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APPENDICES

Appendix A Experimental Data of CTAB Adsorption

Table A1 Adsorption isotherm of CTAB in the absence of electrolyte at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
793.7	3481.14	30.10	132.02	3349.12	133.67
958	4201.75	28.60	125.44	4076.32	162.73
1166	5114.04	31.13	136.54	4977.50	198.19
1400	6140.35	35.38	155.18	5985.18	238.45
1645	7214.91	36.90	161.84	7053.07	281.00
2119	9293.86	36.84	161.58	9132.28	364.85
2587	11346.49	39.18	171.84	11174.65	445.38
3068	13456.14	41.39	181.54	13274.61	529.71
3513	15407.89	51.49	225.83	15182.06	606.19
3704	16245.61	45.92	201.40	16044.21	639.34
3994	17517.54	49.19	215.75	17301.80	691.66
4349	19074.56	50.46	221.32	18853.25	750.83
4617	20250.00	66.02	289.56	19960.44	796.19
5186	22745.61	130.80	573.68	22171.93	884.40
5560	24385.96	167.10	732.89	23653.07	945.37
6090	26710.53	260.40	1142.11	25568.42	1021.72
6457	28320.18	497.80	2183.33	26136.84	1045.06
6867	30118.42	727.20	3189.47	26928.95	1072.65
7102	31149.12	1004	4403.51	26745.61	1066.41
7529	33021.93	1141	5004.39	28017.54	1114.68
7974	34973.68	1343	5890.35	29083.33	1158.24
8419	36925.44	1973	8653.51	28271.93	1125.47
9078	39815.79	3268	14333.33	25482.46	1014.23
9413	41285.09	3721	16320.18	24964.91	993.43
10190	44692.98	5155	22609.65	22083.33	878.41

Table A2 Adsorption isotherm of CTAB in the presence of 0.1 mM NaCl at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
786.2	3448.25	24.480	107.37	3340.88	133.32
1057	4635.96	16.75	73.46	4562.50	181.85
1347	5907.89	19.19	84.17	5823.73	232.25
1633	7162.28	22.52	98.77	7063.51	281.41
1823	7995.61	29.93	131.27	7864.34	313.20
2164	9491.23	20.46	89.74	9401.49	374.79
2258	9903.51	28.44	124.74	9778.77	390.21
2524	11070.18	26.11	114.52	10955.66	435.87
2598	11394.74	33.02	144.82	11249.91	447.94
2746	12043.86	31.67	138.90	11904.96	474.11
3465	15197.37	71.16	312.11	14885.26	593.51
4095	17960.53	247.00	1083.33	16877.19	672.40
4888	21438.60	679.10	2978.51	18460.09	735.90
5323	23346.49	785.9	3446.93	19899.56	792.02
6109	26793.86	1487.0	6521.93	20271.93	806.84
6964	30543.86	2219.0	9732.46	20811.40	830.79
7652	33561.40	3034	13307.02	20254.39	806.14
8194	35938.60	3792	16631.58	19307.02	768.44
11360	49824.56	6825	29934.21	19890.35	792.29

Table A3 Adsorption isotherm of CTAB in the presence of 0.5 mM NaCl at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
748	3280.70	4.790	21.01	3259.69	129.95
1042	4570.18	5.543	24.31	4545.86	181.25
1364	5982.46	7.163	31.42	5951.04	237.57
1698	7447.37	8.831	38.73	7408.64	295.28
1948	8543.86	9.873	43.30	8500.56	338.20
2296	10070.18	12.15	53.29	10016.89	399.40
2390	10482.46	14.40	63.16	10419.30	415.61
2653	11635.96	14.75	64.69	11571.27	461.10
2627	11521.93	13.84	60.70	11461.23	457.17
2867	12574.56	15.99	70.13	12504.43	497.39
3639	15960.53	18.78	82.37	15878.16	632.60
4641	20355.26	46.28	202.98	20152.28	803.20
5605	24583.33	214.0	938.60	23644.74	940.52
5707	25030.70	297.0	1302.63	23728.07	944.78
6405	28092.11	734.2	3220.18	24871.93	991.51
7299	32013.16	1261	5530.70	26482.46	1055.29
7961	34916.67	1967	8627.19	26289.47	1045.72
8177	35864.04	2417	10600.88	25263.16	1007.91
9711	42592.11	4145	18179.82	24412.28	974.54

