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Appendix A. Surfactant Adsorption

Table A1 Data for SDS adsorption at pH of 5 on carbon black at 30°C
Weight of carbon black = 0.25 g, Volume of solution = 20 ml

Initial SDS concentration (μM)	Equilibrium SDS concentration (μM)	Different SDS concentration (μM)	SDS adsorption density (μmole/m^2)
1000	662.1616	337.8384	0.281532
2000	949.2056	1050.7944	0.875662
3000	1092.3060	1907.6940	1.589745
4000	1771.6144	2228.3856	1.856988
5000	2417.4764	2582.5236	2.152103
6000	3241.4988	2758.5012	2.298751
7000	4109.6908	2890.3092	2.408591
8000	4962.4904	3037.5096	2.531258
9000	5761.5108	3238.4892	2.698741
10000	6761.8528	3238.1472	2.698456
11000	7762.9748	3237.0252	2.697521
12000	8763.7548	3236.2452	2.696871
13000	9759.9880	3240.0120	2.70001
14000	10775.1056	3224.8944	2.687412
15000	11766.4956	3233.5044	2.694587

Table A2 Data for SDS adsorption at pH of 7 on carbon black at 30°C

Weight of carbon black = 0.25 g, Volume of solution = 20 ml

Initial SDS concentration (μM)	Equilibrium SDS concentration (μM)	Different SDS concentration (μM)	SDS adsorption density (μmole/m^2)
1000	746.9740	253.0260	0.210855
2000	995.3920	1004.6080	0.837173333
4000	1895.3800	2104.6200	1.75385
5000	2673.8600	2326.1400	1.93845
6000	3338.3800	2661.6200	2.218016667
7000	4214.5400	2785.4600	2.321216667
8000	5108.4600	2891.5400	2.409616667
9000	6157.0400	2842.9600	2.369133333
10000	6865.9600	3134.0400	2.6117
11000	8021.1000	2978.9000	2.482416667
12000	9071.9000	2928.1000	2.440083333
13000	9937.7000	3062.3000	2.551916667
14000	10936.7000	3063.3000	2.55275
15000	11894.9000	3105.1000	2.587583333

Table A3 Data for SDS adsorption at pH of 9 on carbon black at 30°C

Weight of carbon black = 0.25 g, Volume of solution = 20 ml

Initial SDS concentration (μM)	Equilibrium SDS concentration (μM)	Different SDS concentration (μM)	SDS adsorption density (μmole/m^2)
1000	856.5680	143.4320	0.119526667
2000	1125.7800	874.2200	0.728516667
3000	1410.6800	1589.3200	1.324433333
4000	1941.2600	2058.7400	1.715616667
5000	2525.8600	2474.1400	2.061783333
6000	3259.9400	2740.0600	2.283383333
7000	4008.8200	2991.1800	2.49265
8000	5162.4800	2837.5200	2.3646
9000	5962.4200	3037.5800	2.531316667
10000	7122.0000	2878.0000	2.398333333
11000	8050.7000	2949.3000	2.45775
12000	8923.9000	3076.1000	2.563416667
13000	9908.7892	3091.2108	2.576009
14000	10912.2635	3087.7365	2.57311375
15000	11926.5000	3073.5000	2.56125

Table A4 Data for SDS adsorption at pH of 11 on carbon black at 30°C

Weight of carbon black = 0.25 g, Volume of solution = 20 ml

Initial SDS concentration (μM)	Equilibrium SDS concentration (μM)	Different SDS concentration (μM)	SDS adsorption density ($\mu mole/m^2$)
1000	873.0480	126.9520	0.105793333
2000	1128.4440	871.5560	0.726296667
3000	1429.1800	1570.8200	1.309016667
4000	1966.2000	2033.8000	1.694833333
5000	2628.8800	2371.1200	1.975933333
6000	3382.0400	2617.9600	2.181633333
7000	4259.4800	2740.5200	2.283766667
8000	5182.4600	2817.5400	2.34795
9000	5820.3600	3179.6400	2.6497
10000	6826.3200	3173.6800	2.644733333
11000	7792.1300	3207.8700	2.673225
12000	8762.3600	3237.6400	2.698033333
13000	9763.1300	3236.8700	2.697391667
14000	10768.9000	3231.1000	2.692583333
15000	11780.0200	3219.9800	2.683316667

Table A5 Data for TX-100 adsorption at pH of 5 on carbon black at 30°C

Weight of carbon black = 0.25 g, Volume of solution = 20 ml

Initial TX-100 concentration (μM)	Equilibrium TX-100 concentration (μM)	Different TX-100 concentration (μM)	TX-100 adsorption density ($\mu mole/m^2$)
40	36.3375	3.6625	0.0031
50	29.2250	20.7750	0.0173
90	41.0875	48.9125	0.0408
120	40.5625	79.4375	0.0662
240	33.4625	206.5375	0.1721
360	33.0250	326.9750	0.2725
490	56.2500	433.7500	0.3615
700	82.6960	617.3040	0.5144
840	118.5120	721.4880	0.6012
950	174.4250	775.5750	0.6463
1000	183.4950	816.5050	0.6804
1200	240.1800	959.8200	0.7999
1300	320.1250	979.8750	0.8166
1400	422.4932	977.5068	0.8146
1500	528.1800	971.8200	0.8099
1600	627.7360	972.2640	0.8102
1700	723.5720	976.4280	0.8137

Table A6 Data for TX-100 adsorption at pH of 7 on carbon black at 30°C
Weight of carbon black = 0.25 g, Volume of solution = 20 ml

Initial TX-100 concentration (μM)	Equilibrium TX-100 concentration (μM)	Different TX-100 concentration (μM)	TX-100 adsorption density ($\mu mole/m^2$)
50	39.9625	10.0375	0.0084
60	45.7000	14.3000	0.0119
75	52.4125	22.5875	0.0188
100	54.3125	45.6875	0.0381
130	54.6188	75.3813	0.0628
180	55.6000	124.4000	0.1037
230	68.0875	161.9125	0.1349
360	79.9375	280.0625	0.2334
380	73.6975	306.3025	0.2553
420	78.6223	341.3778	0.2845
720	122.8125	597.1875	0.4977
830	189.2500	640.7500	0.5340
850	158.5500	691.4500	0.5762
1200	359.9375	840.0625	0.7001
1300	444.9880	855.0120	0.7125
1400	559.7000	840.3000	0.7003
1500	654.2652	845.7348	0.7048
1700	847.7240	852.2760	0.7102

Table A7 Data for TX-100 adsorption at pH of 9 on carbon black at 30°C

Weight of carbon black = 0.25 g, Volume of solution = 20 ml

Initial TX-100 concentration (μM)	Equilibrium TX-100 concentration (μM)	Different TX-100 concentration (μM)	TX-100 adsorption density (μmole/m^2)
40	34.4260	5.5740	0.0046
50	42.4095	7.5905	0.0063
60	48.3375	11.6625	0.0097
70	54.9375	15.0625	0.0126
110	57.0625	52.9375	0.0441
230	66.8625	163.1375	0.1359
360	82.7125	277.2875	0.2311
600	97.1625	502.8375	0.4190
720	114.0625	605.9375	0.5049
800	172.1703	627.8297	0.5232
900	327.6875	572.3125	0.4769
1000	409.6375	590.3625	0.4920
1100	541.6000	558.4000	0.4653
1200	610.7700	589.2300	0.4910
1300	710.8180	589.1820	0.4910

Table A8 Data for TX-100 adsorption at pH of 11 on carbon black at 30°C

Weight of carbon black = 0.25 g, Volume of solution = 20 ml

Initial TX-100 concentration (μM)	Equilibrium TX-100 concentration (μM)	Different TX-100 concentration (μM)	TX-100 adsorption density (μmole/m^2)
20	18.1724	1.8276	0.0015
30	26.8955	3.1045	0.0026
40	36.2730	3.7270	0.0031
45	40.1293	4.8707	0.0041
50	45.0770	4.9230	0.0041
60	52.9512	7.0488	0.0059
80	70.9296	9.0704	0.0076
90	78.3745	11.6255	0.0097
100	76.5162	23.4838	0.0196
130	85.0132	44.9868	0.0375
200	108.9836	91.0164	0.0758
300	72.6000	227.4000	0.1895
430	128.9248	301.0752	0.2509
700	232.5400	467.4600	0.3896
800	273.2360	526.7640	0.4390
900	384.5520	515.4480	0.4295
1000	482.6092	517.3908	0.4312
1100	575.6516	524.3484	0.4370
1200	685.7112	514.2888	0.4286
1300	775.6192	524.3808	0.4370

Table A9 Data for SDS adsorption on cotton fabric at surfactant solution pH 5 and 30°C, weight of cotton fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
4000	3998.6481	0.0125
5000	4867.5054	1.2251
6000	5675.6906	2.9987
7000	6578.6152	3.8963
8000	7496.8321	4.6525
9000	8448.1863	5.1023
10000	9401.6493	5.5326
11000	10400.5894	5.5424
12000	11401.9413	5.5299
13000	12387.7412	5.6612
14000	13401.6601	5.5325
15000	14384.6698	5.6896

Table A10 Data for SDS adsorption on cotton fabric at surfactant solution pH 7 and 30°C, weight of cotton fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
4000	3972.2163	0.2569
5000	4930.2369	0.6451
6000	5852.2112	1.3665
7000	6760.9434	2.2104
8000	7650.7882	3.2290
9000	8539.3026	4.2598
10000	9493.1442	4.6866
11000	10556.3363	4.1023
12000	11556.3254	4.1024
13000	12531.4077	4.3328
14000	13530.6074	4.3402
15000	14531.0724	4.3359

Table A11 Data for SDS adsorption on cotton fabric at surfactant solution pH 9 and 30°C, weight of cotton fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
4000	3990.7856	0.0852
5000	4990.1475	0.0911
6000	5933.7906	0.6122
7000	6770.1272	2.1255
8000	7760.5992	2.2136
9000	8724.5528	2.5469
10000	9685.2186	2.9106
11000	10672.3271	3.0298
12000	11654.0822	3.1985
13000	12674.4901	3.0098
14000	13657.9756	3.1625
15000	14655.8126	3.1825

