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APPENDICES

Appendix A Adsorption of Surfactants onto Hydrophobic Silica

The adsorption isotherms of EO/PO triblock copolymer surfactants, which are L31, P123, L64, 17R2, 25R4, and 10R5, onto hydrophobic silica at 29°C, are shown in table A1, A2, A3, A4, A5, and A6, respectively.

Weight of silica = 0.15 g

Volume of copolymer surfactant solution = 15 ml

Table A1 The adsorption isotherm of L31 onto hydrophobic silica

Initial concentration (mM)	Equilibrium concentration (mM)	Adsorbed surfactant (mmol/g of silica)
0.10	0.0001	0.0099
0.45	0.0904	0.0363
0.70	0.1446	0.0536
1.00	0.4607	0.0536
1.10	0.5444	0.0544
1.20	0.6151	0.0564
1.30	0.7122	0.0557
1.40	0.7500	0.0610
1.60	0.9621	0.0626
2.05	1.2670	0.0773
2.30	1.3709	0.0899
2.70	1.6961	0.1028
2.95	1.9634	0.0990
3.20	2.0885	0.1088

Table A2 The adsorption isotherm of P123 onto hydrophobic silica

Initial concentration (mM)	Equilibrium concentration (mM)	Adsorbed surfactant (mmol/g of silica)
0.10	0.0001	0.0099
0.50	0.0003	0.0499
1.00	0.0239	0.0974
1.10	0.0520	0.1047
1.20	0.1770	0.1023
1.25	0.2583	0.0989
1.30	0.3335	0.0963
1.40	0.4604	0.0939
1.50	0.6800	0.0818
1.75	0.9216	0.0826

Table A3 The adsorption isotherm of L64 onto hydrophobic silica

Initial concentration (mM)	Equilibrium concentration (mM)	Adsorbed surfactant (mmol/g of silica)
0.10	0.0001	0.0099
0.50	0.0002	0.0499
1.00	0.1590	0.0838
1.25	0.4911	0.0755
1.50	0.5923	0.0905
1.75	1.0102	0.0738
2.00	1.1834	0.0814
2.50	1.6185	0.0879
3.00	2.0386	0.0959
3.50	2.6267	0.0870

Table A4 The adsorption isotherm of 17R2 onto hydrophobic silica

Initial concentration (mM)	Equilibrium concentration (mM)	Adsorbed surfactant (mmol/g of silica)
0.05	0.0001	0.0049
0.10	0.0099	0.0090
0.30	0.0401	0.0259
0.50	0.2238	0.0276
0.75	0.3332	0.0415
1.00	0.5464	0.0451
1.25	0.7714	0.0478
1.50	0.9521	0.0547
1.75	1.2235	0.0525
2.00	1.4598	0.0536
2.25	1.6777	0.0571

Table A5 The adsorption isotherm of 25R4 onto hydrophobic silica

Initial concentration (mM)	Equilibrium concentration (mM)	Adsorbed surfactant (mmol/g of silica)
0.10	0.0458	0.0054
0.30	0.1213	0.0178
0.50	0.1845	0.0314
0.75	0.4350	0.0314
1.00	0.6754	0.0323
1.25	0.9139	0.0335
1.50	1.0856	0.0412
1.75	1.3843	0.0364

Table A6 The adsorption isotherm of 10R5 onto hydrophobic silica

Initial concentration (mM)	Equilibrium concentration (mM)	Adsorbed surfactant (mmol/g of silica)
0.10	0.0001	0.0099
0.30	0.0134	0.0285
0.75	0.4407	0.0310
1.25	0.8820	0.0367
1.75	1.3091	0.0440
2.25	1.7588	0.0491
2.75	2.2219	0.0529
3.00	2.4545	0.0544
3.25	2.6910	0.0557
3.50	2.9456	0.0552

Appendix B Adsolubilization of Organic Compounds

The adsolubilization of phenol in the adsorbed layer of block copolymer surfactants, which are L31, P123, L64, 17R2, 25R4, and 10R5, are shown in table B1, B2, B3, B4, B5, and B6 respectively.