Table A4 Adsorption isotherm of CTAB in the presence of 1 mM NaCl at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
719	3153.51	19.41	85.13	3068.38	122.56
1109	4864.04	21.82	95.70	4768.33	190.12
1501	6583.33	24.18	106.05	6477.28	258.11
1898	8324.56	27.04	118.60	8205.96	327.06
2345	10285.09	30.81	135.13	10149.96	405.59
2724	11947.37	30.44	133.51	11813.86	471.14
3185	13969.30	35.11	153.99	13815.31	550.85
3560	15614.04	38.23	167.68	15446.36	617.24
4136	18140.35	42.29	185.48	17954.87	717.62
4958	21745.61	58.43	256.27	21489.34	857.69
6194	27166.67	336.10	1474.12	25692.54	1024.42
7431	32592.11	898.60	3941.23	28650.88	1143.52
8122	35622.81	1317	5776.32	29846.49	1191.48
9233	40495.61	2942	12903.51	27592.11	1099.73

Table A5 Adsorption isotherm of CTAB in the presence of 5 mM NaCl at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
729.8	3200.88	4.621	20.27	3180.61	126.74
1016	4456.14	5.453	23.92	4432.22	176.62
1226	5377.19	5.602	24.57	5352.62	213.51
1492	6543.86	8.536	37.44	6506.42	259.17
1793	7864.04	9.359	41.05	7822.99	312.73
2138	9377.19	9.798	42.97	9334.22	372.77
2333	10232.46	11.12	48.77	10183.68	405.08
3952	17333.33	31.97	140.22	17193.11	684.98
5049	22144.74	148.7	652.19	21492.54	857.81
5901	25881.58	530.8	2328.07	23553.51	940.07
7041	30881.58	1496	6561.40	24320.18	969.51
7943	34837.72	2752	12070.18	22767.54	906.53

Table A6 Adsorption isotherm of CTAB in the presence of 10 mM NaCl at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
877.2	3847.37	12.26	53.77	3793.60	151.26
1194	5236.84	14.29	62.68	5174.17	206.27
1519	6662.28	16.56	72.63	6589.65	262.75
1870	8201.75	18.38	80.61	8121.14	323.23
2184	9578.95	19.57	85.83	9493.11	378.06
2559	11223.68	20.82	91.32	11132.37	444.49
2721	11934.21	27.47	120.48	11813.73	471.51
2871	12592.11	22.70	99.56	12492.54	497.22
3039	13328.95	23.37	102.50	13226.45	527.16
3173	13916.67	25.43	111.54	13805.13	549.35
3955	17346.49	33.36	146.32	17200.18	685.13
4911	21539.47	166.6	730.70	20808.77	829.20
5904	25894.74	517.9	2271.49	23623.25	941.92
6611	28995.61	959.5	4208.33	24787.28	986.56
7986	35026.32	2305	10109.65	24916.67	992.10
9097	39899.12	3993	17513.16	22385.96	894.19

Table A7 Adsorption isotherm of CTAB in the presence of 0.1 mM MgSO₄ at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
743.6	3261.40	11.85	51.97	3209.43	127.74
1021	4478.07	14.32	62.81	4415.26	176.26
1294	5675.44	16.99	74.52	5600.92	223.19
1580	6929.82	19.18	84.12	6845.70	273.34
1848	8105.26	31.10	136.40	7968.86	317.36
2167	9504.39	23.28	102.11	9402.28	374.22
2438	10692.98	28.11	123.29	10569.69	421.78
2797	12267.54	31.28	137.19	12130.35	482.90
2947	12925.44	34.89	153.03	12772.41	508.46
3266	14324.56	36.69	160.92	14163.64	564.18
3397	14899.12	40.20	176.32	14722.81	586.45
3234	14184.21	43.09	188.99	13995.22	557.69
3635	15942.98	42.63	186.97	15756.01	627.85
3792	16631.58	54.00	236.84	16394.74	653.70
3788	16614.04	42.57	186.71	16427.32	654.87
3952	17333.33	74.29	325.83	17007.50	677.59
4143	18171.05	153.80	674.56	17496.49	696.79
4311	18907.89	100.7	441.67	18466.23	737.17
4523	19837.72	377.7	1656.58	18181.14	725.65
4781	20969.30	614.3	2694.30	18275.00	729.10
5936	26035.09	1664.0	7298.25	18736.84	747.23
6052	26543.86	1966.0	8622.81	17921.05	713.28
6815	29890.35	2358.0	10342.11	19548.25	779.28
7091	31100.88	2709.0	11881.58	19219.30	764.95