Table A12 Data for SDS adsorption on cotton fabric at surfactant solution pH 11 and 30°C, weight of cotton fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
4000	3975.6338	0.2253
5000	4943.4753	0.5227
6000	5899.3107	0.9310
7000	6810.0562	1.7563
8000	7798.2029	1.8659
9000	8800.7553	1.8423
10000	9797.8028	1.8696
11000	10798.5706	1.8625
12000	11802.0963	1.8299
13000	12799.2844	1.8559
14000	13798.6031	1.8622
15000	14798.7755	1.8606

Table A13 Data for TX-100 adsorption on cotton fabric at surfactant solution pH 5 and 30°C

Weight of cotton fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
90	70.1140	0.1839
100	79.1714	0.1926
110	88.5080	0.1987
120	93.6150	0.2440
160	122.2225	0.3493
170	126.3860	0.4033
220	171.4375	0.4490
280	229.9825	0.4625
360	304.8449	0.5100
400	343.8983	0.5187
500	444.3830	0.5143
600	543.7463	0.5201
700	643.8102	0.5196
800	743.9940	0.5179
900	844.2082	0.5159

Table A14 Data for TX-100 adsorption on cotton fabric at surfactant solution pH 7 and 30°C

Weight of cotton fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
95	75.6878	0.1786
100	80.3738	0.1815
120	99.0062	0.1941
130	107.3490	0.2094
140	117.1961	0.2109
150	119.5182	0.2818
200	159.4890	0.3746
230	188.4247	0.3844
300	256.4172	0.4030
400	353.3853	0.4310
500	452.5055	0.4392
600	553.2390	0.4324
700	652.3825	0.4403
800	751.7540	0.4461
900	852.5168	0.4390

Table A15 Data for TX-100 adsorption on cotton fabric at surfactant solution pH 9 and 30°C

Weight of cotton fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
140	120.6926	0.1785
145	125.0773	0.1842
150	129.7274	0.1874
155	133.8821	0.1953
160	137.7684	0.2056
180	150.8626	0.2694
190	160.3115	0.2745
250	215.5266	0.3188
300	260.5740	0.3645
400	356.1753	0.4052
500	455.2672	0.4136
600	554.1684	0.4238
700	653.6673	0.4284
800	752.9480	0.4351
900	854.0843	0.4246

Table A16 Data for TX-100 adsorption on cotton fabric at surfactant solution pH 11 and 30°C

Weight of cotton fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
120	102.3441	0.1633
130	112.2035	0.1646
135	116.5436	0.1707
150	130.4741	0.1805
160	139.4757	0.1898
170	148.1587	0.2020
250	220.2701	0.2749
300	266.6723	0.3082
400	357.8820	0.3894
500	457.6285	0.3918
600	558.7500	0.3814
700	659.8975	0.3708
800	757.7479	0.3907
900	858.2550	0.3860

Table A17 Data for SDS adsorption on blended cotton/polyester fabric at surfactant solution pH 5 and 30°C, weight of blended cotton/polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
4000	3998.2800	0.0214
5000	4993.9076	0.0758
6000	5981.8835	0.2254
7000	6923.1535	0.9561
8000	7851.9572	1.8419
9000	8811.0384	2.3510
10000	9791.8609	2.5896
11000	10811.8261	2.3412
12000	11806.5936	2.4063
13000	12805.3237	2.4221
14000	13803.5233	2.4445
15000	14810.6606	2.3557

Table A18 Data for SDS adsorption on blended cotton/polyester fabric at surfactant solution pH 7 and 30°C, weight of blended cotton/polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
4000	3998.7622	0.0154
5000	4995.2820	0.0587
6000	5935.8206	0.7985
7000	6921.0316	0.9825
8000	7918.4355	1.0148
9000	8893.6076	1.3237
10000	9893.9211	1.3198
11000	10894.8052	1.3088
12000	11893.0691	1.3304
13000	12893.7041	1.3225
14000	13890.0068	1.3685
15000	14892.3377	1.3395

Table A19 Data for SDS adsorption on blended cotton/polyester fabric at surfactant solution pH 9 and 30°C, weight of blended cotton/polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
4000	3997.0663	0.0365
5000	4993.5861	0.0798
6000	5987.4052	0.1567
7000	6971.2418	0.3578
8000	7955.4160	0.5547
9000	8942.7328	0.7125
10000	9927.8715	0.8974
11000	10923.3866	0.9532
12000	11924.2707	0.9422
13000	12925.9425	0.9214
14000	13924.7851	0.9358
15000	14925.8380	0.9227

Table A20 Data for SDS adsorption on blended cotton/polyester fabric at surfactant solution pH 11 and 30°C, weight of blended cotton/polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
4000	3996.4072	0.0447
5000	4995.3302	0.0581
6000	5989.9210	0.1254
7000	6970.8078	0.3632
8000	7959.6759	0.5017
9000	8950.7703	0.6125
10000	9945.7710	0.6747
11000	10948.4153	0.6418
12000	11947.2981	0.6557
13000	12949.0824	0.6335
14000	13949.7094	0.6257
15000	14948.3832	0.6422

Table A21 Data for TX-100 adsorption on blended cotton/polyester fabric at solution pH 5 and 30°C, weight of blended cotton/polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
50	49.7926	0.0026
60	59.5833	0.0052
70	68.7301	0.0158
80	75.8567	0.0516
90	87.5775	0.0301
100	97.0075	0.0372
200	190.1900	0.1221
300	274.3275	0.3194
400	367.3225	0.4066
500	467.0975	0.4094
600	567.9888	0.3983
700	668.9750	0.3860
800	768.2575	0.3949
900	869.2975	0.3820

Table A22 Data for TX-100 adsorption on blended cotton/polyester fabric at solution pH 7 and 30°C, weight of blended cotton/polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
40	39.9150	0.0011
50	49.3819	0.0077
60	59.2260	0.0096
70	68.4817	0.0189
80	78.2973	0.0212
90	87.2922	0.0337
100	95.6131	0.0546
200	187.3100	0.1579
300	277.6100	0.2786
400	380.3600	0.2444
500	476.9693	0.2865
600	575.9750	0.2989
700	676.4625	0.2928
800	776.7125	0.2897
900	878.1250	0.2722

Table A23 Data for TX-100 adsorption on blended cotton/polyester fabric at solution pH 9 and 30°C, weight of blended cotton/polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
40	39.9162	0.0010
50	49.7913	0.0026
60	59.6319	0.0046
70	69.4390	0.0070
80	78.7566	0.0155
90	87.5711	0.0302
100	96.8863	0.0387
200	194.9825	0.0624
300	285.2850	0.1831
400	385.4000	0.1816
500	483.1925	0.2091
600	584.7125	0.1902
700	681.6400	0.2284
800	785.0965	0.1854
900	885.4000	0.1816

Table A24 Data for TX-100 adsorption on blended cotton/polyester fabric at solution pH 11 and 30°C, weight of blended cotton/polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
40	39.9190	0.0010
50	49.8394	0.0020
60	59.8106	0.0024
70	69.6230	0.0047
80	78.7759	0.0152
90	87.6780	0.0289
100	97.2206	0.0346
200	195.2072	0.0596
300	292.6714	0.0912
400	391.8101	0.1019
500	493.2519	0.0840
600	592.9509	0.0877
700	693.5232	0.0806
800	793.6198	0.0794
900	893.2092	0.0845

Table A25 Data for SDS adsorption on polyester fabric at solution pH 5 and 30°C

Weight of polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
1000	995.2813	0.0755
2000	1994.8438	0.0825
3000	2992.9688	0.1125
4000	3991.2375	0.1402
5000	4988.4000	0.1856
6000	5983.4188	0.2653
7000	6976.5500	0.3752
8000	7966.0438	0.5433
9000	8957.3000	0.6832
10000	9950.6500	0.7896
11000	10946.6500	0.8536
12000	11944.2438	0.8921
13000	12944.0938	0.8945
14000	13943.9313	0.8971
15000	14943.9500	0.8968

Table A26 Data for SDS adsorption on polyester fabric at solution pH 7 and 30°C

Weight of polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
1000	996.0688	0.0629
2000	1996.8875	0.0498
3000	2994.8000	0.0832
4000	3993.3563	0.1063
5000	4991.6188	0.1341
6000	5986.2188	0.2205
7000	6978.9438	0.3369
8000	7969.9313	0.4811
9000	8963.0500	0.5912
10000	9954.9688	0.7205
11000	10953.3188	0.7469
12000	11951.1750	0.7812
13000	12947.3000	0.8432
14000	13947.1750	0.8452
15000	14947.2875	0.8434

Table A27 Data for SDS adsorption on polyester fabric at solution pH 9 and 30°C

Weight of polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
1000	998.2438	0.0281
2000	1997.9938	0.0321
3000	2996.1813	0.0611
4000	3994.8250	0.0828
5000	4992.9688	0.1125
6000	5988.8188	0.1789
7000	6982.1500	0.2856
8000	7976.1563	0.3815
9000	8970.6188	0.4701
10000	9962.5813	0.5987
11000	10958.2063	0.6687
12000	11958.1500	0.6696
13000	12958.2875	0.6674
14000	13958.2375	0.6682
15000	14958.1188	0.6701

Table A28 Data for SDS adsorption on polyester fabric at solution pH 11 and 30°C

Weight of polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
1000	999.1500	0.0136
2000	1998.8813	0.0179
3000	2997.9688	0.0325
4000	3996.4813	0.0563
5000	4994.9438	0.0809
6000	5991.5063	0.1359
7000	6984.4938	0.2481
8000	7980.6500	0.3096
9000	8977.3688	0.3621
10000	9971.1875	0.4610
11000	10964.8000	0.5632
12000	11964.2438	0.5721
13000	12963.8500	0.5784
14000	13963.8875	0.5778
15000	14963.8063	0.5791

Table A29 Data for TX-100 adsorption on polyester fabric at solution pH 5 and 30°C

Weight of polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
40	39.9388	0.0010
50	49.9019	0.0016
60	59.7156	0.0045
70	69.3850	0.0098
80	78.4750	0.0244
90	86.3750	0.0580
100	93.8688	0.0981
200	190.2688	0.1557
300	284.5125	0.2478
400	383.4625	0.2646
500	484.0813	0.2547
600	582.6563	0.2775
700	683.0125	0.2718
800	783.3188	0.2669
900	882.8688	0.2741

