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APPENDIX

Table A-1 No. of days octyltrimethylammonium bromide (C8TAB)
required to be adsorbed on 0.1 g MCM-41

Time, day	Concentration(μ molar)
0	62000
1	52450
2	43250
3	35630
4	30450
5	28400
6	28400
7	28400
8	28400

Table A-2 No. of days octyltrimethylammonium bromide (C8TAB)
required to be adsorbed on 1 g Hi-Sil 255

Time, day	Concentration(μ molar)
0	62000
1	54750
2	44500
3	37124
4	32874
5	28760
6	28760
7	28760

Table A-3 C8TAB Adsorption isotherm on MCM-41

pH~ 5, solution 25 ml

No.	Initial C8TAB concentration ($\mu\text{mol/l}$)	Final C8TAB concentration ($\mu\text{mol/l}$)	C8TAB adsorption on MCM-41 ($\mu\text{mol/g MCM-41}$)	Adsorption density (molecules/sq. nm)
1	62000	28850	8288	4.96
2	60000	26860	8285	4.96
3	58000	24900	8275	4.96
4	56000	22800	8300	4.97
5	54000	20910	8273	4.95
6	52000	18900	8275	4.96
7	50000	17500	8125	4.87
8	48000	15590	8103	4.85
9	46000	14300	7925	4.75
10	44000	12200	7950	4.76
11	42000	8850	8288	4.96
12	40000	5740	8565	5.13
13	35000	2850	8038	4.81
14	32000	980	7755	4.64
15	30000	550	7363	4.41
16	29000	430	7143	4.28
17	28000	380	6905	4.14
18	26000	365	6409	3.84
19	24000	356	5911	3.54
20	22000	304	5424	3.25
21	20000	255	4936	2.96
22	19000	245	4689	2.81
23	18000	168	4458	2.67
24	16000	140	3965	2.37
25	14000	90	3478	2.08
26	12000	82	2980	1.78
27	10000	65	2484	1.49
28	8000	43	1989	1.19
29	6000	22	1495	0.90
30	4500	8	1123	0.67

Table A-4 C8TAB Adsorption isotherm on Hi-Sil 255

pH~ 5, solution 25 ml

No.	Initial C8TAB concentration ($\mu\text{mol/l}$)	Final C8TAB concentration ($\mu\text{mol/l}$)	C8TAB adsorption on Hi-Sil 255 ($\mu\text{mol/g silica}$)	Adsorption density (molecules/sq. nm)
1	62000	28306	842	2.98
2	60000	26350	841	2.98
3	58000	24430	839	2.97
4	56000	22500	838	2.97
5	54000	20900	828	2.93
6	52000	19120	822	2.91
7	50000	17420	815	2.88
8	48000	16058	799	2.83
9	46000	14184	795	2.82
10	44000	12450	789	2.79
11	42000	11558	761	2.70
12	40000	9110	772	2.73
13	35000	5850	729	2.58
14	32000	2665	733	2.60
15	30000	1230	719	2.55
16	29000	800	705	2.50
17	28000	350	691	2.45
18	26000	320	642	2.27
19	24000	275	593	2.10
20	22000	233	544	1.93
21	20000	220	495	1.75
22	19000	205	470	1.66
23	18000	145	446	1.58
24	16000	126	397	1.41
25	14000	80	348	1.23
26	12000	66	298	1.06
27	10000	53	249	0.88
28	8000	35	199	0.71
29	6000	25	149	0.53
30	4500	12	112	0.40

Table A-5 No. of days decyltrimethylammonium bromide (C10TAB)
required to be adsorbed on 0.1 g MCM-41

Time, day	Concentration(μ molar)
0	62000
1	56000
2	43600
3	36870
4	29730
5	29725
6	29725
7	29723
8	29720

Table A-6 No. of days decyltrimethylammonium bromide (C10TAB)
required to be adsorbed on 1 g Hi-Sil 255

Time, day	Concentration(μ molar)
0	62000
1	56300
2	44500
3	38800
4	33100
5	30157
6	30157
7	30157
8	30154