Table A8 Adsorption isotherm of CTAB in the presence of 0.5 mM MgSO₄ at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
637.3	2795.18	8.671	38.03	2757.14	109.72
918.6	4028.95	11.88	52.11	3976.84	158.41
1134	4973.68	16.80	73.68	4900.00	194.95
1294	5675.44	16.01	70.22	5605.22	223.40
1640	7192.98	18.36	80.53	7112.46	283.25
2064	9052.63	22.95	100.66	8951.97	356.51
2239	9820.18	26.73	117.24	9702.94	386.73
2803	12293.86	34.53	151.45	12142.41	484.24
2992	13122.81	40.01	175.48	12947.32	515.83
3153	13828.95	41.91	183.82	13645.13	543.09
3508	15385.96	89.53	392.68	14993.29	596.87
3625	15899.12	179.0	785.09	15114.04	601.67
3799	16662.28	282.8	1240.35	15421.93	614.30
3758	16482.46	254.7	1117.11	15365.35	612.04
3958	17359.65	280.8	1231.58	16128.07	641.91
3993	17513.16	283.0	1241.23	16271.93	647.64
4010	17587.72	332.1	1456.58	16131.14	641.78
4000	17543.86	360.5	1581.14	15962.72	637.11
4181	18337.72	417.9	1832.89	16504.82	658.61
4134	18131.58	374.3	1641.67	16489.91	656.71
4365	19144.74	434.4	1905.26	17239.47	686.01
4519	19820.18	595.7	2612.72	17207.46	685.56
5508	24157.89	1544	6771.93	17385.96	694.05
5881	25793.86	1810	7938.60	17855.26	711.22
6097	26741.23	2110	9254.39	17486.84	696.55

Table A9 Adsorption isotherm of CTAB in the presence of 1 mM MgSO₄ at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
760.2	3334.21	11.56	50.70	3283.51	131.05
969.6	4252.63	12.73	55.83	4196.80	167.50
1314	5763.16	12.87	56.45	5706.71	227.31
1552	6807.02	14.24	62.46	6744.56	268.76
1826	8008.77	16.97	74.43	7934.34	315.92
2415	10592.11	19.91	87.32	10504.78	418.85
2811	12328.95	22.13	97.06	12231.89	486.94
3288	14421.05	24.46	107.28	14313.77	571.18
3414	14973.68	25.14	110.26	14863.42	592.17
3480	15263.16	25.94	113.77	15149.39	602.96
3749	16442.98	28.28	124.04	16318.95	650.68
3900	17105.26	29.24	128.25	16977.02	676.51
3882	17026.32	29.98	131.49	16894.82	675.25
4138	18149.12	31.87	139.78	18009.34	716.93
4502	19745.61	33.96	148.95	19596.67	779.81
4464	19578.95	36.52	160.18	19418.77	773.81
4315	18925.44	45.29	198.64	18726.80	746.24
4811	21100.88	108.3	475.00	20625.88	823.55
5139	22539.47	292.6	1283.33	21256.14	847.53
5497	24109.65	676.2	2965.79	21143.86	841.55
5599	24557.02	793.2	3478.95	21078.07	840.43
5809	25478.07	1070	4692.98	20785.09	829.74
7213	31635.96	2396	10508.77	21127.19	842.90
7179	31486.84	2311	10135.96	21350.88	849.28

Table A10 Adsorption isotherm of CTAB in the presence of 5 mM MgSO₄ at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
623.0	2732.46	6.396	28.05	2704.40	107.64
865.3	3795.18	7.777	34.11	3761.07	149.81
1137	4986.84	10.21	44.78	4942.06	196.66
1312	5754.39	9.907	43.45	5710.93	227.80
1601	7021.93	11.19	49.08	6972.85	277.47
2098	9201.75	13.32	58.42	9143.33	364.28
2215	9714.91	13.18	57.81	9657.11	384.82
2852	12508.77	16.49	72.32	12436.45	496.86
2967	13013.16	18.84	82.63	12930.53	515.26
3004	13175.44	17.14	75.18	13100.26	522.86
3465	15197.37	85.63	375.57	14821.80	590.51
3623	15890.35	118.3	518.86	15371.49	612.90
3690	16184.21	119.5	524.12	15660.09	623.16
3751	16451.75	133.4	585.09	15866.67	631.13
3871	16978.07	136.4	598.25	16379.82	652.19
3966	17394.74	168.3	738.16	16656.58	663.48
3881	17021.93	222.7	976.75	16045.18	639.50
4025	17653.51	188.8	828.07	16825.44	671.81
4013	17600.88	213.2	935.09	16665.79	663.45
3942	17289.47	215.6	945.61	16343.86	651.15
4170	18289.47	173.1	759.21	17530.26	697.72
4499	19732.46	372.8	1635.09	18097.37	720.72
4923	21592.11	762.4	3343.86	18248.25	726.01
5481	24039.47	1312	5754.39	18285.09	727.76
5855	25679.82	1676	7350.88	18328.95	732.28