Table A30 Data for TX-100 adsorption on polyester fabric at solution pH 7 and 30°C

Weight of polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
40	39.9431	0.0009
50	49.8413	0.0025
60	59.6400	0.0058
70	69.3869	0.0098
80	78.4519	0.0248
90	88.0344	0.0315
100	96.3875	0.0578
200	192.1438	0.1257
300	287.6000	0.1984
400	386.7625	0.2118
500	485.9125	0.2254
600	586.9688	0.2085
700	685.8938	0.2257
800	786.5188	0.2157
900	886.8188	0.2109

Table A31 Data for TX-100 adsorption on polyester fabric at solution pH 9 and 30°C

Weight of polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
40	39.9313	0.0011
50	49.8250	0.0028
60	59.6438	0.0057
70	69.5375	0.0074
80	79.4250	0.0092
90	88.4125	0.0254
100	97.4313	0.0411
200	196.2688	0.0597
300	294.4125	0.0894
400	393.3188	0.1069
500	492.7875	0.1154
600	593.6188	0.1021
700	693.7250	0.1004
800	792.1438	0.1257
900	892.0813	0.1267

Table A32 Data for TX-100 adsorption on polyester fabric at solution pH 11 and 30°C

Weight of polyester fabric = 0.5g, Volume of solution 20 ml

Initial Concentration (μM)	Equilibrium Concentration (μM)	Adsorption density μmole/m^2
40	39.9413	0.0009
50	49.9300	0.0011
60	59.8119	0.0030
70	69.7056	0.0047
80	79.5719	0.0068
90	89.4113	0.0094
100	98.6600	0.0214
200	198.1163	0.0301
300	296.2813	0.0595
400	396.0313	0.0635
500	495.7063	0.0687
600	595.1625	0.0774
700	695.5313	0.0715
800	795.6563	0.0695
900	895.6125	0.0702

Appendix B Zeta Potential Measurement

Table B1 Data for zeta potential measurement of carbon black at pH 5 and variable SDS at 30°C

SDS Conc. (μM)	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	1100	12000	13000	14000	15000
Zeta potential (-mV) 1	20.3	21.7	22.4	23.1	23.7	24.1	24.8	25.1	26.5	27.8	28.9	31.1	31.9	32.7	33.0
2	20.4	21.7	22.8	23.5	23.8	23.9	24.9	25.3	26.4	27.6	29.1	31.5	32.0	32.8	32.9
3	20.5	21.5	22.6	23.6	23.9	23.8	24.5	25.0	25.9	27.9	29.3	31.2	32.1	32.7	33.4
4	20.2	21.6	22.4	23.2	24.0	24.0	24.6	24.9	26.1	27.6	28.7	31.4	32.3	32.8	33.0
5	21.1	21.8	22.3	23.0	23.5	24.2	24.8	24.8	26.3	27.5	28.9	31.2	32.1	32.6	33.2
6	20.0	21.5	22.1	23.5	24.2	23.7	24.8	24.7	26.2	27.8	29.0	31.3	31.8	32.6	33.1
7	20.0	21.6	22.8	23.4	23.8	24.5	24.8	25.6	25.9	27.6	29.0	31.0	31.7	32.5	33.0
8	21.0	21.7	22.5	22.9	23.6	24.1	24.8	25.4	25.9	27.4	29.4	31.6	32.0	32.9	33.5
9	20.5	21.5	22.6	22.9	23.8	24.2	24.8	25.0	26.2	27.8	29.0	31.5	32.1	32.8	33.3
10	20.4	21.4	22.5	23.5	23.9	23.8	25.1	24.8	26.3	27.5	28.9	31.1	32.1	33.0	33.0
11	20.5	21.6	22.5	23.5	24.1	23.9	25.0	24.9	26.0	27.5	28.7	30.9	31.9	32.8	32.8
12	20.5	21.3	22.7	23.3	24.3	24.3	25.4	25.0	26.4	27.9	28.9	30.9	31.8	32.6	32.8
13	19.9	21.5	22.8	23.1	23.8	24.2	24.8	25.3	26.2	27.6	28.6	31.4	32.0	32.7	33.4
14	19.8	21.7	22.3	23.0	23.6	24.2	24.8	25.3	26.3	27.5	29.0	31.2	31.8	32.8	32.9
15	20.7	21.9	22.4	23.1	23.5	23.9	25.0	25.2	25.9	27.5	29.1	31.6	32.1	33.2	33.5
16	21.1	21.4	22.1	22.9	23.8	23.9	25.1	24.9	25.8	27.4	29.5	31.5	32.0	32.9	33.2
17	20.7	21.2	22.3	22.8	23.7	24.1	25.0	24.8	26.3	27.4	29.0	31.2	32.0	32.4	33.4
18	20.5	21.0	22.6	23.5	23.6	24.0	24.9	25.1	26.4	27.5	29.4	30.7	31.9	32.9	33.5
19	20.8	21.6	22.6	23.2	23.4	23.9	25.3	25.0	26.3	27.5	28.7	31.2	32.3	32.5	33.4

SDS Conc. (μM)	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	1100	12000	13000	14000	15000
20	20.4	21.8	22.5	23.5	24.0	23.9	24.6	24.7	26.0	27.6	29.1	31.5	32.5	33.0	33.6
21	20.5	21.5	22.8	23.4	24.0	24.0	24.8	24.8	26.1	27.4	29.0	31.3	32.1	32.9	32.9
22	20.1	21.7	22.3	22.9	23.4	24.3	24.8	25.0	25.8	27.5	28.8	31.3	31.6	32.5	32.9
23	19.9	21.6	22.0	23.0	23.7	24.0	25.0	24.9	26.1	27.6	28.9	31.2	31.6	32.6	33.5
24	20.7	21.5	22.1	23.5	23.6	23.8	24.9	25.1	26.3	27.6	28.6	30.9	32.1	32.8	32.9
25	20.8	21.5	22.4	23.1	23.9	23.7	24.9	25.1	26.2	27.7	29.2	31.5	31.9	32.9	33.3
Average	20.45	21.5	22.46	23.22	23.78	24.0	24.8	25.03	26.15	27.59	28.9	31.25	31.99	32.76	33.18

Table B2 Data for zeta potential measurement of carbon black at pH 7 and variable SDS at 30°C

SDS Conc. (μM)	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000
Zeta potential (-mV) 1	23.5	25.5	26.3	27.2	27.9	28.2	28.7	29.4	30.5	32.9	34.0	35.6	37.4	38.5	38.6
2	23.2	25.6	26.1	27.3	27.8	28.3	28.6	29.3	30.6	32.8	34.2	35.7	37.5	38.6	38.6
3	23.1	25.4	26.3	27.3	28.2	28.3	28.9	29.5	30.9	32.9	34.3	35.7	37.8	38.7	38.5
4	23.0	25.5	26.2	27.5	27.6	28.5	29.0	29.2	30.6	32.9	34.1	35.8	37.1	38.6	38.5
5	22.9	25.6	26.1	27.3	27.8	28.1	28.6	29.5	30.3	32.8	34.3	35.9	37.5	38.6	38.8
6	23.4	25.7	26.1	27.6	27.9	28.2	28.7	29.6	30.3	32.5	34.2	36.0	37.6	38.4	38.6
7	23.5	25.6	26.3	27.1	27.8	27.9	28.9	29.6	30.5	33.2	34.1	35.4	37.2	38.4	38.5
8	22.9	25.6	26.2	27.4	27.9	28.3	29.0	29.3	30.4	32.7	33.9	35.3	37.3	38.3	38.7
9	23.4	25.3	26.3	26.9	28.0	28.3	28.4	29.8	30.5	33.1	33.8	35.6	37.6	38.3	38.6
10	23.2	25.6	26.3	26.9	28.0	28.3	28.6	28.9	30.6	32.5	34.2	35.7	37.3	38.5	38.5
11	23.4	24.9	26.4	27.0	27.6	27.6	28.5	29.4	30.7	32.6	34.3	35.8	37.5	38.5	38.7

SDS Conc. (μM)	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000
12	23.4	24.9	26.1	27.1	27.5	28.0	28.9	29.3	30.4	32.9	33.9	35.7	37.5	38.4	38.5
13	23.4	25.6	26.4	27.3	27.8	28.3	28.7	29.5	30.5	32.8	33.7	35.2	37.3	38.4	38.5
14	23.2	25.6	26.3	27.4	27.6	28.3	28.6	29.2	30.6	33.2	34.6	35.9	37.6	38.6	38.6
15	23.2	25.4	26.3	27.1	27.9	28.1	28.3	28.9	30.5	32.8	34.5	35.6	37.5	38.2	38.6
16	23.2	25.5	26.5	27.4	27.8	28.2	28.5	29.5	30.6	32.8	34.2	35.9	37.5	38.3	38.6
17	22.9	25.5	26.3	27.4	28.0	28.2	28.9	29.4	30.5	33.3	34.0	35.9	37.9	38.6	38.6
18	22.9	25.6	26.5	27.0	28.1	28.1	29.0	29.4	30.8	32.9	34.0	35.8	37.4	38.9	38.5
19	23.1	25.4	26.5	27.1	27.6	28.1	29.3	29.3	30.5	32.5	33.8	35.9	37.3	38.5	38.6
20	23.2	25.6	26.2	27.0	27.5	28.3	28.6	29.5	30.2	32.8	33.9	35.5	37.3	38.7	38.5
21	23.4	25.7	26.3	27.0	27.9	28.4	28.6	29.4	30.3	33.3	34.2	35.5	37.6	38.4	38.9
22	23.6	25.5	26.5	27.2	27.9	27.6	28.8	29.3	30.5	32.7	34.3	35.6	37.6	38.6	38.7
23	23.5	25.3	26.2	27.3	27.9	27.9	28.4	29.3	30.5	32.6	34.3	35.6	37.5	38.5	38.5
24	22.8	25.6	25.7	27.4	28.2	27.9	28.9	29.5	30.6	33.3	34.5	35.9	37.4	38.9	38.6
25	23.1	25.5	25.9	27.3	28.0	27.8	28.7	29.4	30.6	33.2	34.4	35.5	37.1	38.5	38.7
Averagenzeta potential (-mV)	23.2	25.4	26.2	27.22	27.8	28.1	28.7	29.38	30.52	32.88	34.15	35.68	37.45	38.52	38.60