Table A-7 C10TAB Adsorption isotherm on MCM-41

pH~ 5, solution 25 ml

No.	Initial C10TAB concentration ($\mu\text{mol/l}$)	Final C10TAB concentration ($\mu\text{mol/l}$)	C10TAB adsorption on MCM-41 ($\mu\text{mol/g MCM-41}$)	Adsorption density (molecules/sq. nm)
1	62000	30050	7988	4.78
2	61000	29300	7925	4.75
3	60000	28456	7886	4.72
4	58000	26425	7894	4.73
5	56000	24550	7863	4.71
6	54000	22750	7813	4.68
7	52000	20800	7800	4.67
8	50000	18890	7778	4.66
9	48000	16800	7800	4.67
10	46000	15020	7745	4.64
11	44000	13000	7750	4.64
12	40000	9450	7638	4.57
13	35000	6150	7213	4.32
14	32000	3670	7083	4.24
15	30000	1840	7040	4.22
16	28000	850	6788	4.07
17	26000	550	6363	3.81
18	24000	425	5894	3.53
19	22000	395	5401	3.24
20	20000	365	4909	2.94
21	19500	320	4795	2.87
22	19000	300	4675	2.80
23	18000	266	4434	2.66
24	16000	235	3941	2.36
25	14000	120	3470	2.08
26	12000	98	2976	1.78
27	10000	85	2479	1.48
28	8000	70	1983	1.19
29	6000	42	1490	0.89
30	4500	22	1120	0.67

Table A-8 C10TAB Adsorption isotherm on Hi-Sil 255

pH~ 5, solution 25 ml

No.	Initial C10TAB concentration ($\mu\text{mol/l}$)	Final C10TAB concentration ($\mu\text{mol/l}$)	C10TAB adsorption on Hi-Sil 255 ($\mu\text{mol/g silica}$)	Adsorption density (molecules/sq. nm)
1	62000	29617	810	2.87
2	61000	28700	808	2.86
3	60000	27854	804	2.85
4	58000	25826	804	2.85
5	56000	24258	794	2.81
6	54000	22442	789	2.79
7	52000	20573	786	2.78
8	50000	18560	786	2.78
9	48000	16654	784	2.78
10	46000	14785	780	2.76
11	44000	12880	778	2.76
12	40000	9480	763	2.70
13	35000	5854	729	2.58
14	32000	3219	720	2.55
15	30000	1840	704	2.49
16	28000	1050	674	2.39
17	26000	760	631	2.23
18	24000	620	585	2.07
19	22000	525	537	1.90
20	20000	340	492	1.74
21	19000	280	468	1.66
22	18000	195	445	1.58
23	16000	120	397	1.41
24	14000	70	348	1.23
25	12000	64	298	1.06
26	10000	62	248	0.88
27	8000	60	199	0.70
28	6000	34	149	0.53
29	4500	19	112	0.40

Table A-9 No. of days dodecyltrimethylammonium bromide (C12TAB)
required to be adsorbed on 0.1 g MCM-41

Time, day	Concentration(μ molar)
0	62000
1	56250
2	42580
3	38145
4	32100
5	31440
6	31443
7	31430
8	31425

Table A-10 No. of days dodecyltrimethylammonium bromide (C12TAB) required to be adsorbed on 1 g Hi-Sil 255

Time, day	Concentration(μ molar)
0	62000
1	56650
2	47520
3	38780
4	33120
5	31438
6	31435
7	31433
8	31433

Table A-11 C12TAB Adsorption isotherm on MCM-41

pH~ 5, solution 25 ml

No	Initial C12TAB concentration ($\mu\text{mol/l}$)	Final C12TAB concentration ($\mu\text{mol/l}$)	C12TAB adsorption on MCM-41 ($\mu\text{mol/g MCM-41}$)	Adsorption density (molecules/sq. nm)
1	62000	31220	7695	4.61
2	61000	30262	7685	4.60
3	60000	29305	7674	4.60
4	58000	27267	7683	4.60
5	56000	25387	7653	4.58
6	54000	23346	7664	4.59
7	52000	21340	7665	4.59
8	50000	19430	7643	4.58
9	48000	17590	7603	4.55
10	46000	15545	7614	4.56
11	44000	13665	7584	4.54
12	40000	9907	7523	4.51
13	35000	6266	7184	4.30
14	32000	3507	7123	4.27
15	30000	2066	6984	4.18
16	28000	850	6788	4.07
17	26000	662	6335	3.79
18	24000	520	5870	3.52
19	22000	459	5385	3.23
20	21000	435	5141	3.08
21	20000	425	4894	2.93
22	19000	340	4665	2.79
23	18000	298	4426	2.65
24	16000	264	3934	2.36
25	14000	143	3464	2.07
26	12000	112	2972	1.78
27	10000	94	2477	1.48
28	8000	89	1978	1.18
29	6000	59	1485	0.89
30	4500	45	1114	0.67