Table A11 Adsorption isotherm of CTAB in the presence of 10 mM MgSO₄ at pH ≈ 8

Initial Carbon (mg/L)	Initial CTAB (μM)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μM)	Adsorbed CTAB (μM)	CTAB Adsorption (μmoles/g silica)
770.1	3377.63	8.791	38.56	3339.07	133.22
1037	4548.25	10.300	45.18	4503.07	179.44
1334	5850.88	11.570	50.75	5800.13	230.85
1584	6947.37	11.410	50.04	6897.32	274.52
1848	8105.26	12.390	54.34	8050.92	320.56
2413	10583.33	14.800	64.91	10518.42	418.89
2834	12429.82	15.32	67.19	12362.63	491.95
3278	14377.19	16.89	74.08	14303.11	569.28
3467	15206.14	16.75	73.46	15132.68	602.66
3550	15570.18	19.63	86.10	15484.08	617.51
3523	15451.75	17.91	78.55	15373.20	611.99
3778	16570.18	18.30	80.26	16489.91	656.84
3753	16460.53	18.23	79.96	16380.57	651.57
3852	16894.74	18.43	80.83	16813.90	671.35
4068	17842.11	19.86	87.11	17755.00	706.25
4071	17855.26	19.09	83.73	17771.54	707.18
4213	18478.07	21.15	92.76	18385.31	731.32
4394	19271.93	21.12	92.63	19179.30	763.96
4449	19513.16	28.24	123.86	19389.30	774.02
4975	21820.18	157.8	692.11	21128.07	843.60
5548	24333.33	566.3	2483.77	21849.56	869.29
6162	27026.32	1228	5385.96	21640.35	864.40
6758	29640.35	1908	8368.42	21271.93	846.31
7109	31179.82	2361	10355.26	20824.56	830.16

Table A12 Adsorption isotherm of CTAB in the presence of 0.1 mM Na₂CO₃ at pH ≈ 8

Initial Carbon (mg/L)	Initial CTAB (μM)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μM)	Adsorbed CTAB (μM)	CTAB Adsorption (μmoles/g silica)
631.6	2770.18	9.738	42.71	2727.46	108.58
918.6	4028.95	11.71	51.36	3977.59	158.63
1147	5030.70	14.01	61.45	4969.25	198.33
1391	6100.88	15.61	68.46	6032.41	240.19
1691	7416.67	18.44	80.88	7335.79	292.73
1974	8657.89	20.33	89.17	8568.73	341.86
2227	9767.54	25.72	112.81	9654.74	384.50
2363	10364.04	29.37	128.82	10235.22	408.27
2623	11504.39	30.82	135.18	11369.21	452.33
2951	12942.98	88.38	387.63	12555.35	500.21
3007	13188.60	105.70	463.60	12725.00	508.09
3348	14684.21	212.30	931.14	13753.07	547.49
3198	14026.32	195.10	855.70	13170.61	525.35
3445	15109.65	305.00	1337.72	13771.93	547.92
3526	15464.91	284.00	1245.61	14219.30	567.64
3613	15846.49	241.20	1057.89	14788.60	590.01
3624	15894.74	253.40	1111.40	14783.33	588.63
3763	16504.39	352.6	1546.49	14957.89	597.24
4086	17921.05	547.8	2402.63	15518.42	618.51
4300	18859.65	557.1	2443.42	16416.23	652.99
5206	22833.33	1506	6605.26	16228.07	646.02
5693	24969.30	1770	7763.16	17206.14	684.69
6055	26557.02	2241	9828.95	16728.07	665.66
6217	27267.54	2682	11763.16	15504.39	618.44

Table A13 Adsorption isotherm of CTAB in the presence of 0.5 mM Na₂CO₃ at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
657.7	2884.65	8.474	37.17	2847.48	113.45
919.2	4031.58	12.86	56.40	3975.18	158.56
1169	5127.19	14.04	61.58	5065.61	202.26
1401	6144.74	19.04	83.51	6061.23	241.15
1677	7355.26	19.87	87.15	7268.11	289.57
2259	9907.89	28.36	124.39	9783.51	389.86
2451	10750.00	119.6	524.56	10225.44	407.23
2960	12982.46	330.8	1450.88	11531.58	459.15
3138	13763.16	412.0	1807.02	11956.14	476.53
3447	15118.42	454.9	1995.18	13123.25	522.73
3686	16166.67	827.8	3630.70	12535.96	499.14
3837	16828.95	785.6	3445.61	13383.33	533.52
3821	16758.77	792.7	3476.75	13282.02	529.06
4164	18263.16	890.0	3903.51	14359.65	573.01
4384	19228.07	1021	4478.07	14750.00	587.42
4751	20837.72	1194	5236.84	15600.88	621.43
4908	21526.32	1340	5877.19	15649.12	623.60
5531	24258.77	1980	8684.21	15574.56	620.25
6093	26723.68	2539	11135.96	15587.72	621.64
6414	28131.58	2849	12495.61	15635.96	624.44