Table B3 Data for zeta potential measurement of carbon black at pH 9 and variable SDS at 30°C

SDS Conc. (μM)	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000
Zeta potential (-mV) 1	26.6	27.7	28.0	28.9	29.3	30.1	30.9	31.9	33.0	34.9	36.2	37.7	38.6	39.8	39.9
2	26.7	27.6	28.3	28.8	29.4	30.0	31.0	31.8	33.1	34.8	36.3	37.8	38.0	39.8	40.0
3	26.8	27.8	28.6	29.0	29.0	30.2	30.8	31.9	33.1	35.0	36.2	37.8	38.3	39.7	40.2
4	26.5	27.6	28.4	29.0	29.3	30.0	31.1	32.2	33	35.1	36.0	37.9	38.4	40.0	40.1

SDS Conc. (μM)	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000
5	26.7	27.5	28.1	28.9	29.5	30.1	31.1	31.9	33.2	34.7	36.2	38.0	38.4	40.1	40.0
6	26.9	27.8	28.2	28.6	29.0	30.2	31.2	32.2	32.8	34.7	36.0	37.6	38.3	39.9	39.9
7	26.5	27.9	28.0	29.1	29.6	29.9	31.0	32.3	33.1	34.8	36.0	37.8	38.2	39.5	39.8
8	26.8	27.5	28.3	29.0	29.5	30.0	30.9	32.1	33.2	35.1	36.5	37.8	38.4	39.7	40.0
9	26.7	27.6	28.2	28.8	29.3	29.8	30.8	32.0	32.9	35.2	36.2	37.8	38.1	40.0	40.1
10	26.6	27.8	28.4	28.7	29.4	30.1	30.7	31.8	32.8	35.0	36.3	37.7	38.5	39.8	40.0
11	26.9	27.6	28.4	28.9	29.3	30.3	30.9	30.7	32.9	34.9	36.1	37.9	38.4	39.8	39.8
12	26.5	27.8	28.3	28.6	29.2	30.2	30.9	31.8	32.9	34.9	36.2	37.6	38.5	39.8	40.2
13	26.8	28.0	28.2	29.0	29.3	30.6	31.0	31.9	32.7	35.1	36.1	38.0	38.6	39.7	40.1
14	26.6	28.0	28.2	29.0	29.3	30.2	31.1	32.0	33.1	35.2	36.1	37.9	38.4	39.6	40.0
15	26.5	27.7	28.4	29.1	29.3	30.4	31.0	32.0	33.0	35.0	36.5	37.8	38.3	39.6	40.2
16	26.7	27.4	28.1	28.7	29.4	29.8	31.1	31.9	32.9	35.0	36.4	37.6	38.4	39.7	39.8
17	26.9	27.4	28.5	28.9	29.3	29.7	31.2	31.8	33.0	34.8	36.6	37.6	38.2	39.9	39.7
18	26.8	27.5	28.3	28.7	29.5	30.0	31.0	32.1	33.0	34.7	36.2	37.8	38.3	39.6	40.1
19	26.8	28.1	28.4	29.3	29.4	30.2	30.9	32.0	33.1	34.7	36.3	37.9	38.4	39.8	40.0
20	26.4	28.0	28.3	29.0	29.2	30.6	30.8	31.9	33.1	34.9	36.3	37.7	38.2	39.9	39.6
21	26.5	27.8	28.6	29.1	29.1	30.5	31.0	31.8	33.6	34.7	36.1	37.8	38.6	39.9	39.6
22	26.6	27.9	28.5	29.2	29.3	30.1	31.0	32.2	33.1	34.8	36.1	38.0	38.5	39.7	39.8
23	26.4	27.6	28.3	28.9	29.4	30.0	30.9	32.1	33.0	35.1	36.0	37.9	38.4	39.6	40.0
24	26.5	27.9	28.5	28.8	29.1	29.4	30.8	32.2	32.9	35.0	36.1	37.5	38.1	39.6	40.1
25	26.5	27.8	28.0	28.9	29.5	29.6	31.3	31.9	32.8	34.1	36.2	37.6	38.2	39.8	40.2
Averagenzeta potential (-mV)	26.6	27.7	28.3	28.92	29.3	30.0	30.9	31.94	33.01	34.89	36.21	37.78	38.35	39.77	39.97

Table B4 Data for zeta potential measurement of carbon black at pH 11 and variable SDS at 30°C

SDS Conc. (μM)	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000
Zeta potential (-mV) 1	28.7	29.3	29.9	30.3	30.9	31.2	31.9	32.8	34.0	35.3	37.6	39.4	39.9	40.5	40.9
2	28.8	29.4	29.8	30.4	31.0	31.2	31.8	32.7	34.4	35.2	37.5	39.5	39.8	40.6	40.8
3	28.9	29.3	29.9	30.3	31.3	31.3	32.0	32.9	34.1	35.0	37.6	39.5	40.1	40.7	41.0
4	28.7	29.5	29.8	30.3	30.8	31.1	32.5	32.8	34.2	35.9	37.4	39.3	40.1	40.5	41.1
5	28.6	29.6	29.8	30.5	31.2	31.4	31.9	33.0	33.9	35.6	37.7	39.3	40.2	40.6	41.1
6	29.0	29.4	30.1	30.6	31.3	31.0	31.8	32.6	34.2	35.2	37.4	39.6	40.0	40.2	40.7
7	28.5	29.1	29.7	30.4	30.7	31.1	31.9	32.8	33.8	35.3	37.6	39.2	39.9	40.9	40.5
8	28.9	29.4	29.8	30.4	30.8	31.1	31.8	32.9	34.2	35.2	37.3	39.6	39.8	41.0	40.8
9	29.0	29.5	29.7	30.5	30.8	31.4	32.0	32.5	34.4	35.1	37.9	39.5	39.7	40.8	40.9
10	29.1	29.3	29.8	30.5	31.3	31.3	32.4	32.8	34.1	35.6	37.5	39.4	40.2	40.3	41.0
11	28.7	29.2	30.0	30.5	30.9	31.4	32.2	32.6	33.9	34.9	37.8	39.4	39.8	40.6	41.0
12	28.9	29.2	29.7	30.4	30.8	31.3	32.0	32.6	34.3	35.2	37.5	39.5	39.5	40.3	40.9
13	28.6	29.6	29.8	30.6	31.1	31.3	31.8	32.6	34.0	35.7	38.7	39.6	40.0	40.5	40.7
14	28.5	29.3	29.8	30.1	31.1	31.3	31.8	32.5	34.5	35.4	37.4	39.1	40.3	40.9	40.6
15	28.9	29.3	29.9	30.1	31.0	31.2	31.9	32.9	34.2	35.1	37.5	39.6	39.7	40.8	41.0
16	29.0	29.2	29.5	30.4	30.8	31.4	31.7	32.8	34.3	35.2	37.6	39.8	39.9	40.6	41.1
17	28.6	29.0	30.0	30.5	30.9	31.5	31.8	33.1	34.3	35.2	37.2	39.2	39.4	40.3	40.8
18	28.5	29.1	30.1	30.3	30.9	31.3	32.4	32.7	33.8	34.9	37.5	39.3	40.0	41.0	40.9
19	28.4	29.1	30.2	30.3	30.6	31.5	32.3	32.7	33.9	35.6	37.6	39.4	40.1	41.1	40.9
20	28.7	29.3	30.0	30.1	31.3	31.1	31.8	32.7	34.1	35.3	37.8	39.5	39.9	41.0	40.8
21	28.7	29.4	30.0	30.1	31.4	31.0	31.9	33.1	34.1	35.4	37.4	39.6	39.8	40.6	40.9
22	28.9	29.2	29.8	30.0	30.9	31.0	32.3	32.8	33.9	35.1	37.5	39.4	39.8	40.3	41.0

SDS Conc. (μM)	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000
23	28.8	29.5	29.9	30.3	30.8	31.1	32.1	32.6	34.2	35.2	37.5	39.1	40.2	40.2	41.2
24	28.8	29.5	30.0	30.5	30.8	31.5	31.8	32.9	34.0	35.2	37.8	39.3	39.8	40.1	41.3
25	28.7	29.3	29.6	30.4	31.0	31.3	31.9	32.7	34.1	35.3	37.4	39.4	39.8	40.1	41.0
Averagenzeta potential (-mV)	28.7	29.3	29.8	30.35	30.9	31.2	31.9	32.76	34.12	35.28	37.59	39.42	39.91	40.58	40.92

Table B5 Data for zeta potential measurement of carbon black at pH 5 and variable TX-100 at 30°C

TX-100 Conc. (μM)	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000
Zeta potential (-mV) 1	30.6	30.0	29.6	29.0	28.6	27.8	26.5	24.7	22.0	20.6	18.5	16.5	14.2	12.0	10.0
2	30.2	30.1	29.4	28.8	28.7	27.9	26.3	25.3	22.0	20.8	18.6	16.7	14.1	12.1	10.0
3	30.1	30.2	29.5	29.3	28.7	27.9	26.5	24.8	22.0	20.7	18.6	16.7	14.3	11.8	10.0
4	29.3	29.9	29.5	29.1	28.9	28.1	26.4	24.9	22.3	20.7	18.6	16.9	14.3	11.6	10.2
5	29.6	29.8	29.4	29.1	28.5	28.2	25.9	24.8	22.1	20.6	18.7	16.0	14.3	11.9	10.2
6	30.6	29.9	29.8	29.0	28.9	27.9	25.8	24.7	22.5	20.6	18.2	16.9	14.1	11.7	10.0
7	29.8	29.4	29.3	29.0	27.9	28.9	26.1	25.6	22.6	20.7	18.6	16.5	14.0	11.7	10.1
8	30.1	30.0	28.9	29.0	28.3	27.8	25.8	24.6	22.0	21.0	18.9	16.3	14.0	11.7	10.3
9	30.0	27.9	29.4	28.9	28.9	27.9	25.8	25.0	21.6	20.9	19.0	16.7	14.1	11.9	10.2
10	28.7	30.1	29.7	29.4	28.4	27.6	26.2	24.8	22.0	20.3	19.1	16.8	14.2	12.0	10.1
11	30.3	30.0	30.0	28.7	28.6	27.6	26.1	24.6	21.5	20.6	18.7	17.0	14.3	12.3	9.6
12	29.7	29.7	29.6	28.6	30.1	28.2	26.0	24.6	22.9	20.5	18.6	17.1	14.5	12.4	9.9
13	29.3	29.8	29.7	29.8	28.6	28.6	26.0	25.0	21.9	20.8	18.9	16.8	14.6	11.6	10.3

