Supporting Information

Size-dependent adsorption and its application in determining surfactant molecule number on multimodal SiO_2 particles separately by 2D-DCS

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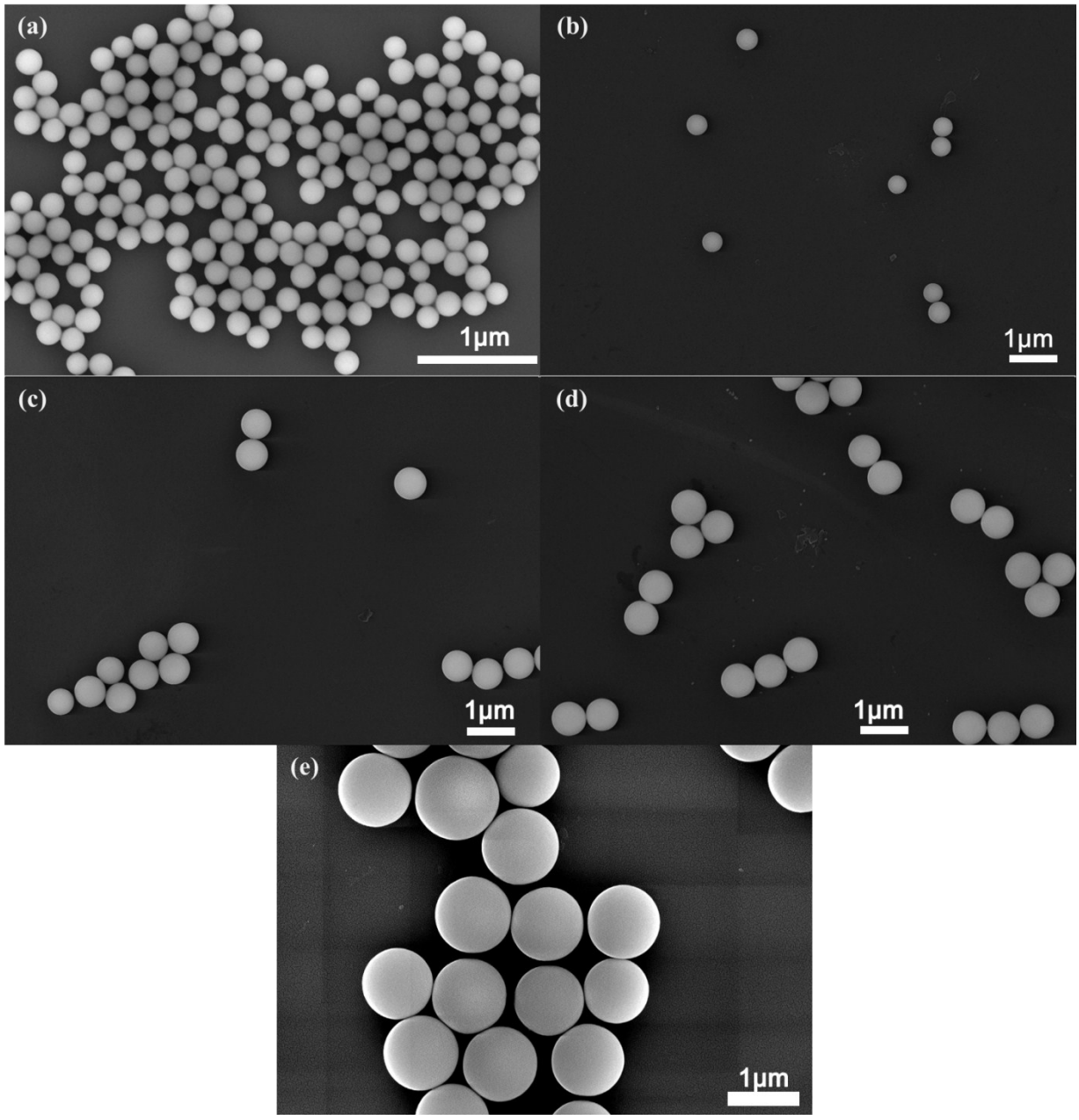

Figure S1. SEM images of the as-synthesized SiO_2 particles with average diameter of (a) 210nm, (b) 430nm, (c) 630nm, (d) 700nm, and (e) 1000nm, respectively