Table A14 Adsorption isotherm of CTAB in the presence of 1 mM Na₂CO₃ at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
698.8	3064.91	16.98	74.47	2990.44	118.98
911.1	3996.05	14.40	63.16	3932.89	157.16
1162	5096.49	15.99	70.13	5026.36	200.09
1451	6364.04	14.36	62.98	6301.05	251.34
1732	7596.49	19.43	85.22	7511.27	299.19
2243	9837.72	15.17	66.54	9771.18	388.90
2473	10846.49	21.90	96.05	10750.44	429.16
2946	12921.05	67.15	294.52	12626.54	504.46
3005	13179.82	29.28	128.42	13051.40	519.46
3197	14021.93	41.05	180.04	13841.89	553.01
3313	14530.70	148.10	649.56	13881.14	554.03
3402	14921.05	73.38	321.84	14599.21	582.34
3529	15478.07	71.81	314.96	15163.11	604.47
3630	15921.05	65.02	285.18	15635.88	622.32
3716	16298.25	253.60	1112.28	15185.96	606.23
3877	17004.39	159.00	697.37	16307.02	649.42
4006	17570.18	376.90	1653.07	15917.11	635.41
4199	18416.67	345.8	1516.67	16900.00	673.98
4438	19464.91	476.3	2089.04	17375.88	692.13
4706	20640.35	868.2	3807.89	16832.46	671.15
5006	21956.14	964.3	4229.39	17726.75	707.09
5406	23710.53	1341	5881.58	17828.95	709.75
6172	27070.18	1845	8092.11	18978.07	755.80
6367	27925.44	2066	9061.40	18864.04	750.36

Table A15 Adsorption isotherm of CTAB in the presence of 5 mM Na₂CO₃ at pH ≈ 8

Initial Carbon (mg/L)	Initial CTAB (μM)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μM)	Adsorbed CTAB (μM)	CTAB Adsorption (μmoles/g silica)
692.0	3035.09	34.61	151.80	2883.29	114.76
966.7	4239.91	47.13	206.71	4033.20	160.65
1271	5574.56	46.90	205.70	5368.86	213.60
1739	7627.19	44.80	196.49	7430.70	295.75
2243	9837.72	44.11	193.46	9644.25	384.62
2576	11298.25	92.08	403.86	10894.39	433.43
3024	13263.16	287.7	1261.84	12001.32	478.62
3264	14315.79	377.4	1655.26	12660.53	506.02
3785	16600.88	519.3	2277.63	14323.25	570.65
3791	16627.19	725.0	3179.82	13447.37	536.50
4303	18872.81	993.2	4356.14	14516.67	578.70
4475	19627.19	1017	4460.53	15166.67	603.89
4783	20978.07	1063	4662.28	16315.79	649.51
4881	21407.89	1146	5026.32	16381.58	652.78
5445	23881.58	1461	6407.89	17473.68	698.25
6122	26850.88	2196	9631.58	17219.30	686.16
6487	28451.75	2346	10289.47	18162.28	723.16

Table A16 Adsorption isotherm of CTAB in the presence of 10 mM Na₂CO₃ at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
783.2	3435.09	88.15	386.62	3048.46	121.53
1057	4635.96	90.33	396.18	4239.78	169.02
1323	5802.63	95.91	420.66	5381.97	214.68
1586	6956.14	93.94	412.02	6544.12	260.51
1861	8162.28	87.89	385.48	7776.80	309.59
2310	10131.58	90.09	395.13	9736.45	388.06
2577	11302.63	85.41	374.61	10928.03	435.47
3156	13842.11	125.7	551.32	13290.79	528.88
3433	15057.02	241.0	1057.02	14000.00	557.55
3505	15372.81	271.0	1188.60	14184.21	564.55
3786	16605.26	320.6	1406.14	15199.12	606.03
3946	17307.02	341.3	1496.93	15810.09	629.51
4074	17868.42	619.5	2717.11	15151.32	603.64
4285	18793.86	738.1	3237.28	15556.58	619.17
4536	19894.74	774.0	3394.74	16500.00	658.03
4819	21135.96	885.6	3884.21	17251.75	688.97
5037	22092.11	779.5	3418.86	18673.25	744.10
5551	24346.49	1378	6043.86	18302.63	730.35
6224	27298.25	1920	8421.05	18877.19	751.48
6491	28469.30	2263	9925.44	18543.86	739.09

