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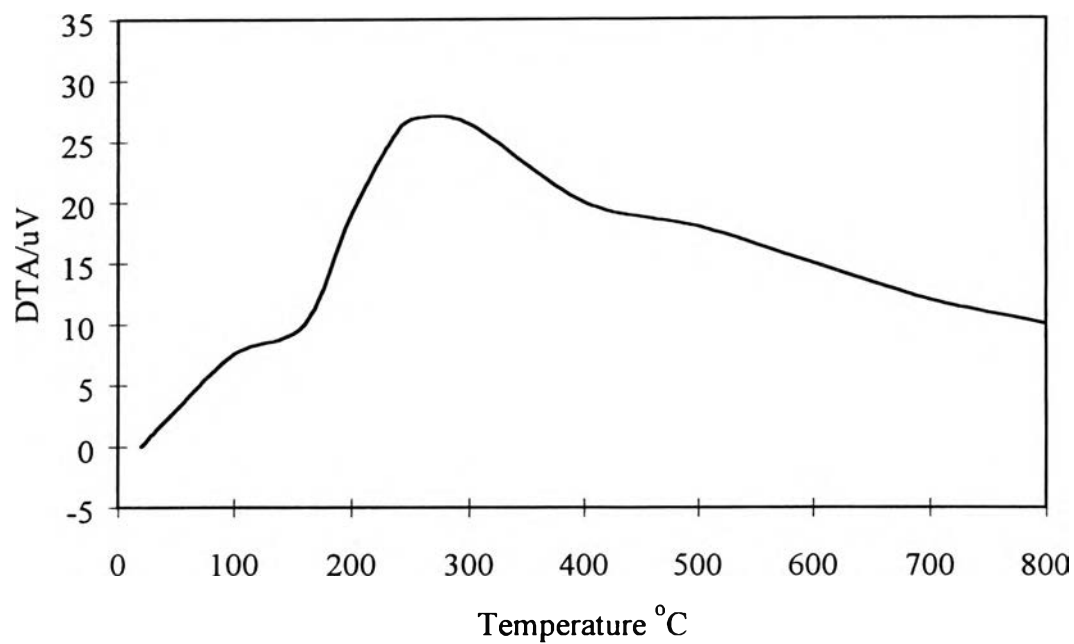Yu, C., (1995), Ph.D. Dissertation, University of Oklahoma.

APPENDIX A

Figure A.1 DTA curve of ODS silica (30.0 mg and 20-850 °C).

APPENDIX B

Table A.1 CTAB adsorption isotherm on silica Hi-Sil®233

System : 14 ml of aqueous solution, 0.7 g of silica, pH ≈ 7

Initial concentration of CTAB (μM)	Equilibrium concentration of CTAB (μM)	Adsorbed CTAB (μmoles/g)
3000	1861.17	22.77
4000	2131.41	37.37
6000	2216.79	75.66
7000	2305.61	93.89
8000	2353.65	112.93
9000	2512.96	129.74
10000	2513.82	149.72
15000	3145.97	237.08
17500	4833.09	253.34
20000	7504.49	249.91
22500	9523.64	259.53
25000	11551.60	268.97
27500	13486.70	280.27
30000	15699.7	286.01
32500	18122.00	287.56
35000	19700.70	305.99
37500	22523.50	299.53
40000	24509.30	291.81
42500	26610.90	317.78
45000	29549.00	309.02

Table A.2 ODS adsorption isotherm on silica Hi-Sil®233

System : 180 ml of toluene with ODS, 6.00 g of silica

Initial concentration of ODS (μM)	Equilibrium Concentration of ODS (μM)	Adsorbed ODS (μmoles/g)
4239.91	1020.92	96.20
7066.52	2368.72	140.31
9893.12	4218.70	169.36
15193.00	7735.21	222.39
21199.55	11191.54	298.37
28266.06	16924.38	337.76
49465.61	37576.22	352.32

Table A.3 Effect of phenol on CTAB adsorption

System : 14 ml of aqueous solution, 0.7 g of silica

Initial concentration of CTAB (μM)	Equilibrium concentration of CTAB (μM)	Adsorbed CTAB (μmoles/g)
2937.06	1889.04	21.41
3916.08	2042.25	38.28
4895.10	2094.26	57.22
5874.13	2227.90	74.49
6853.15	2273.72	93.55
7832.17	2325.79	112.49
8811.17	2396.95	131.03
9790.21	2424.35	150.47
14685.31	2831.53	242.16
19580.42	6616.78	262.83
22027.97	8691.88	272.44
24475.52	11071.70	273.82
29370.63	15000.50	293.56
34265.73	19703.60	297.48
39160.84	23662.50	316.61
44055.94	28695.40	313.79

Table A.4 Effect of TCE on CTAB adsorption

System : 14 ml of aqueous solution, 0.7 g of silica

Initial concentration of CTAB (μM)	Equilibrium concentration of CTAB (μM)	Adsorbed CTAB (μmoles/g)
4000	2033.57	39.33
5000	2139.96	57.20
6000	2240.66	75.19
7000	2299.65	94.01
8000	2357.68	112.85
9000	2395.41	132.09
10000	2440.66	151.19
15000	3131.76	237.36
17500	4516.03	259.68
20000	6579.56	268.41
22500	8687.88	286.24
30000	15750.30	284.99
35000	20218.10	295.63
40000	25328.80	293.42
45000	29527.90	309.44

