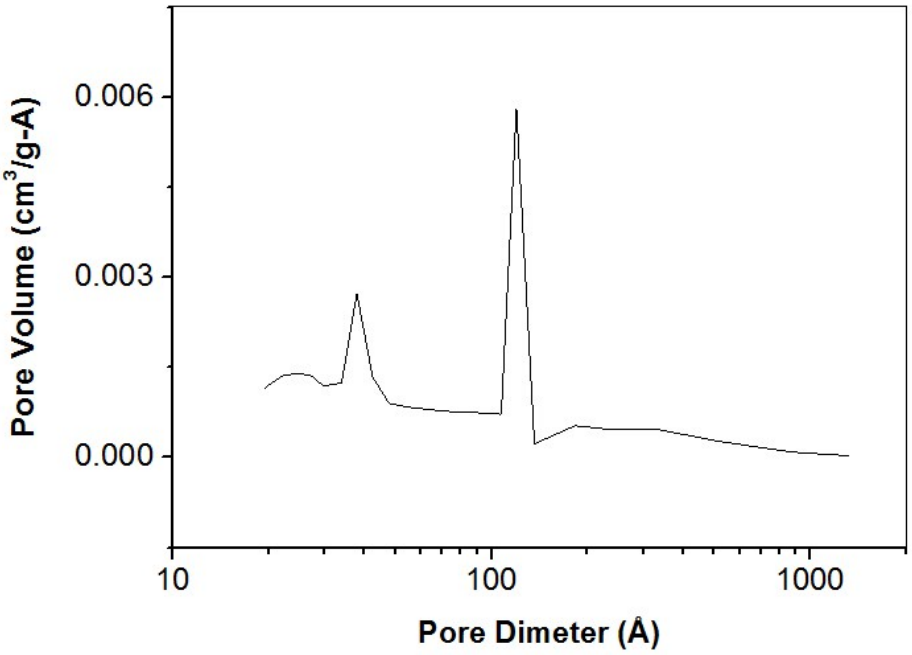
Electronic Supplementary Material (ESI) for Environmental Science: Processes & Impacts.

Supplementary Information

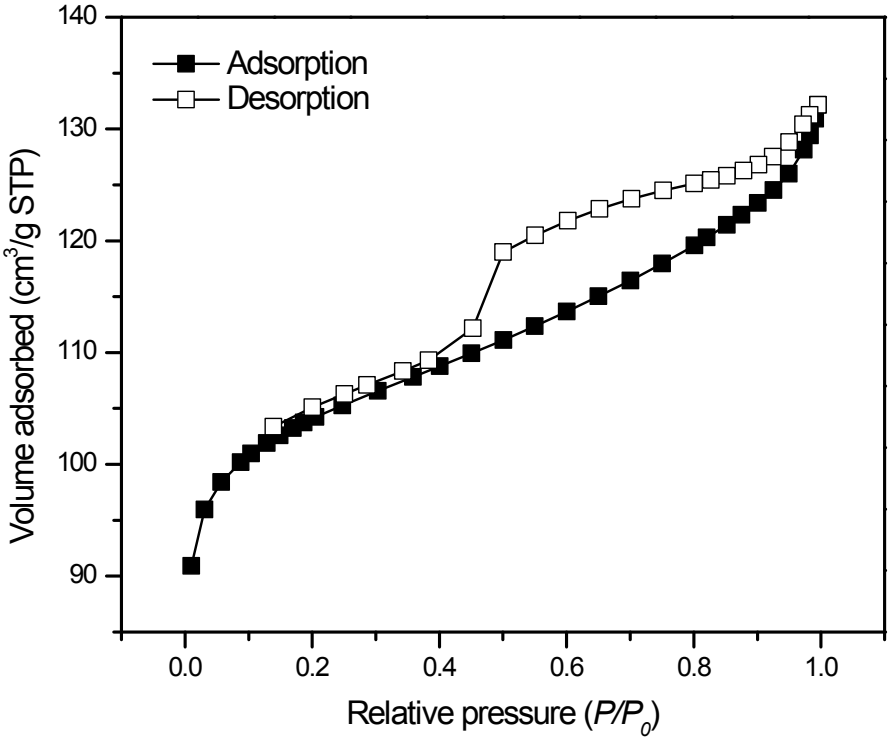
Table S1. Molecular descriptors of organic sorbates [37, 40].