TX-100 Conc. (μM)	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000
14	29.9	29.9	29.8	29.5	28.9	28.1	26.0	25.3	21.9	20.7	18.4	16.5	14.8	11.5	9.8
15	30.1	30.1	29.8	29.4	28.3	27.9	26.3	25.2	22.4	20.6	16.8	16.5	14.9	11.9	10.1
16	30.5	30.2	28.9	29.6	28.1	27.9	26.4	24.9	21.8	20.8	18.7	16.3	14.3	11.8	9.8
17	30.1	30.2	29.1	29.1	27.9	28.1	26.1	24.6	22.0	20.6	18.9	16.3	14.3	11.6	9.9
18	31.5	30.0	29.6	29.9	28.9	27.9	28.9	25.1	22.3	20.4	18.3	16.5	14.0	12.0	9.9
19	30.5	30.6	29.7	29.0	28.1	27.9	28.1	24.6	22.1	20.8	18.1	16.2	14.2	11.8	10.1
20	33.4	29.7	27.3	29.3	28.6	28.1	26.1	24.7	21.9	20.7	18.0	16.0	14.1	11.7	10.6
21	30.0	29.9	29.3	28.7	28.6	28.0	26.3	24.3	21.6	20.9	18.0	17.0	13.9	11.4	10.3
22	30.1	29.7	29.8	29.3	28.7	28.1	26.0	25.0	21.6	20.5	18.6	16.3	13.8	12.0	9.1
23	30.2	29.7	29.8	29.8	28.6	27.8	26.4	24.9	22.1	21.0	18.6	16.4	13.8	12.3	9.3
24	29.7	29.8	30.0	29.7	28.5	27.6	26.1	24.1	22.1	21.0	18.5	16.9	13.8	12.3	9.5
25	29.8	33.4	33.7	24.8	29.9	25.3	19.2	22.4	23.0	19.6	19.9	15.7	13.1	14.7	13.0
Averagenzeta potential (-mV)	30.16	30	29.6	29.03	28.65	27.88	26.05	24.7	22.09	20.6	18.55	16.54	14.16	11.9	10.09

Table B6 Data for zeta potential measurement of carbon black at pH 7 and variable TX-100 at 30°C

TX-100 Conc. (μM)	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000
Zeta potential (-mV) 1	33.6	33.1	32.7	32.1	31.8	30.6	28.5	26.7	24.0	23.3	22.8	20.9	19.8	17.7	16.7
2	33.1	33.2	32.6	32.1	31.9	30.5	28.6	26.8	24.0	23.4	22.6	20.3	19.8	17.6	13.0
3	33.5	33.2	32.5	32.0	31.9	30.7	28.6	26.8	24.1	23.4	23.1	20.5	19.3	17.2	16.5
4	33.6	33.2	32.8	32.0	32.0	30.7	28.4	26.9	24.2	23.5	22.6	20.8	19.5	17.3	16.9
5	33.5	33.1	32.6	32.6	32.0	30.6	28.6	27.0	23.9	26.3	25.6	21.0	19.2	17.3	16.0
6	33.7	33.0	32.6	32.0	32.0	30.9	28.6	26.8	23.9	23.5	22.5	20.6	19.2	18.0	16.9

TX-100 Conc. (μM)	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000
7	33.7	33.6	32.9	32.1	31.9	30.6	28.7	26.5	23.5	23.0	22.6	21.3	19.6	19.0	16.5
8	33.6	33.2	32.6	32.2	31.9	30.2	28.9	26.9	23.5	22.9	22.0	20.6	18.9	17.6	16.3
9	33.9	33.1	32.9	31.9	31.5	30.0	27.9	26.3	24.0	24.6	21.6	20.6	19.0	17.2	17.0
10	33.5	32.9	33.1	31.8	31.6	30.5	28.3	26.8	24.0	22.1	22.8	21.0	19.1	17.9	17.0
11	32.9	32.9	32.5	32.0	31.2	30.6	28.3	26.6	24.2	23.5	22.9	20.6	19.5	17.8	16.9
12	32.8	33.8	32.0	32.0	32.0	30.4	28.6	26.8	24.2	23.4	22.9	20.5	19.8	16.5	17.1
13	33.1	32.6	33.0	31.9	32.0	30.4	28.9	26.7	24.2	23.1	23.0	20.8	20.6	17.8	16.8
14	32.9	32.5	33.5	31.9	32.6	30.7	28.6	26.6	24.1	23.6	21.9	20.5	20.5	17.5	16.8
15	33.8	33.6	32.8	32.0	31.8	30.6	28.4	26.7	23.5	23.3	22.4	20.5	20.9	17.6	16.8
16	33.8	33.1	32.9	32.4	31.5	31.0	28.6	26.8	23.6	20.6	22.8	20.5	20.5	17.2	16.9
17	33.6	32.8	32.6	32.1	31.2	30.6	28.5	26.4	24.5	23.5	21.6	20.6	21.0	18.2	16.3
18	33.5	32.9	32.9	32.0	31.6	30.5	28.5	27.0	27.3	23.1	22.3	20.6	25.0	17.6	16.5
19	33.7	33.1	32.7	32.5	31.4	30.9	27.9	26.9	25.3	23.5	28.6	21.0	19.5	17.2	17.5
20	33.4	33.0	32.5	32.2	31.7	30.3	27.8	26.9	24.8	23.4	21.9	20.6	19.4	17.5	16.0
21	33.5	33.0	32.7	32.5	31.7	30.2	28.5	26.9	24.0	23.1	21.6	20.9	19.8	17.0	17.0
22	33.6	33.6	32.7	32.3	31.8	30.6	28.3	26.8	25.0	23.1	22.9	20.5	19.3	16.8	17.1
23	33.5	33.1	32.8	32.3	31.6	30.6	28.6	27.0	24.1	22.4	22.1	20.7	18.6	17.5	19.0
24	33.8	33.1	32.4	32.0	31.6	30.5	28.6	26.5	24.0	21.6	22.1	20.5	18.5	16.9	16.9
25	38.9	33.8	33.8	32.5	33.7	33.2	30.3	29.9	19.9	25.7	24.2	17.9	19.2	23.0	17.4
Averagenzeta potential (-mV)	33.70	33.1	32.8	32.14	31.84	30.66	28.54	26.88	24.07	23.3	22.86	20.57	19.82	17.7	16.71

Table B7 Data for zeta potential measurement of carbon black at pH 9 and variable TX-100 at 30°C

TX-100 Conc. (μM)	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000
Zeta potential (-mV) 1	37.6	37.0	36.7	35.9	35.0	34.2	32.9	31.5	29.6	26.6	26.3	25.7	24.4	23.2	21.7
2	37.7	37.0	36.5	35.8	35.1	34.3	32.9	31.8	29.8	26.5	26.1	25.6	24.5	22.9	21.8
3	37.9	37.1	36.4	35.6	35.2	34.2	32.8	31.9	29.8	26.8	26.2	25.8	25.0	22.8	21.9
4	37.5	37.4	36.5	35.7	35.2	34.2	32.7	32.0	29.3	26.9	26.0	25.9	24.6	22.9	21.9
5	37.5	36.7	36.4	35.9	35.0	34.1	32.8	32.1	29.4	26.1	26.0	25.3	24.3	22.9	22.0
6	37.6	37.1	36.8	35.8	35.2	34.6	32.5	32.0	28.6	25.9	26.1	25.6	24.9	23.0	21.8
7	37.2	37.0	37.0	36.0	35.3	34.5	32.8	32.6	30.0	26.0	25.9	25.8	24.5	23.0	21.6
8	38.9	37.3	36.9	35.9	35.2	34.2	32.6	31.8	29.5	26.3	25.8	26.1	24.6	23.1	21.8
9	38.0	36.9	36.1	35.7	35.0	34.1	32.1	31.9	31.5	26.5	26.0	25.9	24.4	22.5	21.8
10	37.3	36.5	36.3	35.6	34.9	34.0	32.2	32.7	29.5	26.4	27.6	26.3	24.0	22.6	22.0
11	37.5	36.8	36.3	34.9	34.8	34.6	31.3	30.0	28.9	26.8	26.5	26.4	25.0	22.7	21.8
12	37.5	37.5	36.5	35.2	34.8	34.9	31.8	25.0	29.6	26.0	27.5	25.7	24.9	22.8	21.7
13	37.3	38.7	36.5	35.7	35.0	34.5	32.7	32.6	31.0	25.9	25.1	25.1	24.4	22.8	21.6
14	37.6	37.4	36.6	35.4	35.1	34.2	32.7	31.5	30.0	25.7	27.0	25.6	24.6	22.8	21.3
15	37.9	37.5	36.9	35.1	34.9	34.5	32.7	31.8	30.1	26.7	25.9	25.3	24.8	23.0	21.6
16	37.9	37.0	37.0	35.2	35.0	34.1	32.8	31.9	29.8	26.8	28.0	25.8	24.3	23.5	21.5
17	37.9	37.1	36.9	35.6	34.9	34.6	32.9	31.6	29.6	26.4	26.0	26.9	24.1	23.1	21.6
18	37.4	37.0	36.7	35.9	34.6	34.6	33.1	31.6	27.6	26.9	26.3	25.4	24.0	22.5	22.0
19	37.8	36.5	36.8	35.8	35.0	34.1	33.2	31.8	28.0	27.0	26.1	24.6	23.9	22.4	20.6
20	38.2	36.9	36.8	35.1	35.0	34.2	32.9	31.5	29.5	26.7	25.4	24.9	24.6	22.9	20.8
21	37.6	37.0	35.9	35.6	35.1	34.0	32.9	30.0	29.3	27.0	25.5	25.0	24.1	22.8	20.9
22	38.0	37.0	36.4	35.9	34.9	34.0	32.8	31.8	29.7	27.1	25.9	25.6	24.6	23.5	22.3

