Electronic Supplementary Material (ESI) for RSC Advances.

Electronic Supplementary Information

Geopolymer Template Route to Micro- and Meso-porous Carbon

Yi-Rong Pei,[a] Jae-Hun Yang,[b] Goeun Choi[c] and Jin-Ho Choy *[cd]

[a] *Department of Chemistry and Nanoscience, Ewha Womans University, Seoul 03760, Korea.*
[b] *Global Innovative Center for Advanced Nanomaterials (GICAN), School of Engineering, Faculty of Engineering and Built Environment, The University of Newcastle, Callaghan, New South Wales 2308, Australia.*
[c] *Intelligent Nanohybrid Materials Laboratory (INML), Institute of Tissue Regeneration Engineering (ITREN), Dankook University, Cheonan 31116, Korea.*
[d] *Tokyo Tech World Research Hub Initiative (WRHI), Institute of Innovative Research, Tokyo Institute of Technology, Yokohama 226-8503, Japan.*
E-mail: jhchoy@dankook.ac.kr

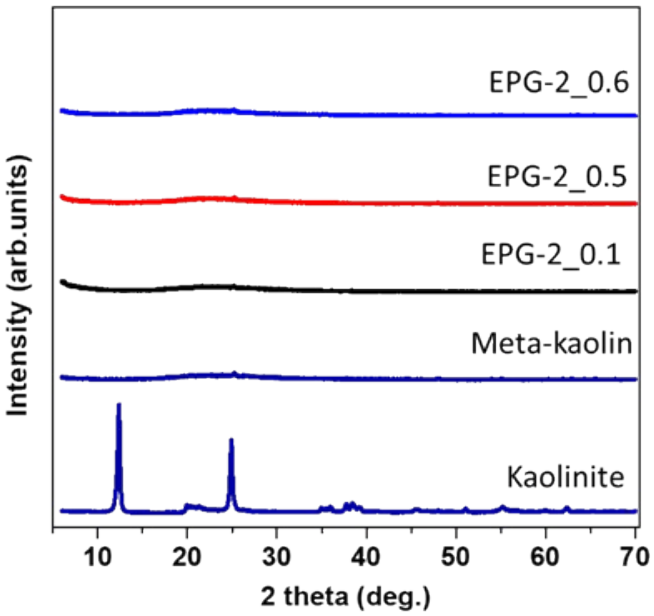
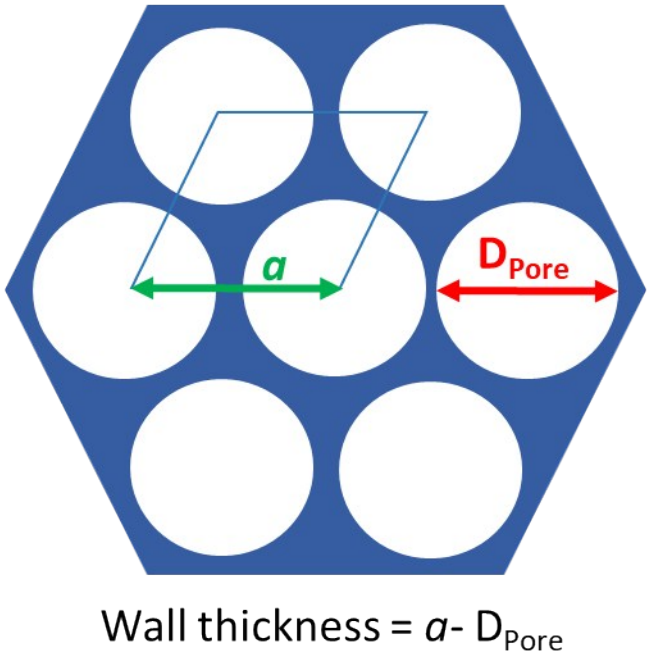


Figure S1. Powder x-ray diffraction pattern in wide angle range of kaolinite, meta-kaolin derived through dihydroxylation of kaolinite at 750 ^{0}C for 10 h and EPG-2_0.1, EPG-2_0.5, EPG-2_0.6 which were synthesized with the molar ratio of CTAB/(Si+Al) = 0.1, 0.5 and 0.6.