Class of compounds	Compounds	*E*	*S*	*A*	*B*	*L*
alkane	*n*-pentane	0.000	0.00	0.00	0.00	2.162
	n-hexane	0.000	0.00	0.00	0.00	2.688
	n-heptane	0.000	0.00	0.00	0.00	3.173
	cyclohexane	0.305	0.10	0.00	0.00	2.964
aromatic	benzene	0.610	0.52	0.00	0.14	2.786
chloroalkane	dichloromethane	0.387	0.57	0.10	0.05	2.019
	trichloromethane	0.425	0.49	0.15	0.02	2.480
	tetrachloromethane	0.458	0.38	0.00	0.00	2.823
chloroalkene	1,1-dichloroethylene	0.362	0.34	0.00	0.05	2.110
	trichloroethylene	0.524	0.53	0.12	0.03	2.997
alcohol	methanol	0.278	0.44	0.43	0.47	0.970
	ethanol	0.246	0.42	0.37	0.48	1.485
	2-propanol	0.212	0.36	0.33	0.56	1.764
ether	diethyl ether	0.041	0.25	0.00	0.45	2.015
ketone	acetone	0.179	0.70	0.04	0.49	1.696
ester	ethyl acetate	0.106	0.62	0.00	0.45	2.314
nitrile	acetonitrile	0.237	0.90	0.07	0.32	1.739

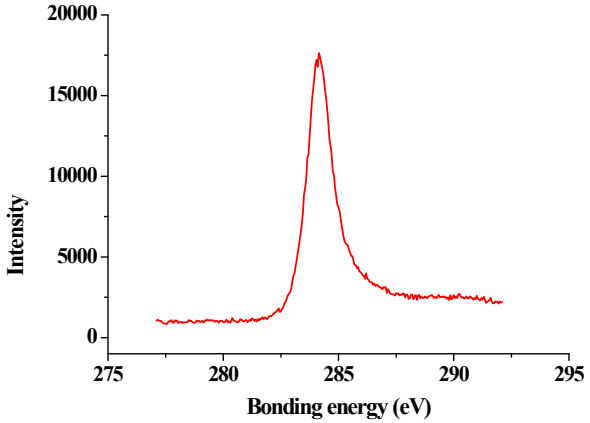
(a)


Pore Volume (cm³/g-A)
0.006
0.003
0.000
10
100
1000
Pore Dimeter (Å)

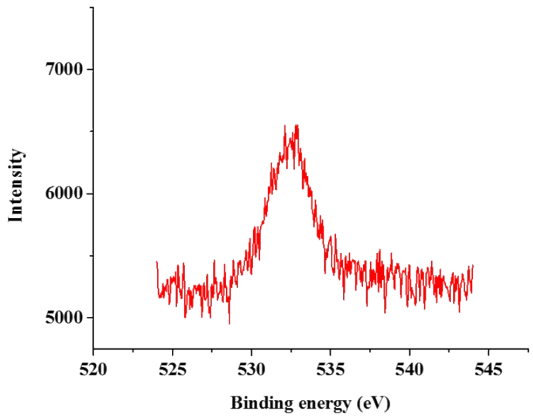
(b)


Adsorption
Desorption
Volume adsorbed (cm³/g STP)
140
130
120
110
100
90
0.0
0.2
0.4
0.6
0.8
1.0
Relative pressure (P/P0)

(c)



(d)



(e)

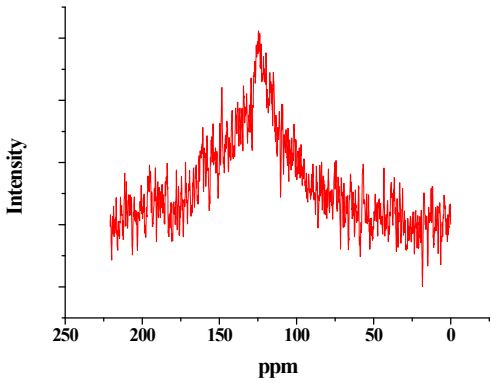


Figure S1. (a) Pore size distribution of MWCNT. (b) Adsorption and desorption isotherms of nitrogen on MWCNT. (c) XPS C_{1s} spectrum (284–285 eV). (d) XPS O_{1s} spectrum (530–535 eV). (e) ^{13}C NMR spectrum.

