Electronic Supplementary Material (ESI) for Sustainable Energy & Fuels.

The effect of KOH concentration in chemical activation of porous carbon sorbents for carbon dioxide uptake and carbon dioxide-methane selectivity: the relative formation of micro (<2 nm) versus meso (> 2 nm) porosity†

Saunab Ghosh[a] and Andrew R. Barron[a,b,c]*

Electronic Supplementary Material

Table S1. IR frequencies and functional groups present in PTh.

IR frequency (cm^{-1})	Functional groups
720-830	C-S stretching vibrations
1045	C-O-C asymmetric stretching vibrations
1260	CH_2-S wagging vibrations
1345	C-C stretching vibrations
1435, 1515	C=C symmetric stretching vibrations of the thiophene ring
1670	C=C asymmetric stretching vibrations of the thiophene ring

Table S2. Summary of PC and SPC samples studied with their molar gas uptakes and selectivity for CO_2 over CH_4 at different uptake pressures.

	CO_2 uptake ($mmol.g^{-1}$) at			CH_4 uptake ($mmol.g^{-1}$) at			Molar (CO_2 : CH_4) uptake ratio		
Sample[a]	10 bar	20 bar	30 bar	10 bar	20 bar	30 bar	10 bar	20 bar	30 bar
Act. charcoal[c]	6.27	7.51	8.45	4.28	5.44	6.03	1.46	1.38	1.41
BPL*	6.30	7.87	8.66	3.24	4.96	6.18	1.94	1.59	1.40
SPC-1	10.01	12.85	14.68	4.425	5.90	6.85	2.26	2.18	2.14
SPC-2	10.56	15.62	19.18	4.20	6.11	7.17	2.51	2.56	2.68
SPC-3	12.96	18.64	22.64	5.30	7.34	8.96	2.45	2.54	2.53
SPC-4	11.92	17.30	21.82	5.06	7.16	9.03	2.36	2.41	2.42
SPC-5	11.48	16.73	21.29	5.13	7.27	8.81	2.24	2.30	2.41

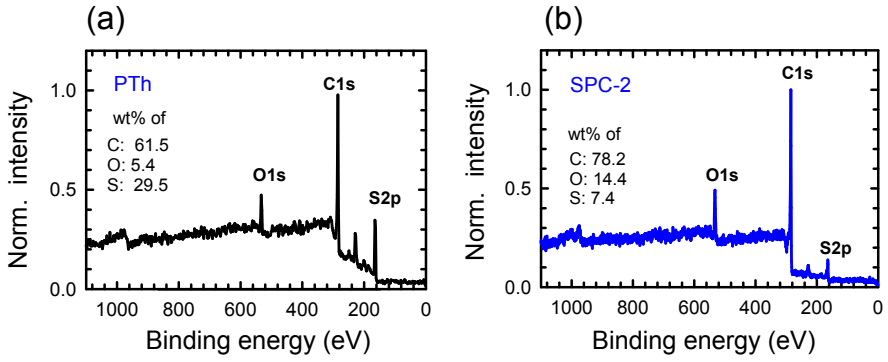

Fig. S1. Characterization of chemical composition of polymer precursor and activated SPC samples by XPS spectroscopy. Typical XPS survey scans for (a) the PTh precursor and (b) activated SPC-700-2 samples.

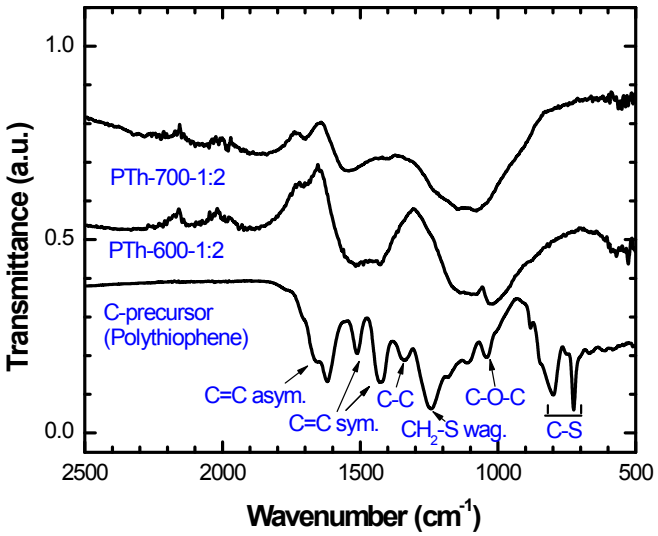

Fig. S2. FTIR spectra of carbon precursor (PTh) and activated SPC samples at 2 different temperatures.