Scheme S1 Structure model of porous geopolymer EPG-2_0.1.

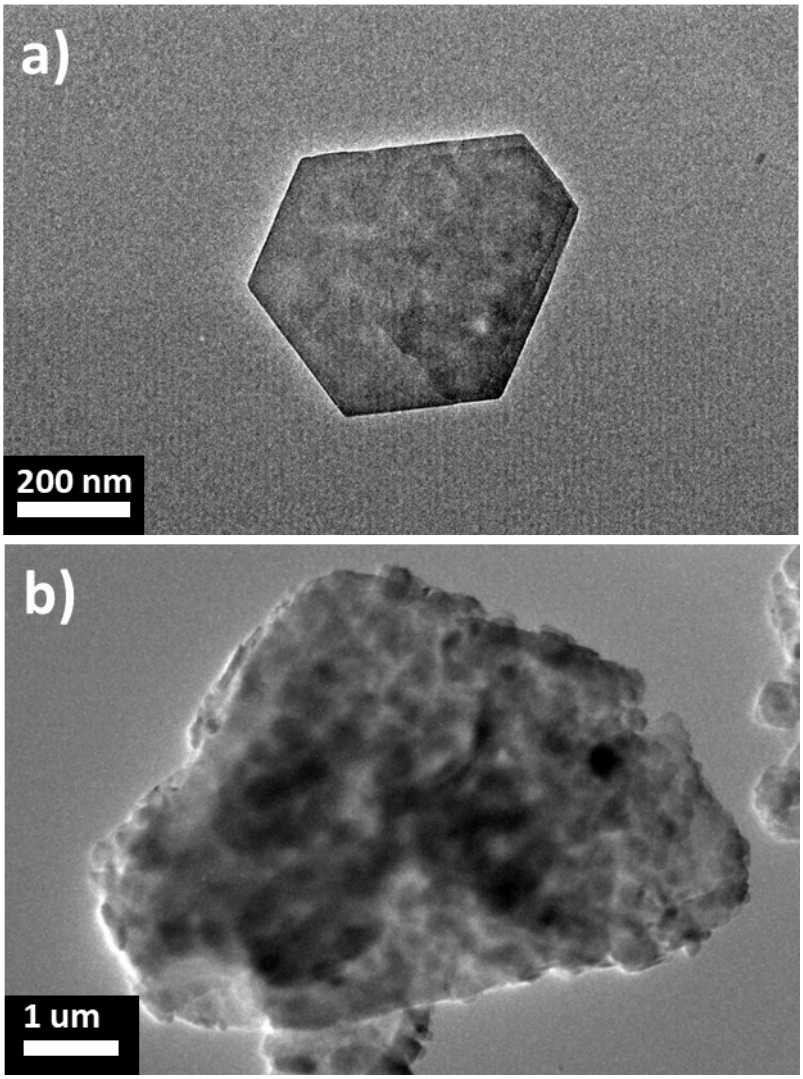


Figure S2. TEM images of a) kaolinite and b) meta-kaolin.