Table A.5 Adsolubilzation of phenol into CTAB admicelles

System : 14 ml of aqueous solution, 0.7 g of silica

Equilibrium concentration of CTAB (μM)	Equilibrium concentration of phenol (μM)	Adsolubilized phenol (μM)
1889.04	1770.14	6.70
2042.25	1670.03	8.74
2094.26	1607.08	10.03
2227.90	1550.54	11.18
2273.72	1507.30	12.07
2325.79	1419.60	13.86
2396.95	1380.08	14.67
2424.35	1330.83	15.67
2831.53	1165.63	19.04
6616.78	1166.05	19.04
8691.88	1204.87	18.24
11071.70	1222.80	17.88
15000.50	1301.20	16.27
19703.60	1323.82	15.81
23662.50	1424.52	13.76
28695.40	1430.46	13.63

Table A.6 Adsolubilization of phenol into bonded ODS

System : 14 ml of aqueous solution, 0.7 g of ODS silica

Equilibrium concentration of ODS (μM)	Equilibrium concentration of phenol (μM)	Adsolubilized phenol (μM)
0	2097.90	0
1020.82	1921.12	3.84
2388.72	1812.05	6.12
4218.70	1711.23	8.36
7735.21	1601.12	10.92
11191.54	1582.26	11.61
16924.38	1528.89	12.96
37576.32	1518.23	13.28

Table A.7 Adsolubilization of TCE into CTAB admicelles

System : 14 ml of aqueous solution, 0.7 g of silica

Equilibrium concentration of CTAB (μM)	Equilibrium concentration of TCE (μM)	Adsolubilized TCE (μM)
2033.57	4.51	0.071
2139.96	4.20	0.077
2240.66	3.94	1.082
2299.65	3.71	0.086
2357.68	3.40	0.093
2395.41	3.16	0.097
2440.66	2.81	0.104
3131.76	2.62	0.108
4516.03	2.76	0.105
6579.56	3.23	0.096
8687.88	3.20	0.097
15750.30	4.04	0.080
20218.10	3.99	0.080
25328.80	4.34	0.074
29527.90	4.45	0.072

Table A.8 Adsolubilization of TCE into bonded ODS

System : 14 ml of aqueous solution, 0.7 g of ODS silica

Equilibrium concentration of ODS (μM)	Equilibrium concentration of TCE (μM)	Adsolubilized TCE (μM)
0	8.038	0
1020.82	4.260	0.078
2388.72	3.260	0.100
4218.70	2.700	0.113
7735.21	2.072	0.130
11191.54	1.972	0.134
16924.38	1.900	0.137
37576.32	1.806	0.140

Table A.9 Effect of agitation speed on desorption of ODS from silica

System : 50 ml of aqueous solution, 0.1 g of silica or ODS silica

Agitation speed (rpm)	% ODS desorption
1	-
2	-
3	-
4	0
5	0
6	0
7	2.93
8	4.60

Table A.10 Effect of agitation time on desorption of ODS from silica

System : 50 ml of aqueous solution, 0.1 g of silica or ODS silica

Agitation time (min.)	% ODS desorption
5	-
10	-
20	-
30	0
50	-
60	0
70	-
90	-
120	0.93
180	2.78

Table A.11 Effect of pH on desorption of ODS from silica

System : 50 ml of aqueous solution, 0.1 g of silica or ODS silica

pH values	% ODS desorption at 210 rpm	% ODS desorption at 360 rpm
2.34	-	-
2.88	0	1.85
3.84	-	-
4.58	0	0.93
6.78	0	0.93
7.1	-	-
10.14	-	-
10.61	0	0

Table A.12 Effect of temperature on desorption of ODS from silica

System : 50 ml of aqueous solution, 0.1 g of silica or ODS silica

Temperature ($^{\circ}$C)	% ODS desorption
10	-
15	-
25	0
35	0
45	2.93
50	-
55	3.70

Table A.13 Stability of ODS silica at various ozone concentrations

System : 100 ml of aqueous solution, 0.15 g of ODS silica, pH $\approx$ 7

Oxidation time (min.)	Normallized remaining amount of carbon on silica surface after oxidizing with ozone (Cm/Co)		
	78 gO_3/cm^3	117 gO_3/cm^3	150 gO_3/cm^3
5	-	0.94	-
10	-	0.92	0.90
20	0.936	0.91	0.88
30	-	0.89	0.87
35	0.91	-	-
40	-	0.86	0.83
45	0.90	-	0.77
50	-	-	-
57	0.88	-	-
80	0.86	-	-

Table A.14 Stability of ODS silica under ozone concentration at various pH values

System : 100 ml of aqueous solution, 0.15 g of ODS silica, 150 g of O_3/cm^3

Oxidation time (min.)	Normallized remaining amount of carbon on silica surface after oxidizing with ozone (Cm/Co)		
	pH 4	pH 7	pH 11
5	-	-	0.92
10	-	0.90	0.91
15	0.87	-	-
20	-	-	0.90
22	-	0.88	-
30	0.84	-	0.88
40	0.81	0.81	-
50	0.76	-	-
80	-	0.72	-

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