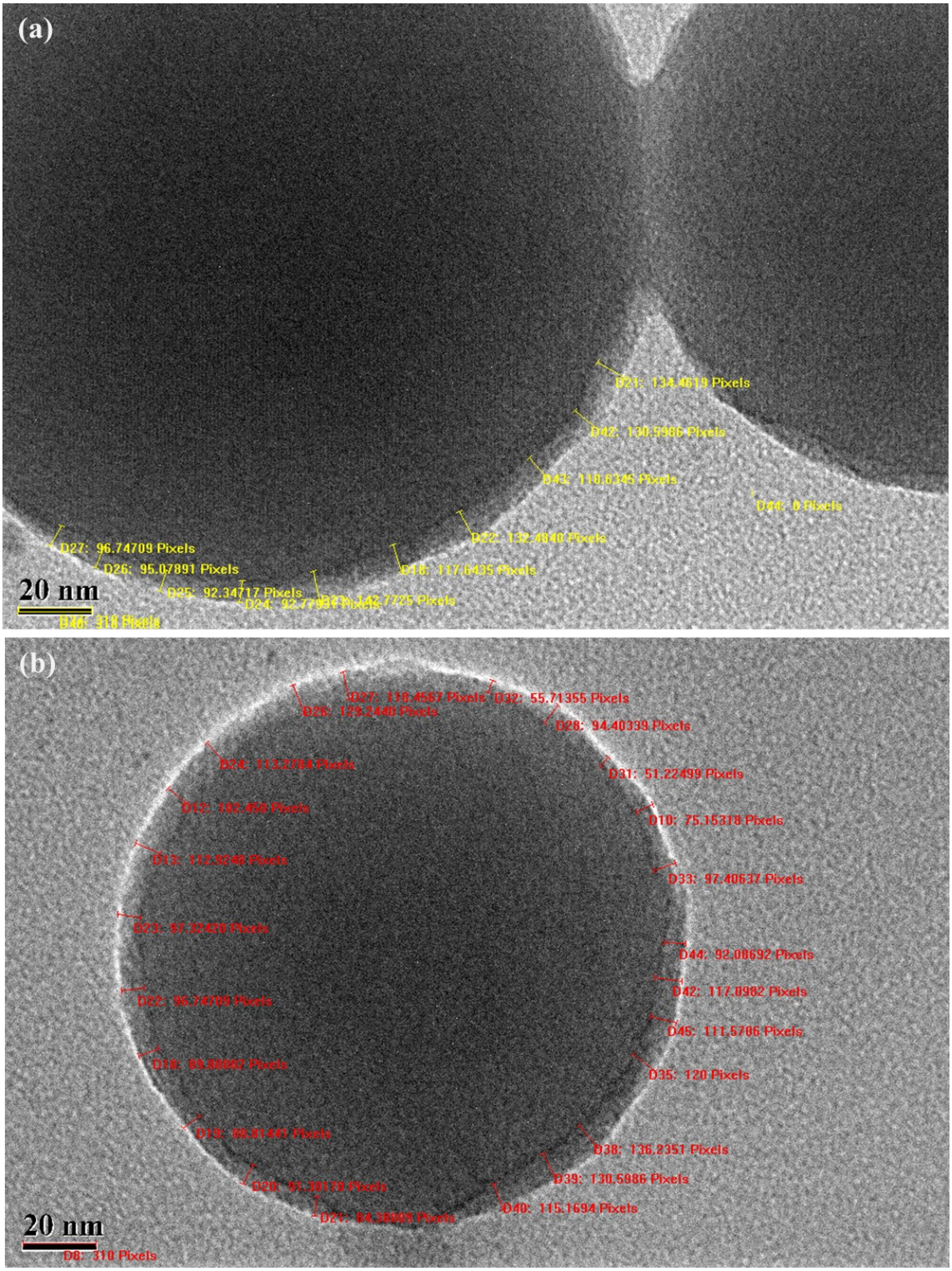

Figure S2. TEM images of CTAB-adsorbed SiO_2 nanoparticles (a) the average layer thickness =7.39 (b) the average layer thickness =6.46

Table S1. Statistic determination of CTAB adlayer thickness on different SiO_2 nanoparticles