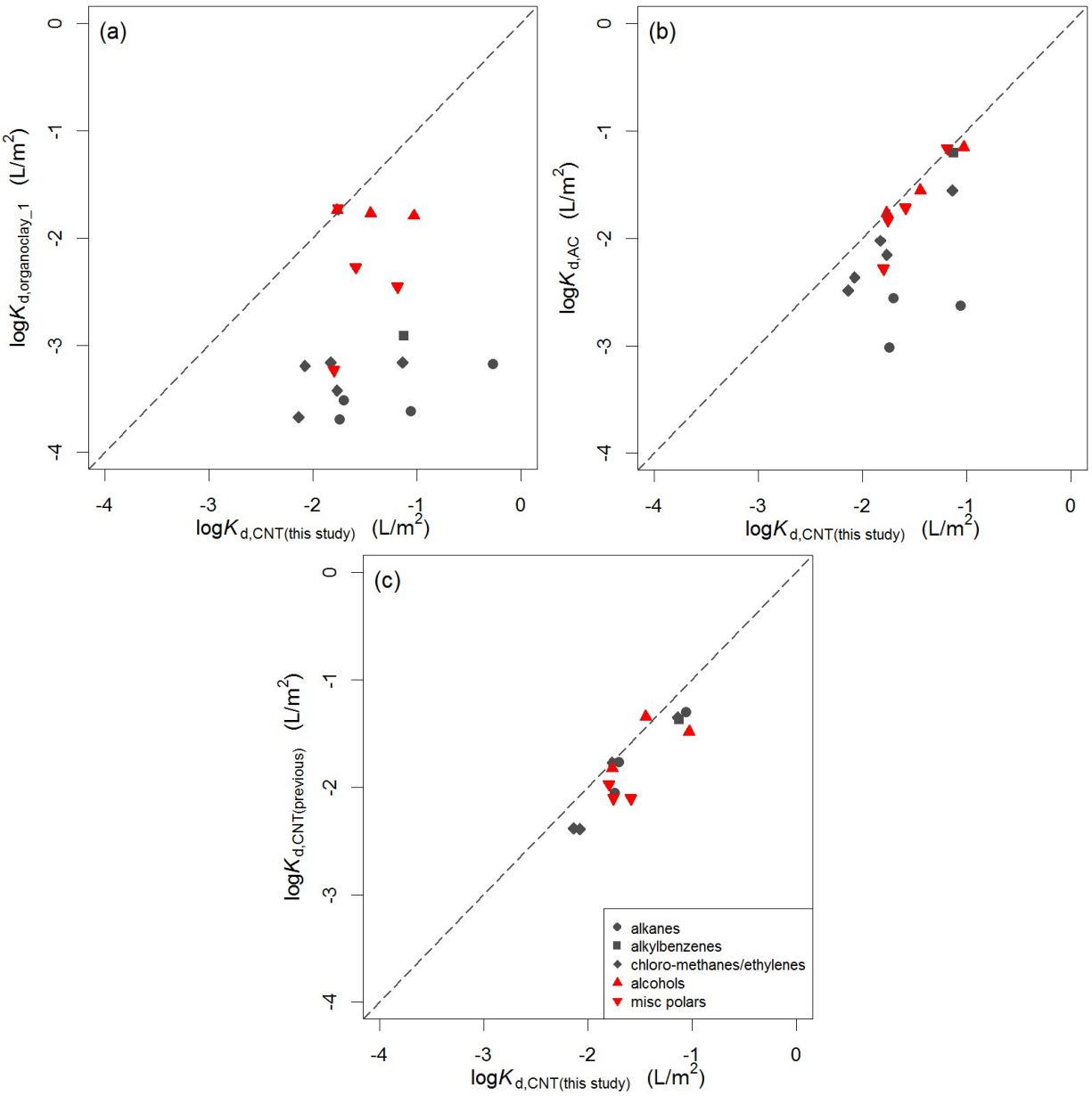


Figure S2. Surface area normalized logarithmic gas-solid partition coefficients (log K_d) of VOCs on the MWCNT (designated as '*this study*') compared with (a) organo-clay #1, (b) activated carbon, and (c) at another MWCNT (designated as '*previous*') at 90% RH. The long dashed-line is a 1-to-1 correspondence.