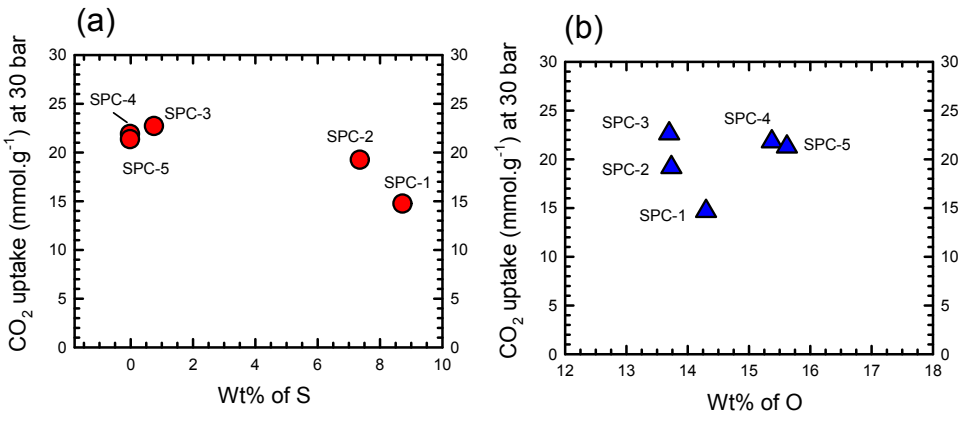

Fig. S3 High pressure CO_2 uptake as a function of (a) S wt% and (b) O wt% in SPC samples activated with different KOH:PTh ratio. Experiments were performed at 24 °C.

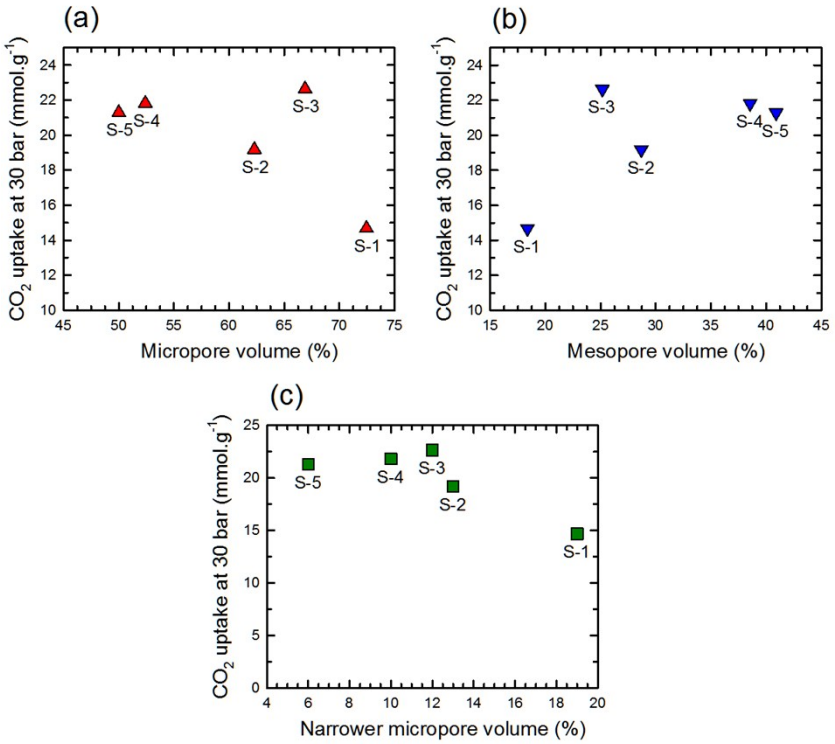

Fig. S4 percentages of pore volumes for micropores, narrower micropores and mesopores versus CO_2 uptake.