#	line length **pixels**	thickness **nm**	line length **pixels**	thickness **nm**
1	134.46	8.67	118.45	7.64
2	130.60	8.43	129.24	8.34
3	110.63	7.14	113.28	7.31
4	132.48	8.55	102.45	6.61
5	117.64	7.59	112.92	7.29
6	142.77	9.21	97.32	6.28
7	92.77	5.99	96.75	6.24
8	92.34	5.96	89.89	5.80
9	95.08	6.13	88.81	5.73
10	96.75	6.24	91.30	5.89
11			84.38	5.44
12			55.71	3.59
13			94.40	6.09
14			51.22	3.30
15			75.15	4.85
16			97.41	6.28
17			92.09	5.94
18			117.10	7.55
19			110.57	7.13
20			120.00	7.74
21			136.23	8.79
22			130.60	8.43
23			115.17	7.43
24			84.38	5.44
AVE	114.55	7.39	100.20	6.46
STDEV		1.26		1.39
Median		7.365		6.28

Note: the layer thickness is determined based on the particles in Figure S2, where 1nm is equal to 15.5 pixels.

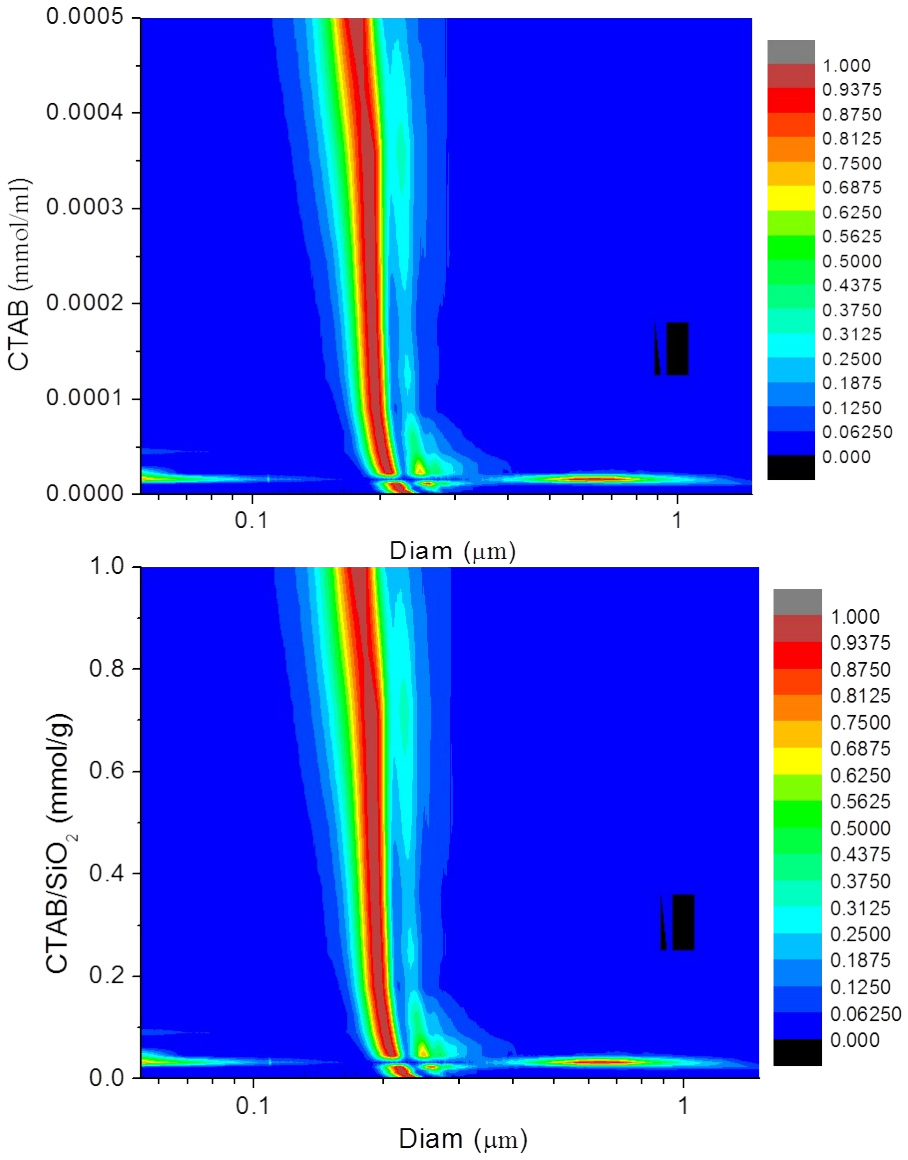

Figure S3. 2D size distribution for CTAB-adsorbed SiO_2 particles (210nm) measured by 2D-DCS