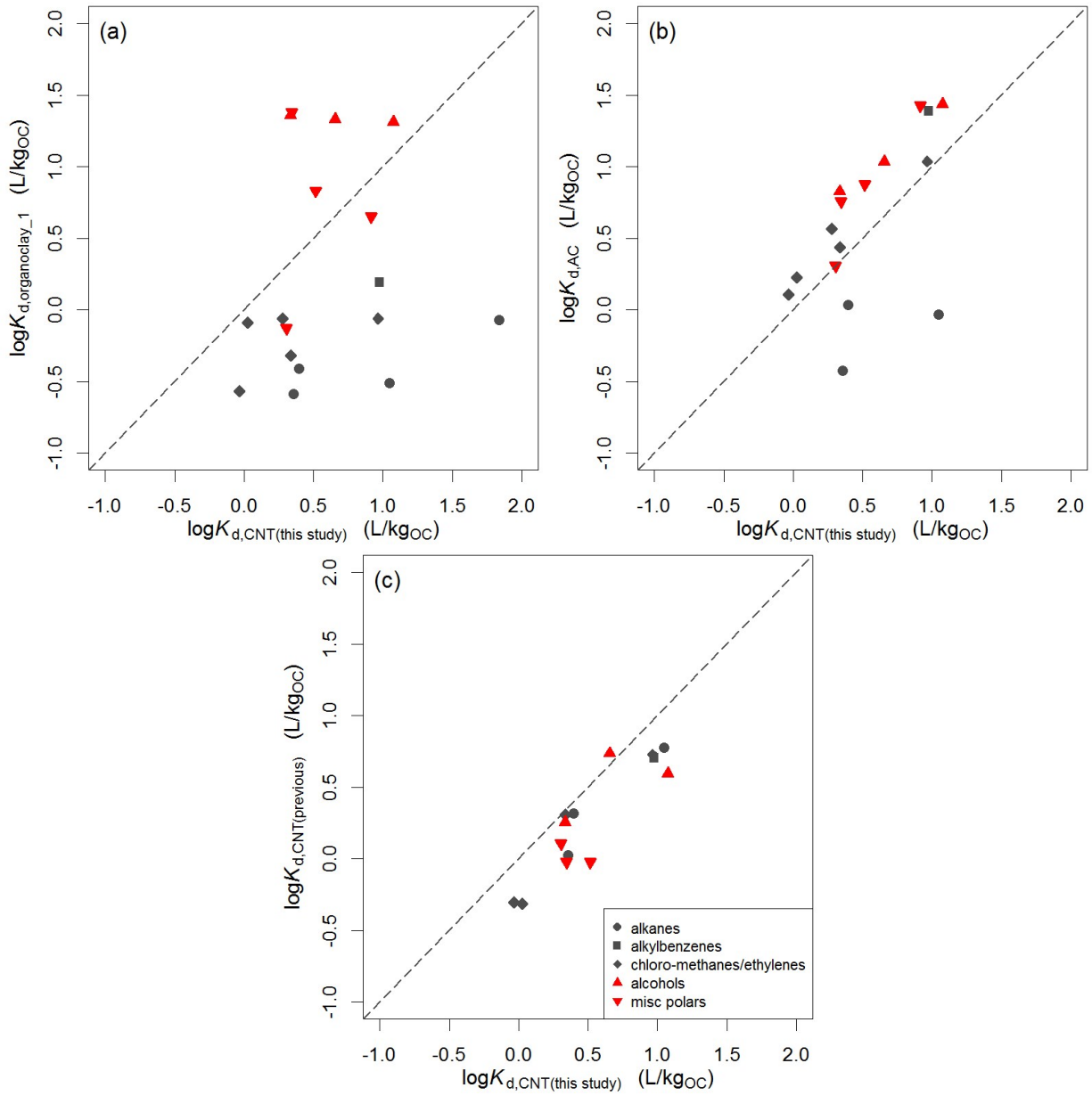


Figure S3. Organic carbon normalized logarithmic gas-solid partition coefficients (log K_d) of VOCs on the MWCNT (designated as '*this study*') compared with (a) organo-clay #1, (b) activated carbon, and (c) at another MWCNT (designated as '*previous*') at 90% RH. The long dashed-line is a 1-to-1 correspondence.