Table A17 Adsorption isotherm of CTAB in the presence of 0.1 mM MgCl₂ at pH ≈ 8

Initial Carbon (mg/L)	Initial CTAB (μM)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μM)	Adsorbed CTAB (μM)	CTAB Adsorption (μmoles/g silica)
649.1	2846.93	8.547	37.49	2809.44	111.93
924.4	4054.39	12.80	56.14	3998.25	159.78
1180	5175.44	15.09	66.18	5109.25	203.35
1460	6403.51	22.76	99.82	6303.68	250.94
1960	8596.49	25.41	111.45	8485.04	337.58
2224	9754.39	30.51	133.82	9620.57	382.76
2494	10938.60	39.64	173.86	10764.74	428.36
3005	13179.82	132.9	582.89	12596.93	501.27
3180	13947.37	226.0	991.23	12956.14	516.39
3347	14679.82	262.1	1149.56	13530.26	539.27
3561	15618.42	416.4	1826.32	13792.11	549.60
3780	16578.95	586.7	2573.25	14005.70	557.33
3912	17157.89	652.3	2860.96	14296.93	569.15
4018	17622.81	699.5	3067.98	14554.82	579.18
4067	17837.72	685.4	3006.14	14831.58	592.67
4208	18456.14	725.8	3183.33	15272.81	608.84
4258	18675.44	820.3	3597.81	15077.63	600.70
4346	19061.40	862.5	3782.89	15278.51	608.71
4417	19372.81	875.4	3839.47	15533.33	620.59
4711	20662.28	1098	4815.79	15846.49	632.72
4977	21828.95	1301	5706.14	16122.81	642.09
5659	24820.18	1842	8078.95	16741.23	666.58
6250	27412.28	2510	11008.77	16403.51	653.79
6521	28600.88	2884	12649.12	15951.75	636.29

Table A18 Adsorption isotherm of CTAB in the presence of 0.5 mM MgCl₂ at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
663.4	2909.65	9.928	43.54	2866.11	114.07
875.2	3838.60	12.84	56.32	3782.28	150.57
1150	5043.86	15.48	67.89	4975.96	198.25
1423	6241.23	18.39	80.66	6160.57	245.49
1679	7364.04	28.39	124.52	7239.52	289.00
2187	9592.11	95.86	420.44	9171.67	365.33
2424	10631.58	99.39	435.92	10195.66	406.69
2931	12855.26	448.1	1965.35	10889.91	434.47
3250	14254.39	621.9	2727.63	11526.75	460.70
3458	15166.67	683.4	2997.37	12169.30	486.29
3625	15899.12	845.7	3709.21	12189.91	486.62
3819	16750.00	1014	4447.37	12302.63	491.32
3824	16771.93	1088	4771.93	12000.00	478.85
4096	17964.91	1288	5649.12	12315.79	491.16
4360	19122.81	1218	5342.11	13780.70	550.13
4634	20324.56	1463	6416.67	13907.89	553.77
4961	21758.77	1701	7460.53	14298.25	570.11
5470	23991.23	2028	8894.74	15096.49	600.74
5961	26144.74	2604	11421.05	14723.68	588.01
6326	27745.61	2703	11855.26	15890.35	632.96

Table A19 Adsorption isotherm of CTAB in the presence of 1 mM MgCl₂ at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
647.1	2838.16	9.976	43.75	2794.40	111.20
918.9	4030.26	12.18	53.42	3976.84	158.25
1173	5144.74	14.33	62.85	5081.89	202.22
1396	6122.81	17.87	78.38	6044.43	241.20
1646	7219.30	20.09	88.11	7131.18	284.51
2131	9346.49	26.62	116.75	9229.74	367.28
2342	10271.93	28.11	123.29	10148.64	405.30
2799	12276.32	49.68	217.89	12058.42	481.09
3030	13289.47	129.90	569.74	12719.74	507.17
3123	13697.37	136.30	597.81	13099.56	522.21
3377	14811.40	229.70	1007.46	13803.95	549.52
3522	15447.37	385.30	1689.91	13757.46	548.32
3774	16552.63	335.80	1472.81	15079.82	599.83
3740	16403.51	403.80	1771.05	14632.46	584.01
3719	16311.40	417.00	1828.95	14482.46	577.57
3921	17197.37	562.10	2465.35	14732.02	586.93
3855	16907.89	511.80	2244.74	14663.16	583.49
4179	18328.95	664.8	2915.79	15413.16	613.70
4193	18390.35	602.2	2641.23	15749.12	627.21
4372	19175.44	791.6	3471.93	15703.51	625.26
4564	20017.54	809.5	3550.50	16467.05	655.54
5150	22587.72	1343	5890.35	16697.37	666.16
6006	26342.11	2278	9991.23	16350.88	651.04
6313	27688.60	2345	10285.09	17403.51	695.17