Table A12 C12TAB Adsorption isotherm on Hi-Sil 255

pH~ 5, solution 25 ml

No	Initial C12TAB concentration ($\mu\text{mol/l}$)	Final C12TAB concentration ($\mu\text{mol/l}$)	C12TAB adsorption on Hi-Sil 255 ($\mu\text{mol/g silica}$)	Adsorption density (molecules/sq. nm)
1	62000	30781	780	2.76
2	61000	29750	781	2.77
3	60000	28790	780	2.76
4	58000	26776	781	2.76
5	56000	24870	778	2.76
6	54000	22856	779	2.76
7	52000	20937	777	2.75
8	50000	19030	774	2.74
9	48000	17241	769	2.72
10	46000	15273	768	2.72
11	44000	13600	760	2.69
12	40000	9760	756	2.68
13	35000	6000	725	2.57
14	32000	3360	716	2.54
15	30000	2040	699	2.48
16	28000	1390	665	2.36
17	26000	870	628	2.22
18	24000	750	581	2.06
19	22000	550	536	1.90
20	20000	480	488	1.73
21	19000	350	466	1.65
22	18000	270	443	1.57
23	16000	133	397	1.40
24	14000	82	348	1.23
25	12000	76	298	1.06
26	10000	77	248	0.88
27	8000	74	198	0.70
28	6000	68	148	0.53
29	4500	38	112	0.40

Table A-13 No. of days tetradecyltrimethylammonium bromide (C14TAB) required to be adsorbed on 0.1 g MCM-41

Time, day	Concentration(μ molar)
0	62000
1	55210
2	45520
3	39140
4	32390
5	32390
6	32385
7	32385
8	32380

Table A-14 No. of days tetradecyltrimethylammonium bromide (C14TAB)
required to be adsorbed on 1 g Hi-Sil 255

Time, day	Concentration(μ molar)
0	62000
1	53000
2	42600
3	36500
4	32150
5	32145
6	32145
7	32145

Table A-15 C14TAB Adsorption isotherm on MCM-41

pH~ 5, solution 25 ml

No.	Initial C14TAB concentration ($\mu\text{mol/l}$)	Final C14TAB concentration ($\mu\text{mol/l}$)	C14TAB adsorption on MCM-41 ($\mu\text{mol/g MCM-41}$)	Adsorption density (molecules/sq. nm)
1	62000	32267	7433	4.45
2	61000	31310	7423	4.45
3	60000	30305	7424	4.45
4	58000	28347	7413	4.44
5	56000	26305	7424	4.45
6	54000	24387	7403	4.43
7	52000	22382	7405	4.43
8	50000	20380	7405	4.44
9	48000	18860	7285	4.36
10	46000	17182	7205	4.32
11	44000	15414	7147	4.28
12	40000	11432	7142	4.28
13	35000	6870	7033	4.21
14	32000	4180	6955	4.17
15	30000	2867	6783	4.06
16	28000	1265	6684	4.00
17	26000	826	6294	3.77
18	24000	656	5836	3.50
19	22000	536	5366	3.21
20	20000	405	4899	2.93
21	19000	390	4653	2.79
22	18000	320	4420	2.65
23	16000	202	3950	2.37
24	14000	179	3455	2.07
25	12000	140	2965	1.78
26	10000	106	2474	1.48
27	8000	110	1973	1.18
28	6000	96	1476	0.88
29	4500	89	1103	0.66

Table 16 C14TAB Adsorption isotherm on Hi-Sil 255

pH~ 5, solution 25 ml

No.	nitil C14TAB concentration ($\mu\text{mol/l}$)	Final C14TAB concentration ($\mu\text{mol/l}$)	C14TAB adsorption on Hi-Sil 255 ($\mu\text{mol/g silica}$)	Adsorption density (molecules/sq. nm)
1	62000	31991	750	2.66
2	61000	31069	748	2.65
3	60000	30040	749	2.65
4	58000	28059	749	2.65
5	56000	26068	748	2.65
6	54000	24138	747	2.64
7	52000	22110	747	2.65
8	50000	20180	746	2.64
9	48000	18576	736	2.60
10	46000	16856	729	2.58
11	44000	14992	725	2.57
12	40000	11027	724	2.56
13	35000	6417	715	2.53
14	32000	3697	708	2.51
15	30000	2400	690	2.44
16	28000	1120	672	2.38
17	26000	845	629	2.23
18	24000	520	587	2.08
19	22000	495	538	1.90
20	20000	420	490	1.73
21	19000	256	469	1.66
22	18000	155	446	1.58
23	16000	98	398	1.41
24	14000	89	348	1.23
25	12000	88	298	1.05
26	10000	85	248	0.88
27	8000	84	198	0.70
28	6000	74	148	0.52
29	4500	77	111	0.39

Table A-17 No. of days cetyltrimethylammonium bromide (C16TAB)
required to be adsorbed on 0.1 g MCM-41

Time, day	Concentration(μ molar)
0	62000
1	56547
2	44500
3	37900
4	33563
5	33550
6	33550
7	33545
8	33540

Table A-18 No. of days Cetyltrimethylammonium bromide (C16TAB)
required to be adsorbed on 1 g Hi-Sil 255

Time, day	Concentration(μ molar)
0	62000
1	54200
2	44523
3	35420
4	33250
5	33250
6	33250
7	33250

