Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Superhydrophobic SiO_2-based Nanocomposite being Modified with Organic Groups as Catalyst for Selective Oxidation of Ethylbenzene

*Chen Chen [a], Song Shi [a], Min Wang [a], Hong Ma [a], Lipeng Zhou [b], Jie Xu [a]**

[a] State Key Laboratory of Catalysis, Dalian National Laboratory for Clean Energy, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian 116023, P. R. China.

[b] Institute of Catalysis, Department of Chemistry, Zhengzhou University, 100 Kexue Road, Zhengzhou 450001, PR China

E-mail: xujie@dicp.ac.cn

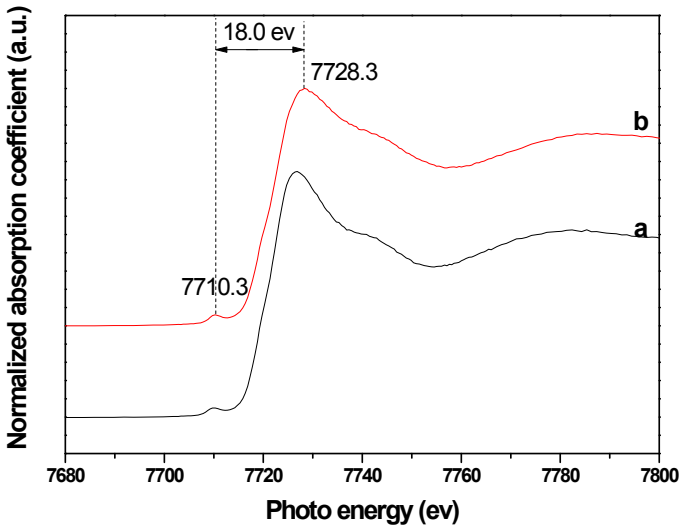


Fig. S1. Co K-edge XANES spectra for (a) Co-SiO_2 and (b) Pr-Co-SiO_2

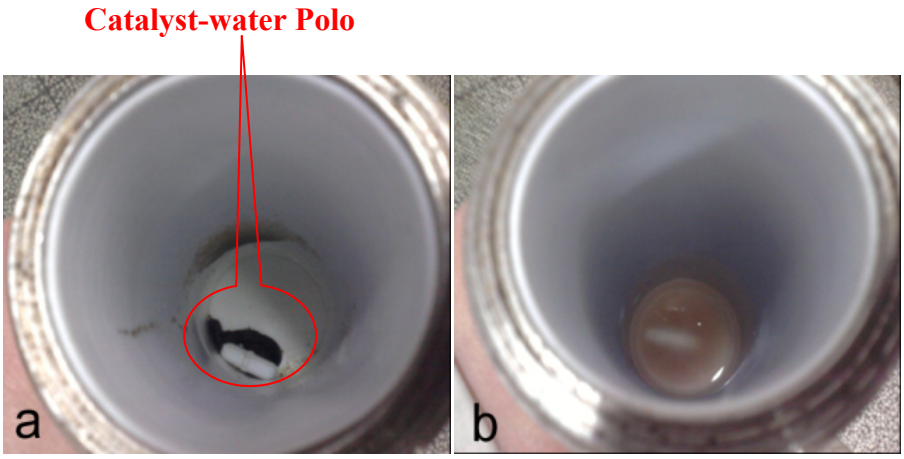


Fig. S2. Comparison of reaction mixture after catalytic reaction with hydrophilic Co-SiO_2 (a) and superhydrophobic Pr-Co-SiO_2 (b) as catalyst, respectively

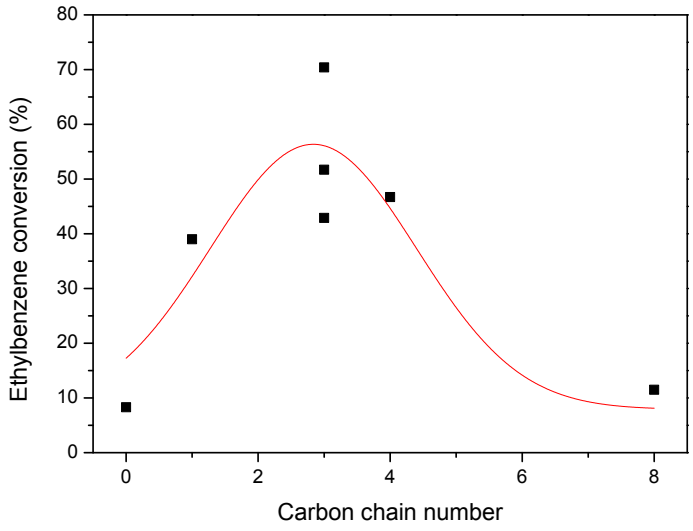
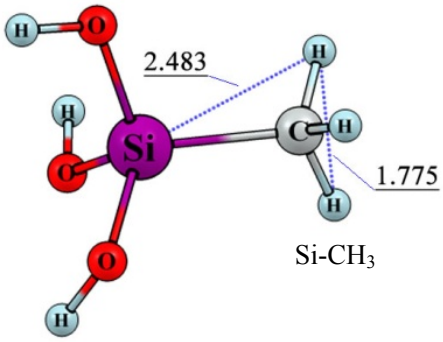
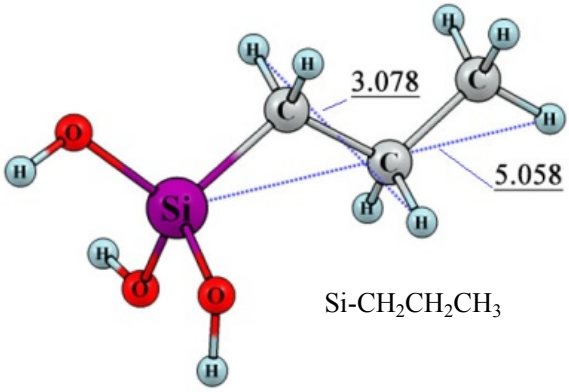