Table A20 Adsorption isotherm of CTAB in the presence of 5 mM MgCl₂ at pH \approx 8

Initial Carbon (mg/L)	Initial CTAB (μ M)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μ M)	Adsorbed CTAB (μ M)	CTAB Adsorption (μ moles/g silica)
647.2	2838.60	10.03	43.99	2794.61	111.27
893.9	3920.61	12.59	55.22	3865.39	154.40
1149	5039.47	14.71	64.52	4974.96	198.09
1408	6175.44	21.50	94.30	6081.14	242.66
1668	7315.79	23.64	103.68	7212.11	287.16
2172	9526.32	98.24	430.88	9095.44	362.15
2413	10583.33	295.9	1297.81	9285.53	369.79
2971	13030.70	394.3	1729.39	11301.32	451.33
3122	13692.98	614.6	2695.61	10997.37	437.71
3382	14833.33	714.7	3134.65	11698.68	465.80
3730	16359.65	862.2	3781.58	12578.07	500.62
3782	16587.72	971.0	4258.77	12328.95	492.57
3792	16631.58	1150	5043.86	11587.72	462.58
4067	17837.72	1252	5491.23	12346.49	492.19
4344	19052.63	1327	5820.18	13232.46	526.98
4851	21276.32	1797	7881.58	13394.74	533.55
5296	23228.07	1938	8500.00	14728.07	587.71
6109	26793.86	2594	11377.19	15416.67	615.19
6287	27574.56	3092	13561.40	14013.16	558.07

Table A21 Adsorption isotherm of CTAB in the presence of 10 mM MgCl₂ at pH ≈ 8

Initial Carbon (mg/L)	Initial CTAB (μM)	Equilibrium Carbon (mg/L)	Equilibrium CTAB (μM)	Adsorbed CTAB (μM)	CTAB Adsorption (μmoles/g silica)
645.5	2831.14	9.511	41.71	2789.43	111.15
854.3	3746.93	10.660	46.75	3700.18	147.27
1102	4833.33	12.090	53.03	4780.31	190.83
1336	5859.65	13.530	59.34	5800.31	231.09
1361	5969.30	14.600	64.04	5905.26	235.88
2004	8789.47	18.380	80.61	8708.86	346.90
2349	10302.63	18.38	80.61	10222.02	406.85
2742	12026.32	22.87	100.31	11926.01	475.23
2908	12754.39	26.90	117.98	12636.40	503.24
3005	13179.82	40.54	177.81	13002.02	517.60
3281	14390.35	46.25	202.85	14187.50	566.03
3484	15280.70	186.60	818.42	14462.28	575.73
3589	15741.23	210.90	925.00	14816.23	590.17
3664	16070.18	270.30	1185.53	14884.65	593.01
3845	16864.04	308.20	1351.75	15512.28	617.40
3842	16850.88	365.50	1603.07	15247.81	607.00
3848	16877.19	399.90	1753.95	15123.25	601.80
4092	17947.37	527.10	2311.84	15635.53	622.31
4368	19157.89	577.40	2532.46	16625.44	661.58
4334	19008.77	595.7	2612.72	16396.05	653.10
4451	19521.93	738.8	3240.35	16281.58	649.19
5204	22824.56	1249	5478.07	17346.49	691.65
6014	26377.19	2152	9438.60	16938.60	674.98
6238	27359.65	2345	10285.09	17074.56	680.94