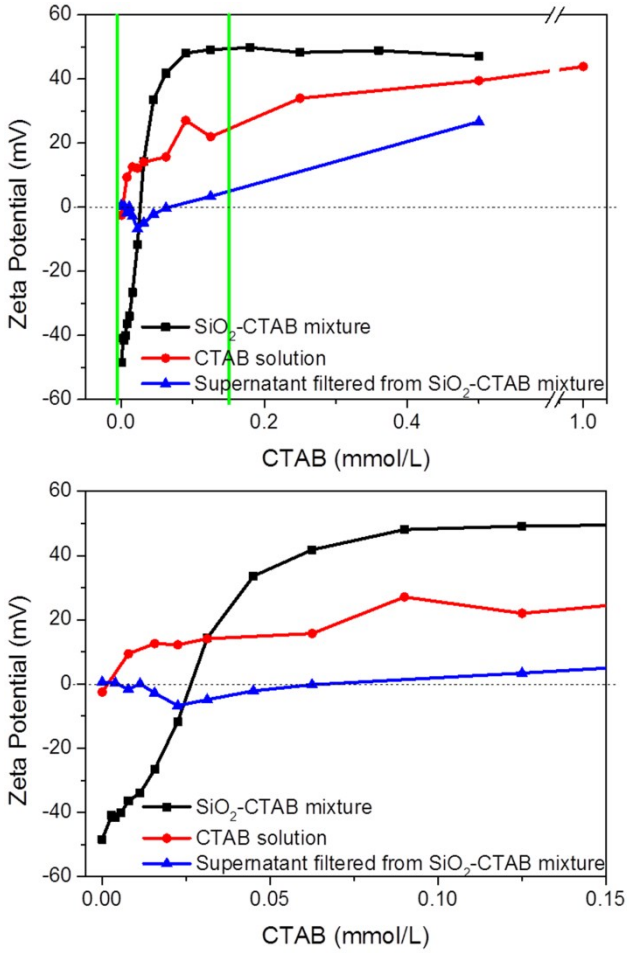

Figure S4. ζ-potential measurement on the titration of CTAB to SiO_2 NPs (430 nm) in wide range (top panel) and at its initial phase (down panel)