Weight of silica = 0.15 g

Volume of phenol- surfactant solution = 15 ml

Aqueous solubility limit of phenol = 882.97 mM

Table B1 The adsolubilization of phenol in an adsorbed layer of hydrophobic silica modified with Pluronics L31

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
50	0.0541	0.2210	4.4200
100	0.1087	0.4027	8.0540
150	0.1605	0.8254	16.5077
200	0.2179	0.7562	15.1232
300	0.3257	1.2371	24.7414
400	0.4312	1.9145	38.2905
500	0.5399	2.3232	46.4641

Table B2 The adsolubilization of phenol in an adsorbed layer of hydrophobic silica modified with Pluronics P123

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
50	0.0354	1.8695	20.7722
100	0.0815	1.8005	20.0056
150	0.1256	3.8876	43.1952
200	0.1719	4.8086	53.4292
300	0.2655	6.5410	72.6778
400	0.3497	9.0933	101.0363
500	0.4320	11.8032	131.1469

Table B3 The adsolubilization of phenol in an adsorbed layer of hydrophobic silica modified with Pluronics L64

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
50	0.0426	1.2349	15.4363
100	0.0818	2.7701	34.6263
150	0.1382	2.7885	34.8558
200	0.1803	4.0645	50.8060
300	0.2759	5.6334	70.4174
400	0.3625	7.9545	99.4309
500	0.4441	10.7690	134.6120

Table B4 The adsolubilization of phenol in an adsorbed layer of hydrophobic silica modified with Pluronics 17R2

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
50	0.0529	0.3279	16.3950
100	0.1042	0.8256	41.2800
150	0.1607	0.8066	40.3283
200	0.2172	0.8202	41.0094
300	0.3246	1.3360	66.7983
400	0.4273	2.2553	112.7649
500	0.5326	2.9635	148.1741

Table B5 The adsolubilization of phenol in an adsorbed layer of hydrophobic silica modified with Pluronics 25R4

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
50	0.0484	0.7217	24.0567
100	0.0937	1.7205	57.3500
150	0.1517	1.5979	53.2644
200	0.1997	2.3658	78.8599
300	0.2953	3.9099	130.3308
400	0.3921	5.3578	178.5925
500	0.4862	7.0484	234.9452

Table B6 The adsolubilization of phenol in an adsorbed layer of hydrophobic silica modified with Pluronics 10R5

Initial concentration (mM)	**Reduced bulk concentration**	**Adsolubilized amount (mmol/g of silica)**	**Adsolubilization ratio**
0	0	0	0
50	0.0528	0.3344	6.6880
100	0.0936	1.7262	34.5240
150	0.1414	2.5058	50.1153
200	0.1830	3.8251	76.5001
300	0.2783	5.4193	108.3863
400	0.3655	7.7136	154.2713
500	0.4533	9.9209	198.4181

The adsolubilization of 2-naphthol in the adsorbed layer of block copolymer surfactants, which are L31, P123, L64, 17R2, 25R4, and 10R5, are shown in table B7, B8, B9, B10, B11, and B12 respectively.

Weight of silica = 0.15 g

Volume of 2-naphthol- surfactant solution = 15 ml

Aqueous solubility limit of 2-naphthol = 5.1389 mM

Table B7 The adsolubilization of 2-naphthol in an adsorbed layer of hydrophobic silica modified with Pluronics L31

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
0.5	0.0612	0.0185	0.3709
1.0	0.1161	0.0402	0.8049
1.5	0.1686	0.0630	1.2604
2.0	0.2144	0.0896	1.7911
2.5	0.2555	0.1184	2.3675
3.0	0.2972	0.1468	2.9355
3.5	0.3204	0.1852	3.7045
4.0	0.3812	0.2032	4.0636
4.5	0.3930	0.2470	4.9406
5.0	0.4407	0.2722	5.4442
6.0	0.5333	0.3247	6.4949
6.9238	0.5971	0.3841	7.6816

Table B8 The adsolubilization of 2-naphthol in an adsorbed layer of hydrophobic silica modified with Pluronics P123

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
0.5	0.0172	0.0411	0.4570
1.0	0.0270	0.0859	0.9542
1.5	0.0351	0.1315	1.4615
2.0	0.0428	0.1774	1.9713
2.5	0.0498	0.2233	2.4811
3.0	0.0575	0.2699	2.9990
3.5	0.0648	0.3161	3.5125
4.0	0.0732	0.3617	4.0191
4.5	0.0841	0.4054	4.5045
5.0	0.0895	0.4516	5.0177
6.0	0.1040	0.5448	6.0535
7.0	0.1094	0.6424	7.1375
8.0	0.1297	0.7302	8.1139
8.9237	0.1439	0.8160	9.0666