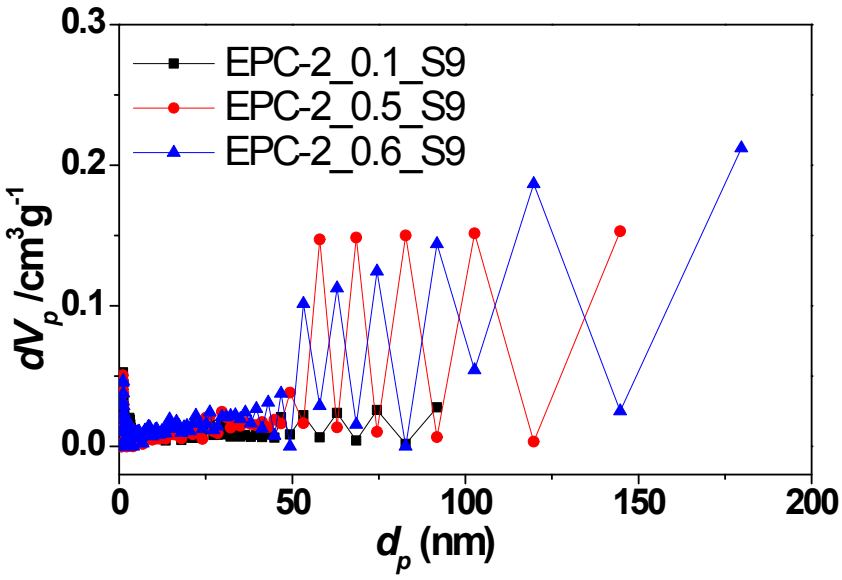


Figure S3. NLDFT pore size distribution of EPC-2_0.1_S9, EPC-2_0.5_S9 and EPC-2_0.6_S9 in the pore size range of 0 ~ 200 nm.

Table S1. Structural parameters and CO_2 uptakes of EPC-2_0.1_S9, EPC-2_0.5_S9, EPC-2_0.6_S9 and carbon materials from literatures.

	CO_2 adsorption (mmol/g)	Temperature (K)	Pressure (atm)	Reference
EPC-2_0.1_S9	3.04	273	1	This work
EPC-2_0.5_S9	2.77	273	1	This work
EPC-2_0.6_S9	2.80	273	1	This work
Porous Carbon (C)	2.8	273	1	1
Mesoporous carbon (CMK-3)	1.7	298	1	2
Activated graphite fibres (G-900)	1.3	298	1	3
Activated carbon	< 0.50	273	1	4
	3.66	273	30	4
Multi-walled CNT	< 0.50	273	1	4
	5.63	273	30	4

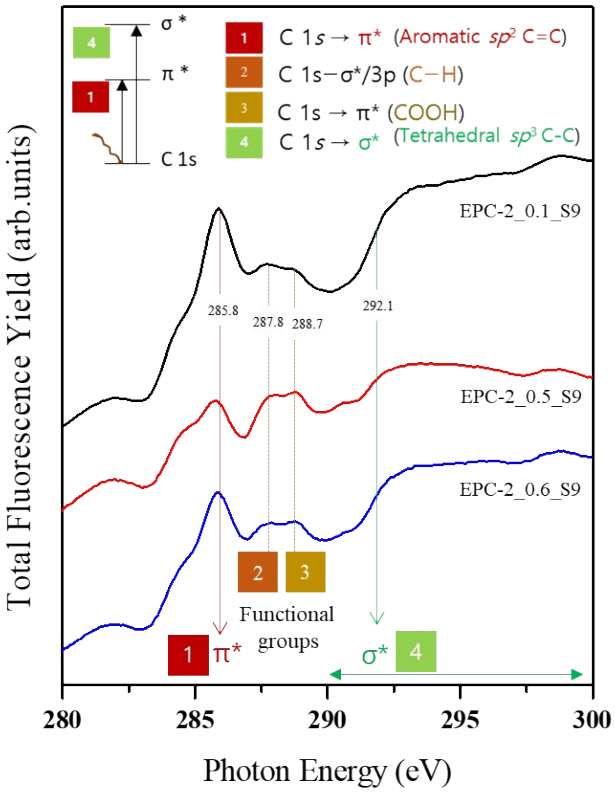


Figure S4. Normalized Carbon K-edge XANES spectra of as-prepared porous carbons, EPC-2_0.1_S9, EPC-2_0.5_S9 and EPC-2_0.6_S9.

References

1. J. Ludwinowicz and M. Jaroniec, *Carbon*, **2015**, *82*, 297.

2. a) M. Sevilla and A. B. Fuertes, *Energy Environ. Sci.*, **2011**, *4*, 1765; b) G. Chandrasekar, W. J. Son and W. S. Ahn, *J. Porous Mater.*, **2009**, *16*, 545.

3. J. Przepiorski, M. Skrodzewicz and A. W. Morawski, *Appl. Surf. Sci.*, **2004**, *225*, 235.

4. K. S. Lakhi, A. V. Baskar, J. S. M. Zaidi, S. S. Al-Deyab, M. E. Newehy, J. -H. Choy and A. Vinu, *RSC Adv.*, **2015**, *5*, 40183.