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APPENDICES

APPENDIX A

Data for calculation of diffusion exponent (n) and constant characteristic (k)

1. Poly(methyl methacrylate-co-divinylbenzene) at 0.025% divinylbenzene

Time(s)	Internal radius (mm.)	External radius (mm.)	ln M_t/M_∞	ln t
12	0.44	0.52	-3.61	2.48
14	0.44	0.54	-3.33	2.64
17	0.43	0.56	-3.07	2.83
20	0.42	0.58	-2.90	3.00
23	0.41	0.61	-2.60	3.14
26	0.41	0.64	-2.44	3.26
29	0.40	0.64	-2.37	3.37
32	0.20	0.66	-2.05	3.47
35	0.40	0.69	-2.10	3.56
38	0.40	0.73	-1.91	3.64
42	0.40	0.74	-1.83	3.74
45	0.39	0.75	-1.77	3.81
48	0.38	0.77	-1.70	3.87
51	0.38	0.79	-1.59	3.93
54	0.37	0.80	-1.53	3.99
57	0.36	0.82	-1.44	4.04
61	0.35	0.84	-1.36	4.11
64	0.35	0.85	-1.31	4.16
67	0.34	0.86	-1.27	4.20
70	0.34	0.89	-1.18	4.25
73	0.34	0.89	-1.18	4.29
76	0.33	0.90	-1.12	4.33
79	0.33	0.92	-1.05	4.37
82	0.33	0.95	-0.97	4.41
85	0.32	0.96	-0.93	4.44
88	0.31	0.96	-0.92	4.48
92	0.30	0.98	-0.85	4.52
95	0.30	0.99	-0.82	4.55
98	0.30	1.01	-0.76	4.58
101	0.30	1.02	-0.73	4.62
104	0.16	1.04	-0.64	4.64
107	0.27	1.05	-0.63	4.67
110	0.24	1.05	-0.62	4.70
113	0.26	1.06	-0.59	4.73
116	0.24	1.06	-0.60	4.75
122	0.23	1.08	-0.54	4.80

2. Poly(methyl mthacrylate-co-divinylbenzene) at 0.05 % divinylbenzene

Time,(s)	Internal radius (mm.)	External radius (mm.)	ln M_t/M_∞	ln t
2	0.42	0.45	-4.24	0.69
4	0.42	0.45	-4.37	1.39
6	0.42	0.45	-4.25	1.79
8	0.44	0.47	-4.37	2.08
10	0.44	0.48	-3.85	2.30
12	0.43	0.49	-3.44	2.48
14	0.43	0.51	-3.15	2.64
16	0.43	0.51	-3.12	2.77
18	0.43	0.53	-2.86	2.89
27	0.40	0.58	-2.21	3.30
28	0.40	0.60	-2.10	3.33
30	0.40	0.60	-2.09	3.40
32	0.40	0.61	-1.97	3.47
34	0.39	0.63	-1.85	3.53
36	0.39	0.64	-1.79	3.58
38	0.38	0.65	-1.69	3.64
40	0.37	0.66	-1.64	3.69
42	0.37	0.67	-1.57	3.74
45	0.36	0.68	-1.52	3.81
47	0.35	0.70	-1.40	3.85
50	0.35	0.71	-1.34	3.91
53	0.34	0.73	-1.25	3.97
55	0.33	0.75	-1.14	4.01
58	0.33	0.76	-1.10	4.06
60	0.31	0.78	-1.00	4.09
63	0.31	0.80	-0.91	4.14
66	0.30	0.81	-0.86	4.19
69	0.29	0.82	-0.82	4.23
72	0.28	0.84	-0.76	4.28
75	0.26	0.85	-0.70	4.32
78	0.25	0.87	-0.63	4.36

3. Poly(methyl methacrylate-co-divinylbenzene) at 0.1% divinylbenzene

Time,(s)	Internal radius (mm.)	External radius (mm.)	ln M_t/M_∞	ln t
9	0.56	0.59	-3.93	2.20
12	0.56	0.60	-3.59	2.48
16	0.55	0.61	-3.30	2.77
20	0.55	0.63	-3.04	3.00
24	0.55	0.64	-2.80	3.18
28	0.54	0.66	-2.57	3.33
32	0.54	0.67	-2.42	3.47
36	0.53	0.68	-2.32	3.58
40	0.52	0.71	-2.09	3.69
44	0.51	0.71	-2.02	3.78
48	0.51	0.72	-1.96	3.87
52	0.51	0.73	-1.84	3.95
56	0.50	0.75	-1.72	4.03
60	0.49	0.76	-1.63	4.09
66	0.48	0.78	-1.51	4.19
72	0.47	0.80	-1.40	4.28
78	0.47	0.82	-1.30	4.36
84	0.45	0.84	-1.20	4.43
90	0.44	0.86	-1.09	4.50
96	0.43	0.88	-1.03	4.56
102	0.42	0.90	-0.93	4.62
109	0.41	0.92	-0.85	4.69
115	0.40	0.94	-0.77	4.74
121	0.38	0.96	-0.69	4.80
127	0.37	0.98	-0.64	4.84
133	0.35	0.99	-0.59	4.89
140	0.33	1.01	-0.51	4.94
150	0.32	1.04	-0.43	5.01
160	0.30	1.06	-0.36	5.08