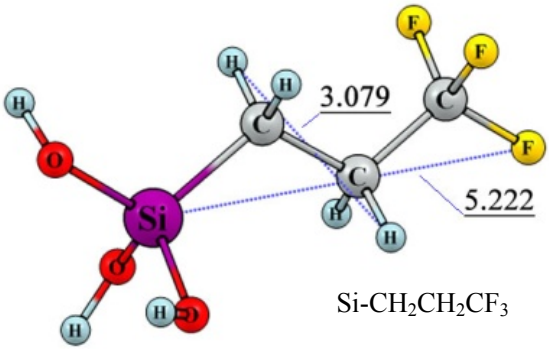
Fig. S3. Relationship between ethylbenzene conversion and carbon chain number of the organic groups



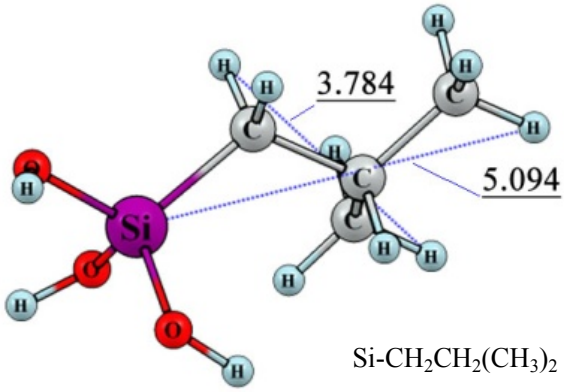
Si-CH_3



Si-$CH_2CH_2CH_3$



Si-$CH_2CH_2CF_3$



Si-$CH_2CH_2(CH_3)_2$

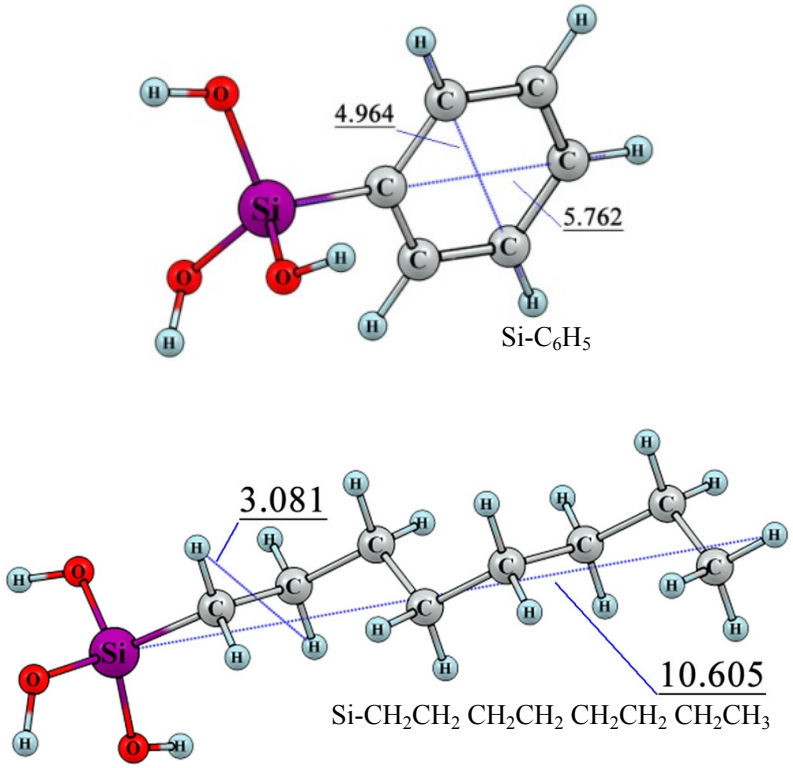


Fig. S4. Geometric information of different organic groups bonding on the surface of SiO_2.

Table S1. Catalytic performance of Pr-Co-SiO_2 and various reported catalytic system in literature for selective oxidation of ethylbenzene

Catalyst	Temp. (K)	Time (h)	O_2 Pressure (MPa)	Solvent	Conv. (%)	Selectivity of Main Products		Ref.
						Ketone	Alcohol	
Pr-Co-SiO_2	393	6	1.0	-	70.4	87.5	6.4	Present work
Mn-MgAl hydrotalcite	408	5	1.0	-	50.3	96.7	Not Mentioned	54
Cobalt(Ⅲ) Pyridinecarboxamide	423	8	1.6	-	70.8	86.1	1.5	48
Cobalt(Ⅲ) Pyridinecarboxamide	393	4	1.6	-	49.8	88.0	9.3	48
Carbon nanotube	428	4	1.5	CH_3CN	38.2	60.9	9.8	9
Co/SBA-15	393	6	1.0	-	37.3	74.3	19.0	11
MnS-1	383	6	1.0	-	33	87	13	55
DACAQ/NHPI/HY	353	10	0.3	CH_3CN	66.2	95.8	4.2	56
DDQ/NHPI	353	6	0.3	CH_3CN	59.3	88.2	6.2	57