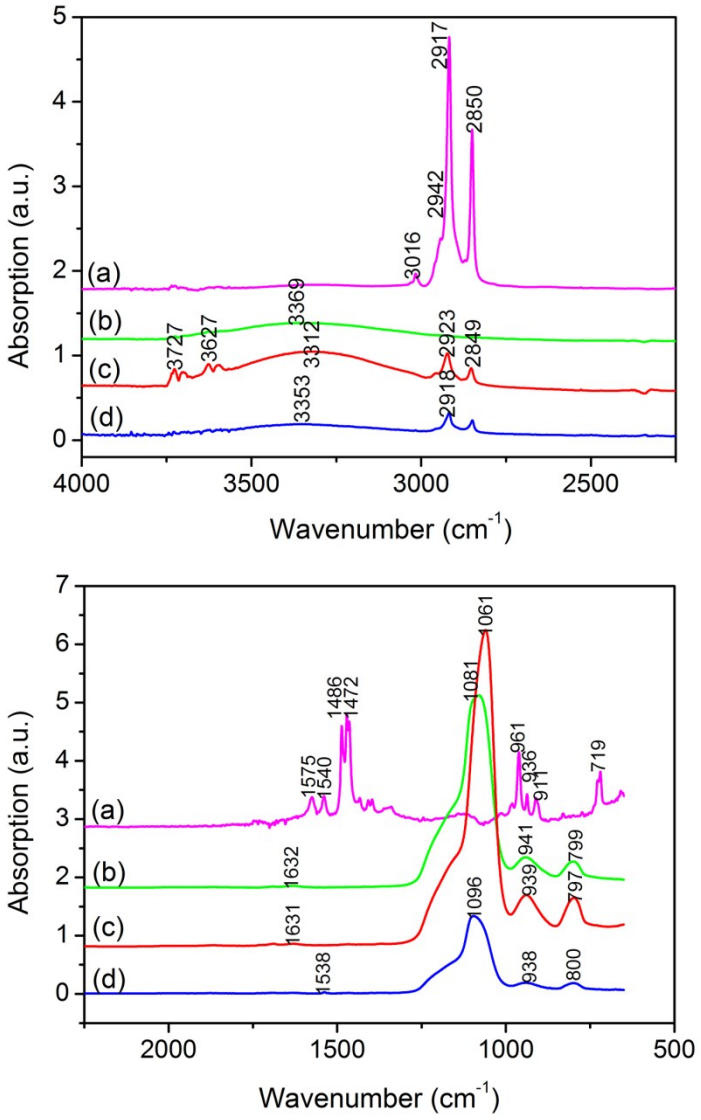

Figure S5. FTIR spectra of (a) pure CTAB, (b) pure SiO_2 (1000nm) particles, (c) SiO_2 particles sorbed with CTA^+ molecules, and (d) the same sample as c, but after water washing

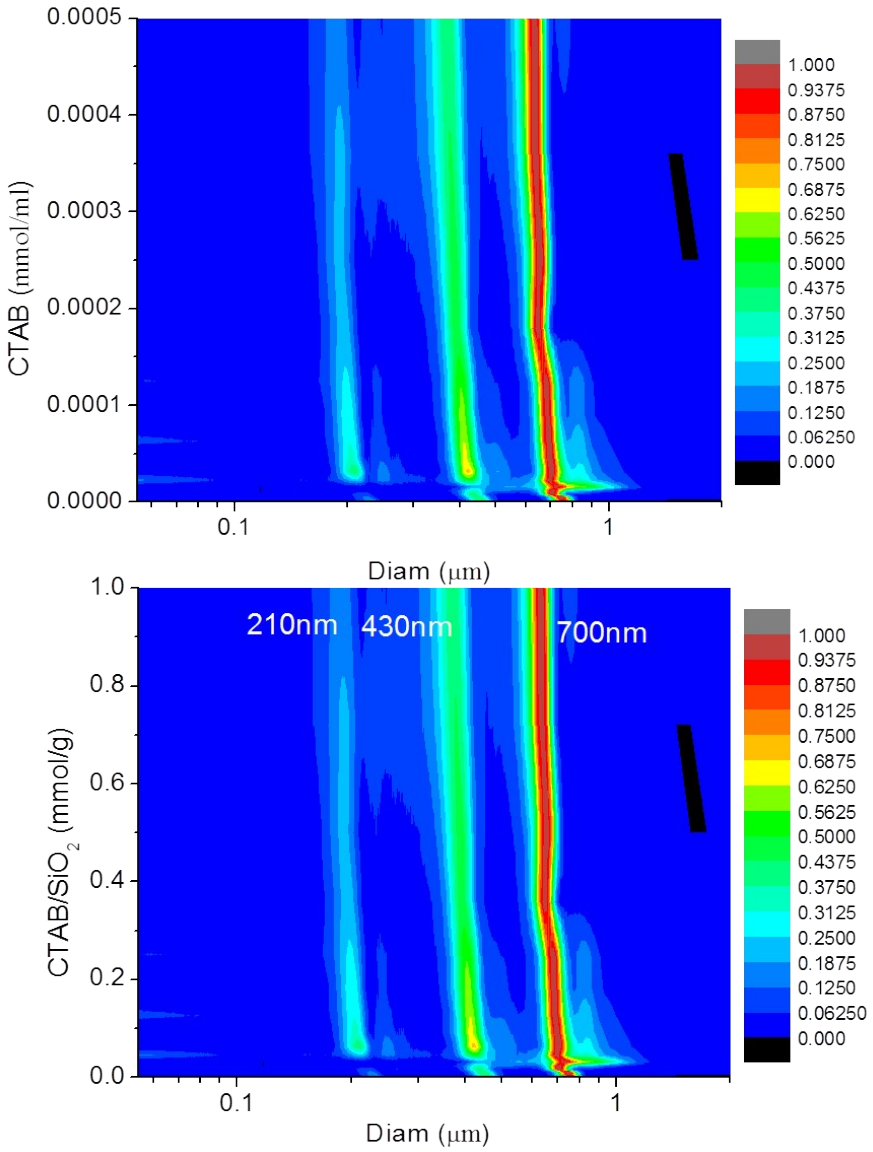

Figure S6. 2D size distribution for CTAB-absorbed SiO_2 particles with multiple size distribution of 210, 430 and 700nm measured by 2D-DCS