Appendix B Experimental Data of Adsolubilization

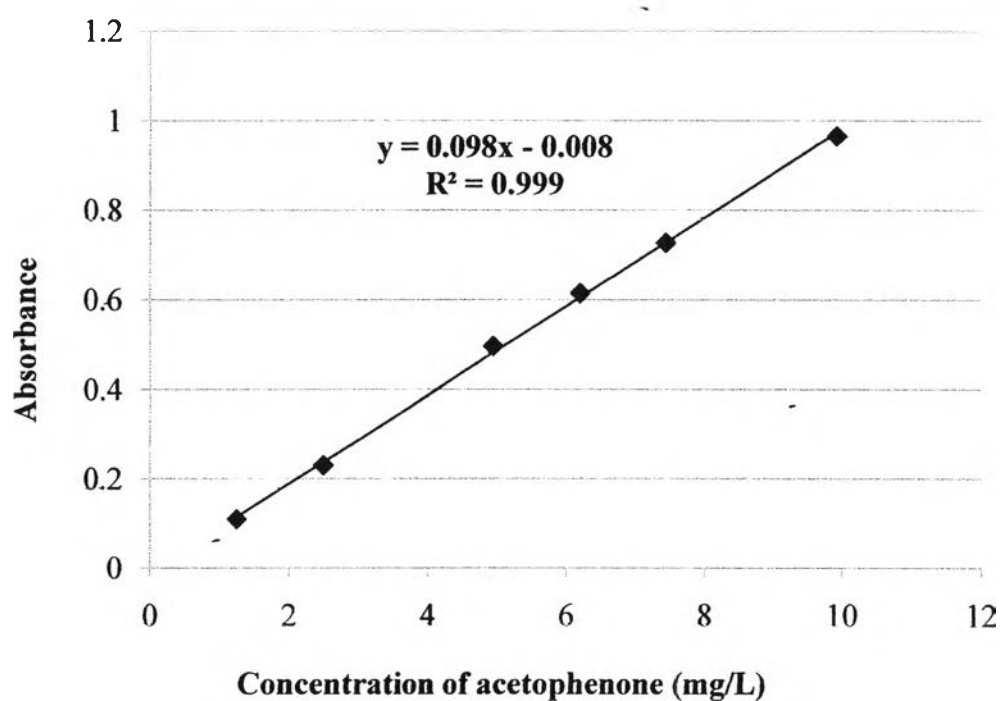
Weight of silica	= 0.5	g
Molecular weight of acetophenone	= 120.15	g/mol
Maximum adsorption	= 500	$\mu\text{mol/g silica}$
Solubility of acetophenone in water	= 5.5	g/L
Volume of acetophenone	= 80	μL
Final volume	\approx 20	mL
Density of acetophenone	= 1.03	g/mL
Concentration of acetophenone	= 4.12	g/L
Initial concentration of acetophenone	= 0.03429047	mol/L

Table B1 Adsolubilization of acetophenone at pH \approx 8

System	Equilibrium Acetophenone (g/L)	Equilibrium Acetophenone (mol/L)	Adsolubilized Acetophenone (mM)	Adsolubilization of Acetophenone (mmol/g silica)
No salt	3.405185	0.028341115	5.949354973	11.89870995
NaCl 0.1 mM	3.07898	0.025626134	8.664336246	17.32867249
NaCl 0.5 mM	3.119055	0.025959675	8.33079484	16.66158968
NaCl 1 mM	3.046255	0.025353766	8.93670412	17.87340824
NaCl 5 mM	3.081575	0.025647732	8.642738244	17.28547649
NaCl 10 mM	3.199745	0.026631253	7.659217645	15.31843529
Na ₂ CO ₃ 0.1 mM	2.9828	0.024825635	9.464835622	18.92967124
Na ₂ CO ₃ 0.5 mM	3.142485	0.026154682	8.135788598	16.2715772
Na ₂ CO ₃ 1 mM	3.08494	0.025675739	8.614731586	17.22946317
Na ₂ CO ₃ 5 mM	3.10151	0.02581365	8.476820641	16.95364128
Na ₂ CO ₃ 10 mM	3.15808	0.026284478	8.005992509	16.01198502
MgSO ₄ 0.1 mM	2.949505	0.024548523	9.741947566	19.48389513
MgSO ₄ 0.5 mM	3.251945	0.02706571	7.224760716	14.44952143
MgSO ₄ 1 mM	3.093675	0.025748439	8.542030795	17.08406159
MgSO ₄ 5 mM	3.11587	0.025933167	8.357303371	16.71460674
MgSO ₄ 10 mM	2.966695	0.024691594	9.598876404	19.19775281
MgCl ₂ 0.1 mM	3.126145	0.026018685	8.271785268	16.54357054
MgCl ₂ 0.5 mM	2.98108	0.024811319	9.479151061	18.95830212
MgCl ₂ 1 mM	3.238795	0.026956263	7.334207241	14.66841448
MgCl ₂ 5 mM	3.07387	0.025583604	8.706866417	17.41373283
MgCl ₂ 10 mM	3.08114	0.025644112	8.646358718	17.29271744

Table B2 Calibration curve of acetophenone by UV-VIS spectrophotometer

X = Equilibrium concentration of acetophenone (mg/L)	Y = Absorbance
1.24	0.10948
2.48	0.23003
4.96	0.49626
6.2	0.61382
7.44	0.72666
9.92	0.96413

**Figure B1** Standard curve of acetophenone by UV-VIS spectrophotometer.

$$\text{Equation } Y = 0.098X - 0.008$$

where X = Equilibrium concentration of acetophenone (mg/L)

Y = Absorbance

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Proceedings:

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