TX-100 Conc. (μM)	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000
23	38.1	37.1	36.5	35.8	34.4	34.1	33.0	30.8	29.6	26.9	26.0	25.7	24.8	23.4	21.6
24	37.9	36.8	35.6	35.9	34.9	34.1	33.2	31.5	29.5	26.8	26.4	25.6	24.6	23.4	21.4
25	36.1	35.6	40.6	40.3	36.3	32.4	39.1	30.7	32.5	29.3	27.4	28.0	24.0	22.3	25.6
Averagenzeta potential (-mV)	37.68	37	36.7	35.81	35.03	34.21	32.94	31.38	29.67	26.6	26.28	25.75	24.48	22.9	21.78

Table B8 Data for zeta potential measurement of carbon black at pH 11 and variable TX-100 at 30°C

TX-100 Conc. (μM)	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000
Zeta potential (-mV) 1	41.1	40.9	39.8	39.3	38.4	38.0	37.8	36.3	35.1	34.2	33.4	32.3	27.5	26.3	25.2
2	40.9	40.8	39.9	39.2	38.4	38.5	37.6	36.3	35.2	34.0	33.6	32.2	27.6	26.5	25.6
3	41.0	40.7	39.7	39.2	38.6	38.2	37.9	36.5	35.2	34.0	33.5	32.2	27.6	26.9	25.8
4	40.6	41.1	39.9	39.0	38.9	38.3	37.9	36.4	35.3	34.1	33.8	32.0	27.5	26.4	26.0
5	40.8	40.6	40.0	39.6	38.2	38.3	38.0	36.2	35.6	33.9	33.6	32.6	27.3	26.5	25.0
6	40.5	41.2	40.6	39.4	38.6	38.0	37.5	36.4	35.2	34.1	33.6	32.9	30.0	26.5	25.6
7	41.0	41.0	39.5	40.0	38.2	37.5	37.1	36.1	35.0	34.0	33.1	32.5	27.8	27.0	25.3
8	41.2	40.2	39.7	39.5	38.2	37.6	37.2	36.9	35.9	34.2	33.5	32.2	27.6	27.1	25.1
9	40.9	40.9	38.9	39.3	38.0	37.9	37.4	36.7	35.6	34.6	33.9	33.6	26.0	26.9	25.0
10	40.9	40.6	41.0	39.1	39.0	37.9	39.0	36.8	35.7	33.2	33.7	32.0	25.3	24.6	25.0
11	40.7	41.1	39.8	39.1	38.5	38.0	38.5	36.8	35.4	33.5	33.5	32.1	27.9	26.5	25.4
12	41.2	40.9	40.6	41.0	38.1	38.1	34.6	36.9	35.1	34.9	33.4	32.2	27.8	25.9	25.9
13	41.1	41.0	40.2	38.9	38.5	37.6	38.9	36.1	35.6	34.0	33.4	32.3	27.5	25.6	26.1
14	40.9	40.8	40.0	38.7	36.8	37.9	39.7	37.0	35.1	34.6	35.6	32.4	26.5	24.0	25.8
15	40.8	40.7	42.0	39.0	38.4	38.2	38.1	37.2	35.0	34.4	33.0	32.5	28.0	27.5	25.1

TX-100 Conc. (µM)	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000
16	41.0	40.7	39.6	39.6	38.5	38.4	38.6	36.9	34.9	34.3	33.5	33.0	27.6	26.5	25.0
17	40.6	40.6	39.7	39.1	38.7	38.2	38.0	36.5	34.6	34.1	33.6	32.9	27.8	26.3	25.0
18	40.7	41.0	41.2	36.4	37.2	37.3	38.3	36.4	35.0	34.6	33.8	32.9	27.7	25.6	24.6
19	41.0	41.6	39.6	39.5	39.0	37.0	38.0	36.3	35.1	33.5	33.8	31.5	28.2	26.0	24.3
20	41.1	40.5	40.6	39.7	38.2	39.5	38.0	36.1	35.2	33.6	33.7	31.0	26.8	26.3	24.9
21	40.5	41.3	40.0	39.6	39.5	37.8	37.9	36.5	34.8	33.7	33.4	32.6	27.5	26.5	25.3
22	40.9	40.6	35.2	40.0	38.4	38.5	35.6	36.9	34.6	34.9	33.1	32.5	26.0	26.5	25.1
23	40.7	40.2	39.4	39.5	39.4	38.6	39.0	36.1	35.0	33.6	33.2	32.5	27.0	26.8	25.6
24	40.7	40.7	39.8	38.1	38.7	38.1	39.7	36.2	35.0	34.0	32.9	32.2	28.6	26.5	25.8
25	42.5	39.8	41.6	40.6	37.2	37.8	35.7	32.9	34.9	32.7	31.4	29.7	28.7	27.1	24.5
Averagenzeta potential (-mV)	40.93	40.8	39.9	39.30	38.38	38.05	37.84	36.38	35.16	34.0	33.48	32.27	27.51	26.3	25.28

Appendix C. Data for PZC of fabrics

Table C1 Data for PZC of fabrics

Cotton Fabric		Blended polyester and cotton		Polyester	
Initial pH	Equilibrium pH	Initial pH	Equilibrium pH	Initial pH	Equilibrium pH
1.46	1.47	1.5	1.3	1.5	1.53
2	2.07	2	2.37	1.9	2.01
3	2.85	3	2.48	2.92	2.26
3.75	2.87	4	2.51	4.26	2.31
5.22	2.9	5	4.26	5.12	2.33
5.88	3.97	6	5.32	5.72	3.85
7.12	5.63	7	6.01	7.01	5.58
8.05	6.67	8	7.24	8.13	6.43
9.15	9.04	9	8.68	9.44	9.12
10.03	9.93	10	9.77	10.05	9.97
11.06	11.06	11	11.2	11.24	11.11

Appendix D. Data for %detergency

Table D1 %Detergency from cotton by using SDS surfactant at different surfactant concentration at pH 5

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
0.0866	1	75.6813	74.2713	88.3541	10.0122	10.0155
	2	76.3540	75.0225	88.0024	10.2581	
	3	76.3248	75.0429	88.1545	9.7762	
0.2020	1	79.1127	75.4333	88.1155	29.0122	28.2081
	2	78.9731	75.4128	88.1233	28.0107	
	3	78.6173	75.0025	88.0988	27.6014	
0.4332	1	80.3689	74.8474	88.2442	41.2157	41.7288
	2	81.3801	75.8744	88.8167	42.5401	
	3	80.9477	75.8412	88.1667	41.4306	
0.6158	1	81.4191	74.1558	88.1167	52.0258	52.0940
	2	82.4365	75.8219	88.3833	52.6577	
	3	82.2265	76.0125	88.0556	51.5985	
0.9152	1	83.0320	75.0586	88.6529	58.6528	58.7565
	2	83.3762	75.9615	88.5254	59.0155	
	3	83.0390	75.7481	88.1896	58.6012	
1.0108	1	82.9992	75.0232	88.5413	59.0025	59.0122
	2	83.1741	76.1598	88.0658	58.9144	
	3	82.8057	75.0537	88.1660	59.1197	
1.1500	1	83.1648	76.1321	88.0208	59.1547	59.1214
	2	83.5479	76.0330	88.7773	58.9668	

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
	3	84.2795	76.2164	89.8267	59.2427	
1.4440	1	83.1214	75.0690	88.6433	59.3211	59.2103
	2	84.1017	75.9537	89.8467	58.6485	
	3	82.9840	74.6522	88.6174	59.6613	

Table D2 %Detergency from cotton by using SDS surfactant at different surfactant concentration at pH 7

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
0.0866	1	76.8828	75.2780	88.2350	12.3859	12.3712
	2	76.6666	75.0440	88.2017	12.3321	
	3	75.8239	74.0940	88.0500	12.3956	
0.2020	1	79.2430	75.4333	88.1950	29.8521	29.7451
	2	79.3785	75.8133	88.1133	28.9852	
	3	79.1173	75.2430	87.9883	30.3980	
0.4332	1	81.1363	75.7350	88.2417	43.1874	43.1569
	2	80.8604	75.4130	88.0817	42.9987	
	3	80.8092	75.1520	88.2217	43.2846	
0.6158	1	82.2260	75.1990	88.1817	54.1258	54.2855
	2	82.8194	76.1900	88.2383	55.0236	
	3	82.5708	76.0510	88.1906	53.7071	
0.9152	1	83.2830	75.5510	88.3917	60.2148	60.1125
	2	83.0314	75.1510	88.1350	60.6932	
	3	82.7588	74.8053	88.1883	59.4295	

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
1.0108	1	83.8190	76.8330	88.3133	60.8521	60.6589
	2	82.6774	74.1770	88.1067	61.0234	
	3	82.7922	74.7190	88.1517	60.1012	
1.1500	1	83.0994	75.0710	88.2083	61.1113	61.1255
	2	85.0950	76.2970	90.7250	60.9785	
	3	85.1870	76.2588	90.8267	61.2867	
1.4440	1	84.5830	74.9851	90.6433	61.2965	61.3221
	2	84.9863	75.6996	90.8467	61.3105	
	3	84.6616	75.2159	90.6100	61.3593	

Table D3 %Detergency from cotton by using SDS surfactant at different surfactant concentration at pH 9

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
0.0866	1	75.4745	73.949	86.0317	12.6258	12.5172
	2	74.8358	73.2400	86.3017	12.2174	
	3	73.7972	71.9143	86.7300	12.7084	
0.2020	1	76.5183	72.2680	86.4283	30.0154	30.2179
	2	77.6878	73.7740	86.7083	30.2589	
	3	76.0451	71.4910	86.4817	30.3794	
0.4332	1	78.7967	72.2090	86.7783	45.2159	45.9632
	2	79.8715	73.9050	86.8600	46.0552	
	3	79.7743	73.6590	86.7767	46.6185	
	1	81.4965	74.7780	86.3544	58.0362	