Table B9 The adsolubilization of 2-naphthol in an adsorbed layer of hydrophobic silica modified with Pluronics L64

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
0.5	0.0270	0.0360	0.4499
1.0	0.0497	0.0743	0.9289
1.5	0.0636	0.1167	1.4587
2.0	0.0755	0.1603	2.0037
2.5	0.0939	0.2007	2.5085
3.0	0.1035	0.2457	3.0712
3.5	0.1240	0.2854	3.5678
4.0	0.1413	0.3257	4.0708
4.5	0.1581	0.3668	4.5853
5.0	0.1649	0.4132	5.1651
6.0	0.1763	0.5074	6.3421
7.0	0.1821	0.6040	7.5500
7.94	0.1910	0.6954	8.6926

Table B10 The adsolubilization of 2-naphthol in an adsorbed layer of hydrophobic silica modified with Pluronics 17R2

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
0.5	0.0516	0.0235	1.1727
1.0	0.0847	0.0563	2.8147
1.5	0.1292	0.0835	4.1764
2.0	0.1683	0.1131	5.6564
2.5	0.2002	0.1464	7.3207
3.0	0.2402	0.1764	8.8185
3.5	0.2741	0.2082	10.4117
4.0	0.3107	0.2396	11.9784
4.5	0.3517	0.2683	13.4141
5.0	0.3949	0.2963	14.8174
6.0	0.4285	0.3785	18.9260
7.0	0.5308	0.4260	21.3000
7.8567	0.5966	0.4776	23.8818

Table B11 The adsolubilization of 2-naphthol in an adsorbed layer of hydrophobic silica modified with Pluronics 25R4

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
0.5	0.0731	0.0124	0.4132
1.0	0.1149	0.0409	1.3618
1.5	0.1428	0.0765	2.5515
2.0	0.1840	0.1052	3.5081
2.5	0.2139	0.1398	4.6591
3.0	0.2551	0.1686	5.6207
3.5	0.2647	0.2131	7.1036
4.0	0.2946	0.2481	8.2712
4.5	0.3166	0.2864	9.5479
5.0	0.3453	0.3221	10.7357
6.0	0.3707	0.4084	13.6129
7.2466	0.3904	0.5342	17.8066

Table B12 The adsolubilization of 2-naphthol in an adsorbed layer of hydrophobic silica modified with Pluronics 10R5

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
0.5	0.0287	0.0351	0.7030
1.0	0.0598	0.0691	1.3816
1.5	0.0752	0.1109	2.2172
2.0	0.0865	0.1551	3.1011
2.5	0.1108	0.1925	3.8499
3.0	0.1298	0.2325	4.6505
3.5	0.1441	0.2751	5.5022
4.0	0.1712	0.3115	6.2299
4.5	0.1825	0.3549	7.0984
5.0	0.1911	0.4007	8.0146
6.0	0.2052	0.4933	9.8651
7.3571	0.2162	0.6119	12.2382

The adsolubilization of naphthalene in the adsorbed layer of block copolymer surfactants, which are L31, P123, L64, 17R2, 25R4, and 10R5, are shown in table B13, B14, B15, B16, B17, and B18 respectively.

Weight of silica = 0.15 g

Volume of naphthalene- surfactant solution = 15 ml

Aqueous solubility limit of naphthalene = 0.2344 mM

Table B13 The adsolubilization of naphthalene in an adsorbed layer of hydrophobic silica modified with Pluronics L31

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
0.0250	0.0318	0.0017	0.0350
0.0500	0.0677	0.0034	0.0681
0.0750	0.1065	0.0050	0.0997
0.1000	0.1280	0.0070	0.1395
0.1250	0.1800	0.0083	0.1651
0.1500	0.2236	0.0097	0.1944
0.1750	0.2483	0.0116	0.2327
0.2000	0.3204	0.0124	0.2486
0.2250	0.4013	0.0130	0.2608
0.3000	0.5285	0.0176	0.3510
0.3500	0.6863	0.0189	0.3772
0.4105	0.8311	0.0215	0.4303