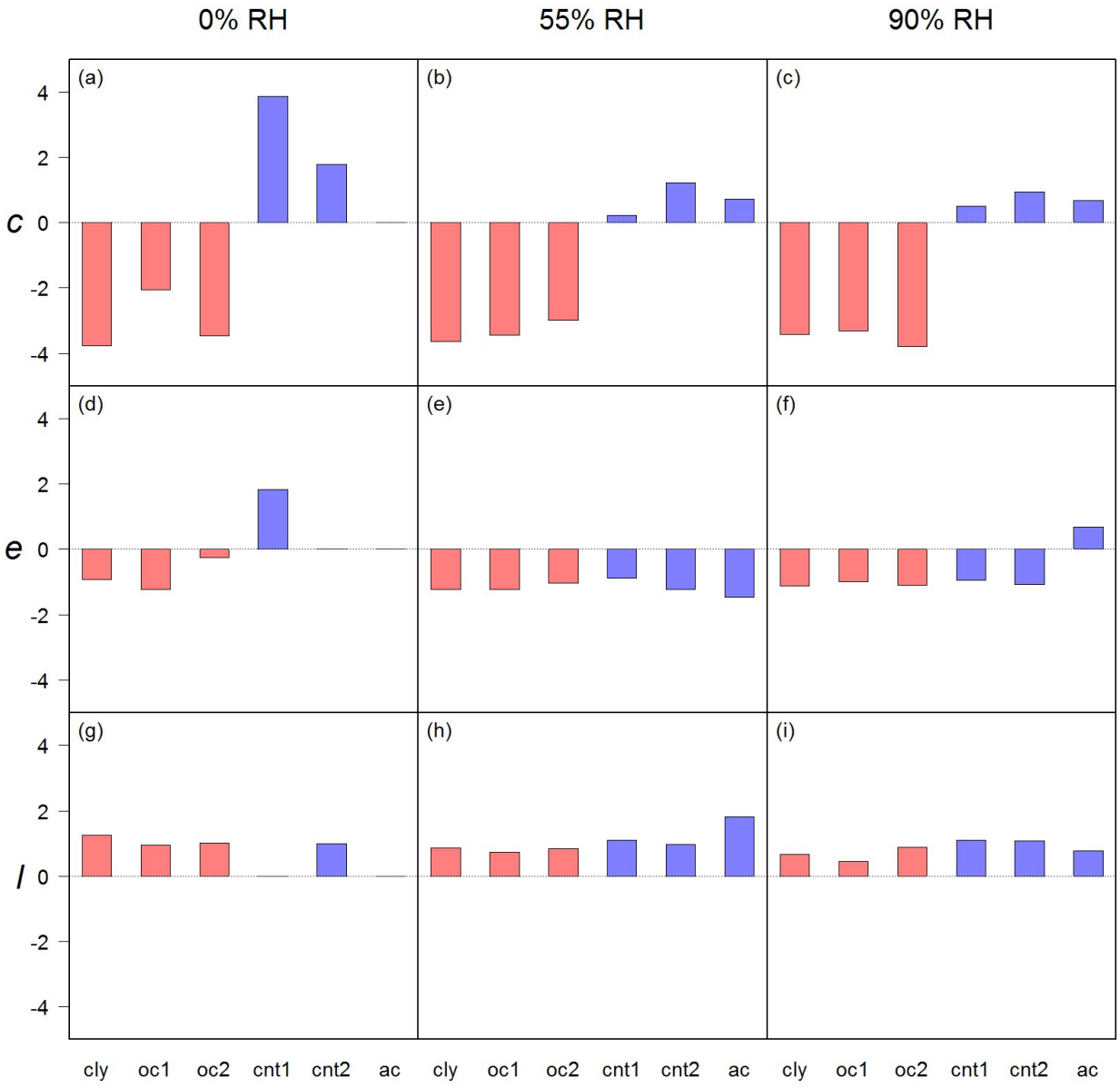


Figure S4. Magnitude of system parameters *c*, *e*, and *l* in the LFER's of gas-solid partitioning of VOCs on six sorbents: montmorillonite clay ('*cly*'), organo-clay #1 and #2 ('*oc1*' & '*oc2*'), MWCNT #1 (previous study) and #2 (this study) ('*cnt1*' & '*cnt2*'), and activated carbon ('*ac*') at the three relative humidities of 0% RH ((a), (d), and (g)), 55% RH ((b), (e), and (h)), and 90% RH ((c), (f), and (i)). Clay-dominant sorbents are marked in red and condensed carbonaceous sorbents are marked in blue.