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
0.6158	2	80.9072	73.3110	86.5394	57.4236	57.5582
	3	81.6956	74.8630	86.8050	57.2148	
	1	81.0762	70.3903	86.7017	65.5122	
0.9152	2	80.8077	70.0760	86.7817	64.2396	65.5185
	3	81.7349	71.9143	86.6150	66.8037	
1.0108	1	81.8747	72.3230	86.8700	65.6612	65.7182
	2	81.8325	72.5110	86.8550	64.9857	
	3	81.9229	72.2680	86.7850	66.5077	
1.1500	1	81.7559	71.9290	86.8350	65.9258	65.8156
	2	81.8552	71.9890	86.9317	66.0269	
	3	81.7487	71.9490	86.9117	65.4941	
1.4440	1	82.6350	74.0360	87.0717	65.9654	65.8812
	2	82.7084	74.3090	87.0117	66.1232	
	3	82.7808	74.3860	87.1917	65.5550	

Table D4 %Detergency from cotton by using SDS surfactant at different surfactant concentration at pH 11

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
0.0866	1	77.3141	76.203	85.1933	12.3589	12.7984
	2	77.4405	76.312	85.2800	12.5841	
	3	77.7504	76.572	85.3317	13.4522	
0.2020	1	78.4550	75.065	85.3483	32.9658	32.6891
	2	77.9789	74.391	85.4717	32.3794	

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
	3	77.3789	73.536	85.2800	32.7221	
0.4332	1	81.0850	77.254	85.5433	46.2158	46.4695
	2	81.7157	78.918	84.8767	46.9521	
	3	81.8291	78.349	85.8750	46.2406	
0.6158	1	82.6980	79.129	85.3667	57.2163	57.0191
	2	82.4450	78.490	85.4317	56.9752	
	3	82.5447	78.954	85.2683	56.8658	
0.9152	1	79.7323	67.695	85.8450	66.3210	66.1255
	2	80.2965	69.504	85.8450	66.0458	
	3	80.2956	68.600	86.3183	66.0097	
1.0108	1	81.8591	74.185	85.7750	66.2132	66.5523
	2	81.6413	73.133	85.8300	67.0103	
	3	81.9180	74.331	85.7517	66.4334	
1.1500	1	82.5025	75.721	85.9567	66.2541	66.6478
	2	82.0078	74.272	85.8233	66.9685	
	3	82.1837	75.418	85.5583	66.7208	
1.4440	1	82.8133	77.130	85.6100	67.0196	66.8573
	2	82.2897	76.404	85.1950	66.9514	
	3	83.1374	76.741	86.3450	66.6009	

Table D5 %Detergency from cotton by using TX-100 surfactant at different surfactant concentration at pH 5

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
0.2588	1	77.4635	76.2540	88.2114	10.1152	10.0369
	2	76.3795	75.0759	88.0872	10.0185	
	3	76.8774	75.5809	88.5751	9.9770	
0.5176	1	78.4819	75.4573	88.9852	22.3581	22.1542
	2	77.7811	74.5881	89.1258	21.9635	
	3	78.2221	75.2874	88.5420	22.1410	
0.9705	1	78.0520	74.0567	88.2963	28.0574	28.1745
	2	79.4073	75.8864	88.1577	28.6921	
	3	78.7035	75.0252	88.2689	27.7740	
1.7469	1	79.8464	75.1897	88.0362	36.2485	36.0259
	2	79.9928	75.1897	88.5432	35.9688	
	3	80.0456	75.0587	88.9652	35.8604	
2.4586	1	81.2839	75.8565	89.3148	40.3277	40.8914
	2	80.4926	74.5852	88.9851	41.0243	
	3	81.0301	75.8102	88.4423	41.3222	
2.7174	1	81.0636	75.8583	89.3101	38.6957	39.0155
	2	81.1294	76.1546	88.8641	39.1422	
	3	80.8842	75.7197	88.8915	39.2086	
3.1056	1	81.5946	75.6321	90.4452	40.2514	40.1542
	2	80.8043	74.6430	89.9857	40.1577	
	3	81.3169	76.2587	88.8873	40.0535	
	1	81.0077	75.9659	88.4564	40.3655	

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
3.3644	2	80.5879	75.0570	89.0285	39.5874	40.1869
	3	81.0739	75.2656	89.5689	40.6078	

Table D6 %Detergency from cotton by using TX-100 surfactant at different surfactant concentration at pH 7

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
0.2588	1	76.9775	75.2024	89.0121	12.8541	12.5841
	2	77.0154	75.4238	88.7587	11.9357	
	3	76.6088	74.7566	89.0458	12.9625	
0.5176	1	79.5652	76.7333	88.7590	23.5482	25.0125
	2	79.8390	76.5037	88.8713	26.9685	
	3	79.1530	75.9653	88.9654	24.5208	
0.9705	1	79.3294	75.1591	89.2557	29.5841	29.3155
	2	80.0915	75.9686	90.1577	29.0563	
	3	79.5553	75.2865	89.8527	29.3061	
1.7469	1	80.5487	76.1069	88.0754	37.1123	37.0693
	2	80.9354	75.8690	89.5485	37.0368	
	3	80.5779	75.5487	89.1197	37.0588	
2.4586	1	81.0436	75.5657	88.8443	41.2540	41.1056
	2	80.0832	74.5589	88.0157	41.0525	
	3	80.8288	75.1568	88.9874	41.0103	
2.7174	1	80.7997	75.0086	89.0513	41.2396	41.1362
	2	81.1519	75.1237	89.8056	41.0589	

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
	3	80.6272	75.1097	88.5309	41.1101	
	1	80.9345	75.0363	89.4024	41.0563	
3.1056	2	80.2350	74.9643	87.8299	40.9678	40.9854
	3	80.6255	75.0226	88.7109	40.9321	
	1	80.3728	75.0366	88.0346	41.0541	
3.3644	2	80.4224	75.0970	88.0056	41.2546	41.0122
	3	80.4497	75.1562	88.1536	40.7279	

Table D7 %Detergency from cotton by using TX-100 surfactant at different surfactant concentration at pH 9

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
	1	77.1557	75.4820	88.7760	12.5896	
0.2588	2	77.5472	75.9634	88.2564	12.8836	12.7156
	3	77.3753	75.7037	88.8933	12.6736	
	1	78.6886	75.0237	88.0328	28.1723	
0.5176	2	78.7326	75.0635	88.1239	28.0935	28.0635
	3	78.7279	74.9965	88.3590	27.9247	
	1	79.3536	75.3652	88.1153	31.2819	
0.9705	2	79.8314	75.9202	88.1566	31.9641	31.1588
	3	79.2093	75.2982	88.2359	30.2304	
	1	80.9134	75.9911	88.5741	39.1187	
1.7469	2	80.7133	75.6787	88.5655	39.0683	39.0486
	3	80.6615	75.6255	88.5520	38.9588	

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
2.4586	1	81.1629	75.3257	88.8104	43.2873	43.0117
	2	80.5985	74.6326	88.4802	43.0831	
	3	80.9037	75.1856	88.5880	42.6647	
2.7174	1	81.1636	75.9630	88.0755	42.9357	42.9843
	2	80.5886	75.1103	87.8056	43.1520	
	3	80.6473	75.0369	88.1253	42.8652	
3.1056	1	81.0823	75.0356	89.0234	43.2283	43.1157
	2	81.0362	75.1366	88.8789	42.9302	
	3	81.0427	75.2263	88.6937	43.1886	
3.3644	1	81.5058	75.9684	88.7703	43.2545	43.0951
	2	81.4065	75.9137	88.6801	43.0257	
	3	81.4420	75.9116	88.7715	43.0051	

Table D8 %Detergency from cotton by using TX-100 surfactant at different surfactant concentration at pH 11

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
0.2588	1	77.7433	76.0102	89.4116	12.9325	12.8988
	2	77.7235	75.9864	89.7896	12.5847	
	3	77.7526	75.8747	90.1236	13.1792	
0.5176	1	79.2405	75.0222	88.9630	30.2587	30.2366
	2	79.4344	75.0787	88.8766	31.5680	
	3	78.9937	75.0330	88.7460	28.8831	
	1	80.3562	75.1169	90.1015	34.9644	

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
0.9705	2	80.1084	75.0270	89.9963	33.9458	34.6887
	3	80.3281	75.2225	89.7452	35.1559	
1.7469	1	80.6796	75.5633	88.0246	41.0578	41.1562
	2	81.1280	75.6024	88.9964	41.2548	
2.4586	1	81.5559	75.9634	88.5679	44.3687	44.9642
	2	81.8275	75.9686	88.9683	45.0694	
	3	81.7705	75.7486	88.9969	45.4545	
2.7174	1	81.2876	75.1269	88.7520	45.2156	45.1247
	2	80.9518	75.1893	87.9636	45.1102	
	3	80.9977	75.2365	88.0254	45.0483	
3.1056	1	81.1313	75.3579	88.1597	45.0985	45.0366
	2	81.2234	75.1968	88.5987	44.9678	
	3	81.1350	75.2987	88.2557	45.0435	
3.3644	1	81.7084	75.9070	88.7564	45.1488	45.0899
	2	81.6624	75.9104	88.6867	45.0210	
	3	81.6778	76.0169	88.5689	45.0999	

Table D9 %Detergency from blended cotton/polyester by using SDS surfactant at different surfactant concentration at pH 5