Table A-19 C16TAB Adsorption isotherm on MCM-41

pH~ 5, solution 25 ml

No.	Initial C16TAB concentration ($\mu\text{mol/l}$)	Final C16TAB concentration ($\mu\text{mol/l}$)	C16TAB adsorption on MCM-41 ($\mu\text{mol/g MCM-41}$)	Adsorption density (molecules/sq. nm)
1	62000	33600	7100	4.25
2	61000	32600	7100	4.25
3	60000	32080	6980	4.18
4	58000	30280	6930	4.15
5	56000	28226	6944	4.16
6	54000	26338	6916	4.14
7	52000	24507	6873	4.12
8	50000	22625	6844	4.10
9	48000	20585	6854	4.11
10	46000	18170	6958	4.17
11	44000	16827	6793	4.07
12	40000	12902	6775	4.06
13	35000	8017	6746	4.04
14	32000	5060	6735	4.03
15	30000	3180	6705	4.02
16	28000	1505	6624	3.97
17	26000	1105	6224	3.73
18	24000	945	5764	3.45
19	22000	720	5320	3.19
20	20000	480	4880	2.92
21	18000	420	4395	2.63
22	16000	230	3943	2.36
23	14000	229	3443	2.06
24	12000	214	2947	1.76
25	10000	200	2450	1.47
26	8000	160	1960	1.17
27	6000	155	1461	0.88
28	4000	102	975	0.58

Table A-20 C16TAB Adsorption isotherm on Hi-Sil 255

pH~ 5, solution 25 ml

No.	Initial C16TAB concentration ($\mu\text{mol/l}$)	Final C16TAB concentration ($\mu\text{mol/l}$)	C16TAB adsorption on Hi-Sil 255 ($\mu\text{mol/g silica}$)	Adsorption density (molecules/sq. nm)
1	62000	33150	721	2.55
2	61000	32250	719	2.55
3	60000	31500	713	2.52
4	58000	29850	704	2.49
5	56000	27900	703	2.49
6	54000	26150	696	2.47
7	52000	23950	701	2.48
8	50000	22000	700	2.48
9	48000	19700	708	2.51
10	46000	17850	704	2.49
11	44000	16100	698	2.47
12	40000	12150	696	2.47
13	35000	7250	694	2.46
14	32000	4650	684	2.42
15	30000	3500	663	2.35
16	28000	1680	658	2.33
17	26000	900	628	2.22
18	24000	750	581	2.06
19	22000	550	536	1.90
20	20000	360	491	1.74
21	18000	170	446	1.58
22	16000	110	397	1.41
23	14000	95	348	1.23
24	12000	95	298	1.05
25	10000	90	248	0.88
26	8000	90	198	0.70
27	6000	80	148	0.52
28	4000	55	99	0.35

Table A-21 Number of carbons in the surfactant tail and adsorption density

No. of carbons in surfactant tail	Adsorption density at II/III of MCM-41 (molecule/sq. nm)	Adsorption density at II/III on Silica (HiSil-255) (molecule/sq. nm)
8	3.83	2.48
10	3.71	2.34
12	3.71	1.65
14	3.17	1.41
16	2.40	1.42

Table A-22 Number of carbons in the surfactant tail and adsorption density at region III/IV transition of MCM-41 and Hi-Sil 255

No. of carbons in surfactant tail	Adsorption density at III/IV of MCM-41 (molecule/ sq. nm)	Adsorption density at III/IV on Silica (Hi-Sil 255) (molecule/ sq. nm)
8	4.73	2.76
10	4.43	2.49
12	4.37	2.36
14	4.19	2.23
16	2.40	1.42

Table A-23 Number of carbons in the surfactant tail and maximum adsorption density of MCM-41 and Hi-Sil 255

No. of carbons in surfactant tail	Maximum Adsorption on MCM-41 (molecule/ sq. nm)	Maximum Adsorption on Silica (Hi-Sil 255) (molecule/ sq. nm)
8	4.91	2.98
10	4.79	2.87
12	4.55	2.76
14	4.40	2.65
16	4.19	2.55

Table A-24 Length of surfactant ion/diameter of the average pore and maximum adsorption density of MCM-41

Length of surfactant ion per diameter of average pore	Maximum Adsorption Density ($\mu\text{mol/g}$ MCM-41)
0.244	4.91
0.306	4.79
0.367	4.55
0.428	4.43
0.488	4.19

Table A-25 Length of surfactant ion per diameter of average pore and
Maximum adsorption density

Length of surfactant ion per diameter of average pore	Maximum Adsorption ($\mu\text{mol/g}$ Hi-Sil 255)
0.045	2.98
0.057	2.87
0.068	2.76
0.079	2.65
0.091	2.55

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