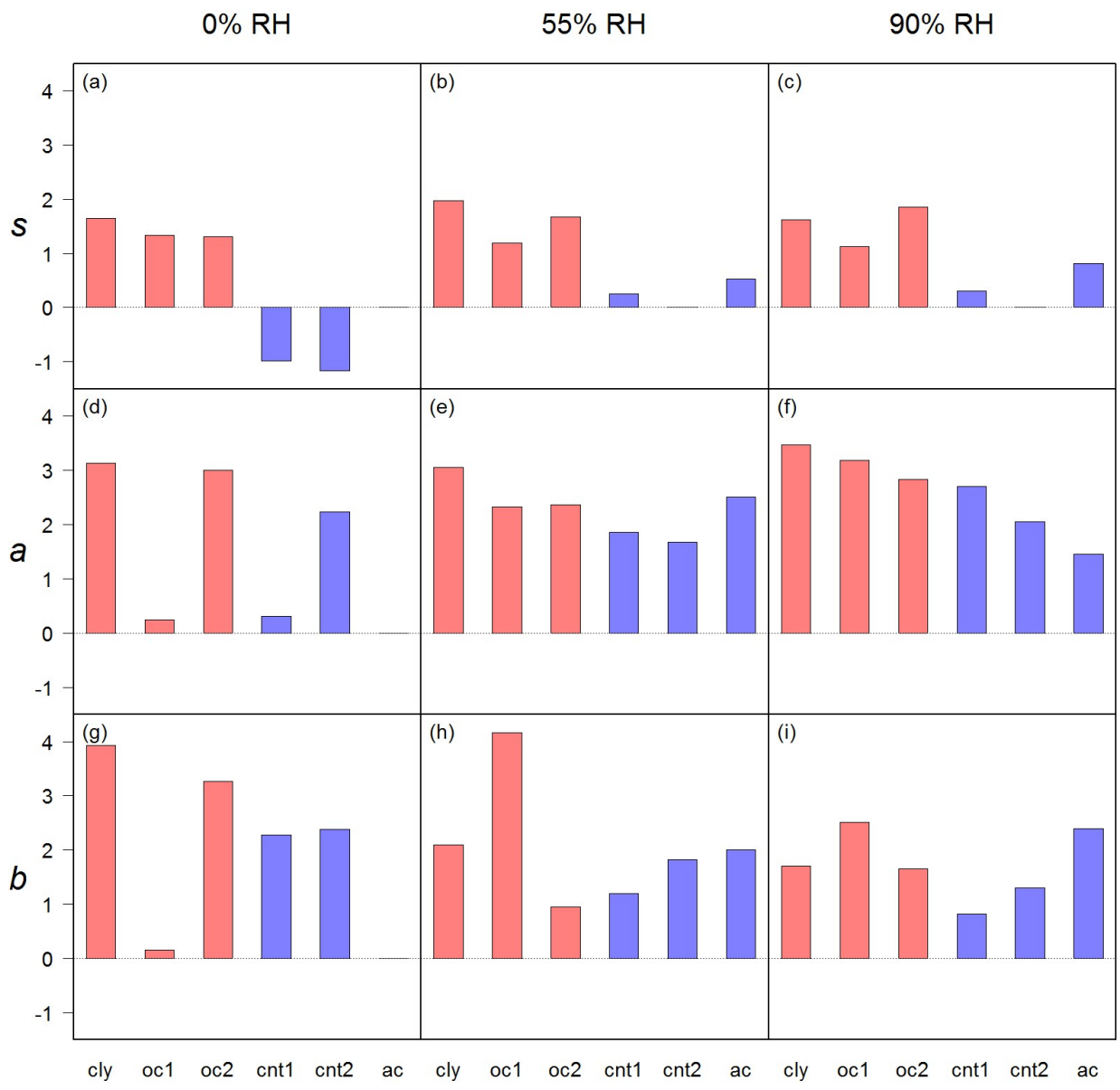


Figure S5. Magnitude of system parameters *s*, *a*, and *b* in the LFER's of gas-solid partitioning of VOCs on six sorbents: montmorillonite clay ('*cly*'), organo-clay #1 and #2 ('*oc1*' & '*oc2*'), MWCNT #1 (previous study) and #2 (this study) ('*cnt1*' & '*cnt2*'), and activated carbon ('*ac*') at the three relative humidities of 0% RH ((a), (d), and (g)), 55% RH ((b), (e), and (h)), and 90% RH ((c), (f), and (i)). Clay-dominant sorbents are marked in red and condensed carbonaceous sorbents are marked in blue.