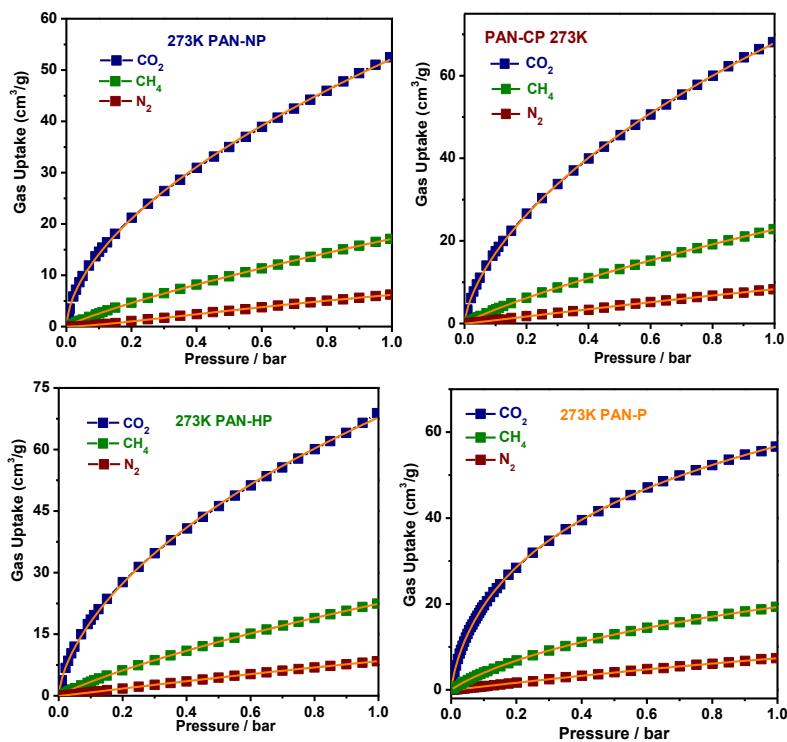
**Figure S2.** HR-TEM images of PAN-NP (a), PAN-CP (b), PAN-HP (c), and FE-SEM image of PAN-NP (d).



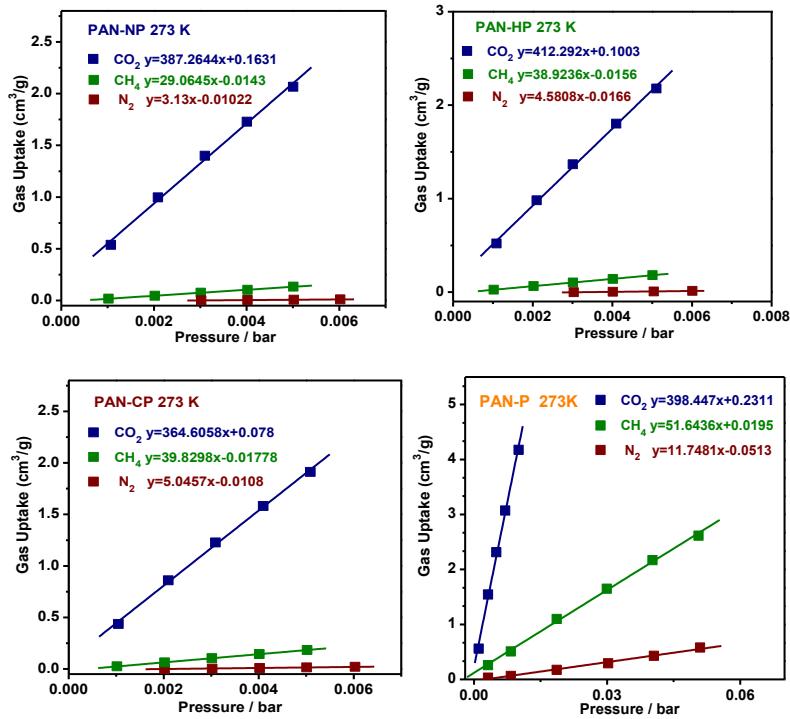
**Figure S3.** Adsorption (filled) and desorption(empty) isotherms of  $\text{CO}_2$  for PANs at 298 K.



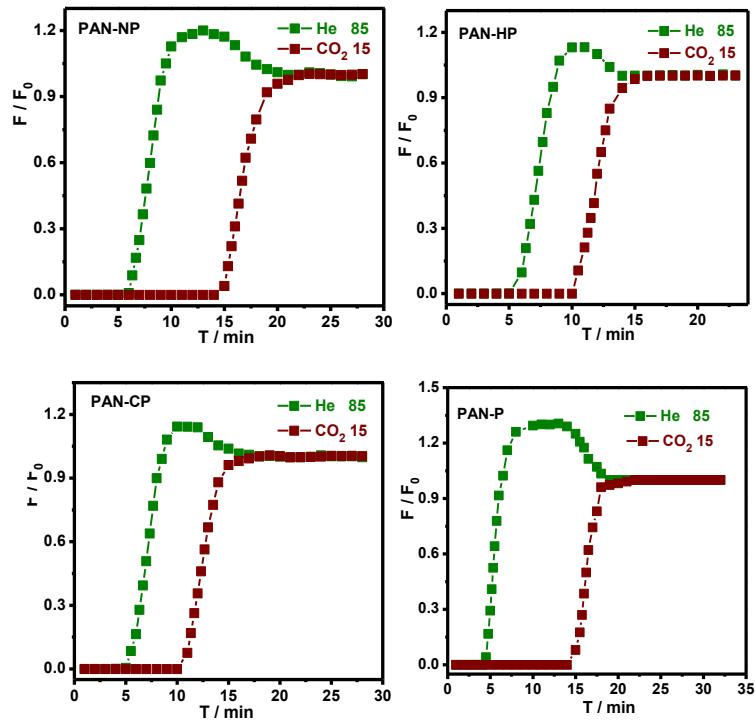
**Figure S4.** Virial plots of  $\text{CO}_2$  in PAN-P, PAN-CP, PCN-HP and PAN-NP.



**Figure S5.** Experimental adsorption isotherms for  $\text{CO}_2$ ,  $\text{CH}_4$  and  $\text{N}_2$  at 273 K, and their single-site Langmuir-Freundlich fitting curves (solid).



**Figure S6.** Adsorption selectivity of CO<sub>2</sub> over CH<sub>4</sub> and N<sub>2</sub> for PANs calculated from initial slope at 273 K.



**Figure S7.** Breakthrough curves of polymers for a mixture of 0.15/0.85 CO<sub>2</sub>/He at 273 K.