Table B14 The adsolubilization of naphthalene in an adsorbed layer of hydrophobic silica modified with Pluronics P123

Initial concentration (mM)	**Reduced bulk concentration**	**Adsolubilized amount (mmol/g of silica)**	**Adsolubilization ratio**
0	0	0	0
0.0250	0.0192	0.0020	0.0227
0.0500	0.0457	0.0039	0.0435
0.0750	0.0792	0.0056	0.0625
0.1000	0.1029	0.0076	0.0842
0.1250	0.1206	0.0097	0.1072
0.1500	0.1416	0.0117	0.1295
0.1750	0.1497	0.0140	0.1553
0.2000	0.1910	0.0155	0.1719
0.2250	0.2197	0.0173	0.1922
0.3000	0.2934	0.0231	0.2563
0.3000	0.3619	0.0314	0.3488
0.5000	0.4196	0.0401	0.4452
0.6000	0.5005	0.0481	0.5339
0.6715	0.5754	0.0535	0.5947

Table B15 The adsolubilization of naphthalene in an adsorbed layer of hydrophobic silica modified with Pluronics L64

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
0.0250	0.0355	0.0017	0.0208
0.0500	0.0558	0.0037	0.0461
0.0750	0.0672	0.0059	0.0738
0.1000	0.0708	0.0083	0.1041
0.1250	0.0930	0.0103	0.1287
0.1500	0.1056	0.0125	0.1560
0.1750	0.1255	0.0145	0.1815
0.2000	0.1508	0.0164	0.2051
0.2250	0.1620	0.0186	0.2328
0.3000	0.2526	0.0240	0.2998
0.4000	0.3106	0.0326	0.4079
0.5000	0.4583	0.0391	0.4892
0.6000	0.5076	0.0479	0.5983
0.6745	0.6248	0.0527	0.6584

Table B16 The adsolubilization of naphthalene in an adsorbed layer of hydrophobic silica modified with Pluronics 17R2

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
0.0250	0.0443	0.0015	0.0728
0.0500	0.0620	0.0035	0.1767
0.0750	0.0945	0.0053	0.2633
0.1000	0.1031	0.0076	0.3778
0.1250	0.1237	0.0096	0.4782
0.1500	0.1437	0.0116	0.5800
0.1750	0.1598	0.0137	0.6863
0.2000	0.1823	0.0157	0.7843
0.2250	0.2162	0.0174	0.8701
0.3000	0.2493	0.0241	1.2047
0.3500	0.3004	0.0278	1.3924
0.4250	0.3378	0.0345	1.7228

Table B17 The adsolubilization of naphthalene in an adsorbed layer of hydrophobic silica modified with Pluronics 25R4

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
0.0250	0.0202	0.0020	0.0675
0.0500	0.0422	0.0040	0.1333
0.0750	0.0699	0.0058	0.1949
0.1000	0.1066	0.0075	0.2490
0.1250	0.1108	0.0099	0.3300
0.1500	0.1342	0.0118	0.3937
0.1750	0.1642	0.0136	0.4539
0.2000	0.1766	0.0158	0.5271
0.2250	0.1839	0.0181	0.6044
0.3000	0.2237	0.0246	0.8212
0.3405	0.2547	0.0280	0.9346

Table B18 The adsolubilization of naphthalene in an adsorbed layer of hydrophobic silica modified with Pluronics 10R5

Initial concentration (mM)	Reduced bulk concentration	Adsolubilized amount (mmol/g of silica)	Adsolubilization ratio
0	0	0	0
0.0250	0.0183	0.0021	0.0413
0.0500	0.0310	0.0043	0.0851
0.0750	0.0499	0.0063	0.1264
0.1000	0.0684	0.0084	0.1676
0.1250	0.0888	0.0104	0.2075
0.1500	0.1024	0.0125	0.2510
0.1750	0.1260	0.0145	0.2901
0.2000	0.1405	0.0166	0.3329
0.2250	0.1545	0.0188	0.3770
0.3000	0.2233	0.0247	0.4939
0.4000	0.3673	0.0313	0.6266
0.5073	0.4827	0.0393	0.7854

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