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
0.0866	1	76.9342	75.3699	88.0212	12.3654	12.5551
	2	76.8834	75.6325	88.1109	10.0248	
	3	77.5668	75.6399	88.2546	15.2751	
0.202	1	79.5012	75.6988	88.1255	30.5988	30.0215
	2	79.2591	75.3025	89.1035	28.6687	
	3	79.8536	75.9855	88.5455	30.7970	
0.4332	1	81.1021	76.0255	88.2015	41.6933	41.0213
	2	81.1905	75.9147	88.7742	41.0264	
	3	80.9036	76.0225	88.1212	40.3441	
0.6158	1	82.0572	75.6358	88.2204	51.0258	53.5250
	2	82.5098	75.5875	88.4854	53.6698	
	3	82.8499	75.6699	88.5191	55.8794	
0.9122	1	83.6395	75.4586	89.3117	59.0547	59.6878
	2	82.9008	75.6398	88.0158	58.6697	
	3	83.8270	75.9633	88.7834	61.3390	
1.0108	1	83.6827	75.1159	89.5563	59.3255	59.2415
	2	83.4269	75.6398	88.8642	58.8841	
	3	83.3621	75.3658	88.8016	59.5149	
1.15	1	84.2161	76.0254	89.7454	59.6987	60.0025
	2	83.5747	76.3659	88.3299	60.2544	
	3	83.4456	76.2154	88.2548	60.0544	
	1	84.0086	75.9656	89.4516	59.6399	

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
1.444	2	83.7055	75.9854	88.8467	60.0257	59.8965
	3	83.6646	76.1255	88.6857	60.0239	

Table D10 %Detergency from blended cotton/polyester by using SDS surfactant at different surfactant concentration at pH 7

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
0.0866	1	79.4912	77.9963	89.1102	13.4511	13.6942
	2	78.6926	77.3658	88.1014	12.3588	
	3	79.3252	77.6475	88.6325	15.2727	
0.202	1	81.9222	78.6395	87.9852	35.1255	35.6691
	2	82.0150	78.6255	88.0255	36.0585	
	3	81.4055	77.3699	88.6354	35.8233	
0.4332	1	82.8894	78.0251	88.2365	47.6358	47.2542
	2	82.7851	77.6365	88.6020	46.9522	
	3	82.4431	77.3655	88.1289	47.1746	
0.6158	1	82.8048	76.9884	88.1817	51.9635	52.0245
	2	82.9829	76.9855	88.4383	52.3659	
	3	83.2881	77.6399	88.5556	51.7441	
0.9122	1	84.9915	77.3658	89.6657	61.9985	61.9854
	2	85.1199	78.9654	88.8514	62.2547	
	3	84.9085	78.6565	88.7888	61.7030	
1.0108	1	84.5935	78.0254	88.5563	62.3696	62.1487
	2	84.6527	77.9684	88.8602	61.3698	

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
	3	84.7662	77.8966	88.8517	62.7067	
	1	84.8173	77.2584	89.4452	62.0254	
1.15	2	84.5512	77.3255	88.7486	63.2556	62.2516
	3	84.4272	77.6588	88.6690	61.4738	
	1	84.1885	77.6987	88.3333	61.0254	
1.444	2	84.9960	78.3255	88.8026	63.6680	61.6685
	3	84.3804	77.5874	88.8505	60.3121	

Table D11 %Detergency from blended cotton/polyester by using SDS surfactant at different surfactant concentration at pH 9

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
	1	78.9493	77.3990	87.5611	15.2553	
0.0866	2	79.7159	78.2545	88.0210	14.9632	15.1154
	3	79.4156	77.8862	87.9963	15.1277	
	1	81.6139	77.5547	87.9640	38.9963	
0.202	2	82.1942	78.6598	88.2154	36.9875	38.2157
	3	82.0695	78.1254	88.3265	38.6633	
	1	82.4886	77.6399	89.0363	42.5465	
0.4332	2	81.8226	77.4471	88.0321	41.3365	42.3651
	3	82.1202	77.6698	87.9687	43.2123	
	1	83.6793	77.2845	88.0215	59.5587	
0.6158	2	83.7490	77.3699	88.1154	59.3654	59.2544
	3	83.8006	77.3322	88.3256	58.8391	

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
0.9122	1	84.8690	78.6358	88.0234	66.3984	66.0788
	2	84.8107	78.4458	87.9635	66.8745	
	3	84.6308	78.3366	88.0254	64.9635	
1.0108	1	84.7450	77.6987	88.3660	66.0547	66.2433
	2	84.8139	77.8587	88.3451	66.3257	
	3	84.5660	77.5478	88.1255	66.3495	
1.15	1	84.5647	77.8554	88.0235	65.9844	66.1474
	2	84.6828	77.3699	88.1476	67.8524	
	3	84.7615	78.2548	88.3263	64.6054	
1.444	1	84.3821	77.3658	88.0216	65.8455	65.7441
	2	84.5652	77.2555	88.3265	66.0255	
	3	83.8412	77.6984	87.0966	65.3613	

Table D12 %Detergency from blended cotton/polyester by using SDS surfactant at different surfactant concentration at pH 11

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
0.0866	1	80.3808	78.9586	88.0544	15.6356	15.0474
	2	80.3599	78.9684	88.6545	14.3655	
	3	80.1537	78.6957	88.3254	15.1411	
0.202	1	82.3081	78.6594	87.6985	40.3655	40.6997
	2	82.2522	78.2365	88.0254	41.0225	
	3	82.6035	78.6544	88.3548	40.7111	
	1	81.9599	77.9874	86.0345	49.3654	

Surfactant Conc. (%w/v)	Sample No.	Soiled swatch after washing (A)	Soiled swatch before washing (B)	unsoiled swatch (C0)	%Detergency	Average %Detergency
0.4332	2	82.3652	78.3655	86.3657	49.9945	49.7482
	3	83.4155	78.5478	88.3057	49.8847	
0.6158	1	84.9209	77.9878	88.5640	65.5541	65.0248
	2	84.0521	77.8957	87.3654	65.0115	
	3	82.4779	78.5567	84.6352	64.5089	
0.9122	1	84.1220	78.4597	86.6358	69.2549	69.2545
	2	83.9118	78.6958	86.3254	68.3655	
	3	84.0387	78.5984	86.3544	70.1432	
1.0108	1	83.7470	77.9357	86.3265	69.2578	69.1174
	2	84.5517	78.5686	87.3254	68.3254	
	3	84.4542	78.6586	86.9654	69.7690	
1.15	1	84.7551	77.5684	87.9887	68.9687	68.8756
	2	84.6702	78.6541	87.3321	69.3254	
	3	84.3646	78.2145	87.2147	68.3327	
1.444	1	85.0248	77.5897	88.3655	68.9985	68.9201
	2	85.0120	77.8789	88.2146	69.0144	
	3	84.8186	77.8965	87.9654	68.7474	

Table E. data for contact angle

Table E1 Data for contact angle of SDS on carbon black at 30°C

SDS Concentration (μM)	pH 5	pH 7	pH 9	pH 11
1000	64.18	64.34	67.89	70.32
2000	62.08	62.59	65.12	69.1
3000	60.9	60.58	60.24	62.98
4000	55.29	57.55	58.54	58.12
5000	49.69	50.87	52.08	52.54
6000	48.05	48.47	49.17	50.17
7000	47.21	48.15	48.88	49.22
8000	46.08	45.94	46.18	46.65
9000	45.32	45.15	45.85	45.03
10000	45.03	45.21	45.36	44.96
11000	44.65	44.96	45.39	45.16

Table E2 Data for contact angle of TX-100 on carbon black at 30°C

TX-100 Concentration (μM)	pH 5	pH 7	pH 9	pH 11
40	61.08	60.78	60.28	60.84
50	56.87	56.21	56.25	57.05
60	46.23	48.55	49.24	49.15
70	40.69	41.08	42.98	43.58
80	37.65	39.85	38.66	39.48
90	36.08	35.01	36.88	35.28
100	29.56	30.02	31	31.02
200	24.05	25.07	26.08	27.24
300	22.02	23.01	23.95	24.51
400	22.11	22.98	23.56	24.89
500	22.26	22.87	23.67	24.66

Table E3 Data for contact angle of SDS on blended cotton/polyester fabric at 30°C

SDS Concentration (μM)	pH 5	pH 7	pH 9	pH 11
1000	64.31	64.61	67.3	67.74
2000	62.42	63.49	63.71	64.26
3000	59.95	60.31	61.09	62.88
4000	57.46	57.63	58.45	59.47
5000	57.04	57.06	58.19	59.1
6000	53.11	54.69	54.91	55.22
7000	49.32	49.95	52.13	52.79
8000	44.16	46.9	47.98	48.46
9000	39.11	40.78	41.75	42.17
10000	39.02	40.02	41.95	42.52
11000	38.68	39.85	41.07	42.61

Table E4 Data for contact angle of SDS on polyester fabric at 30°C

SDS Concentration (μM)	pH 5	pH 7	pH 9	pH 11
1000	67.25	68.95	69.63	70.93
2000	62.66	63.15	64.73	64.74
3000	62.16	62.83	63.23	63.83
4000	60.05	60.87	62.7	62.8
5000	57.15	59.46	61.69	61.98
6000	52.48	55.38	60.21	60.81
7000	51.93	53.63	55.64	58
8000	50.17	52.15	54.89	56.29
9000	46.49	47.46	48.42	49.88
10000	46.63	47.47	48.11	49.99
11000	46.77	47.68	48.89	50.15

Table E5 Data for contact angle of TX-100 on blended cotton/polyester fabric at 30°C

TX-100 Concentration (μM)	pH 5	pH 7	pH 9	pH 11
40	49.9	50.82	64.3	65.92
50	43.86	44.23	45.69	47.18
60	40.56	41.4	42.44	42.74
70	33.06	35.27	37.88	39.16
80	31.66	32.14	32.26	32.87
90	29.08	29.57	30.02	30.91
100	27.35	27.55	27.88	28.54
200	23.76	24.72	25.92	26.76
300	19.91	20.33	21.73	22.94
400	19.89	20.96	22.02	22.87
500	20.03	20.87	21.98	22.45

Table E6 Data for contact angle of TX-100 on polyester fabric at 30°C

TX-100 Concentration (μM)	pH 5	pH 7	pH 9	pH 11
40	60.68	62.01	64.54	64.65
50	51.71	54.1	56.5	59.26
60	46.68	47.35	47.89	50.4
70	41.48	43.44	45.19	45.45
80	39.89	40	40.63	40.91
90	35.56	36.88	37.45	38.75
100	31.08	33.34	33.77	34.16
200	28.5	28.8	28.81	29.18
300	23.15	23.98	24.82	25.61
400	22.33	23.26	24.15	25.08
500	23.05	23.34	24	25.55

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