4. Poly(methyl methacrylate-co-divinylbenzene) at 0.15 % divinylbenzene

Time,(s)	Internal radius (mm.)	External radius (mm.)	ln M_t/M_∞	ln t
18	0.58	0.62	-3.56	2.89
22	0.58	0.62	-3.46	3.09
26	0.58	0.63	-3.27	3.26
30	0.58	0.64	-3.11	3.40
34	0.58	0.65	-2.94	3.53
38	0.57	0.65	-2.80	3.64
42	0.57	0.67	-2.57	3.74
46	0.56	0.68	-2.41	3.83
50	0.56	0.69	-2.32	3.91
54	0.56	0.70	-2.19	3.99
58	0.55	0.71	-2.10	4.06
63	0.54	0.71	-2.01	4.14
69	0.54	0.73	-1.87	4.23
80	0.52	0.75	-1.70	4.38
86	0.51	0.78	-1.47	4.45
92	0.50	0.80	-1.37	4.52
98	0.49	0.81	-1.27	4.58
104	0.48	0.84	-1.15	4.64
110	0.46	0.86	-1.03	4.70
116	0.45	0.88	-0.95	4.75
120	0.44	0.89	-0.87	4.83
130	0.41	0.92	-0.75	4.91
140	0.39	0.95	-0.65	4.98
150	0.36	0.97	-0.55	5.04

APPENDIX B

Data for calculation of relaxation rate constant (K_2) and relaxation rate constant (A)

1. Poly[(methyl methacrylate)-co-divinylbenzene] at 0.025% divinylbenzene

time(s)	radius internal(mm.)	radius external(mm.)	$\ln\left(1-\left(r_e^3-r_\infty^3/r_{e,\infty}^3\right)\right)$
12	0.44	0.52	-3.61
14	0.44	0.54	-3.33
17	0.43	0.56	-3.07
20	0.42	0.58	-2.90
23	0.41	0.61	-2.60
26	0.41	0.64	-2.44
29	0.40	0.64	-2.37
32	0.20	0.66	-2.05
35	0.40	0.69	-2.10
38	0.40	0.73	-1.91
42	0.40	0.74	-1.83
45	0.39	0.75	-1.77
48	0.38	0.77	-1.70
51	0.38	0.79	-1.59
54	0.37	0.80	-1.53
57	0.36	0.82	-1.44
61	0.35	0.84	-1.36
64	0.35	0.85	-1.31
67	0.34	0.86	-1.27
70	0.34	0.89	-1.18
73	0.34	0.89	-1.18
76	0.33	0.90	-1.12
79	0.33	0.92	-1.05
82	0.33	0.95	-0.97
85	0.32	0.96	-0.93
88	0.31	0.96	-0.92
92	0.30	0.98	-0.85
95	0.30	0.99	-0.82
98	0.30	1.01	-0.76
101	0.30	1.02	-0.73
104	0.16	1.04	-0.64
107	0.27	1.05	-0.63
110	0.24	1.05	-0.62
113	0.26	1.06	-0.59
116	0.24	1.06	-0.60
122	0.23	1.08	-0.54
128	0.22	1.13	-0.42
134	0.18	1.13	-0.40
140	0.19	1.14	-0.38
146	0.19	1.16	-0.32
152	0.16	1.16	-0.32

1. Poly[(methyl methacrylate)-co-divinylbenzene] at 0.025% divinylbenzene (continued)

time(s)	radius internal(mm.)	radius external(mm.)	$\ln\left(1-\left(r_e^3-r_\infty^3/r_{e,\infty}^3\right)\right)$
158	0.16	1.17	-0.29
164	0.15	1.19	-0.25
170	0.12	1.20	-0.22
176	0.11	1.21	-0.19
182	0.09	1.23	-0.15
188	0.09	1.23	-0.14
194	0.07	1.23	-0.14
200	0.05	1.24	-0.11
202	0.00	1.24	-0.11
204	0.00	1.24	-0.12
206	0.00	1.25	-0.09

2. Poly[(methyl methacrylate)-co-divinylbenzene] at 0.05% divinylbenzene

time(s)	radius internal(mm.)	radius external(mm.)	$\ln\left(1-\left(r_e^3-r_\infty^3/r_{e,\infty}^3\right)\right)$
2	0.42	0.45	-4.24
4	0.42	0.45	-4.37
6	0.42	0.45	-4.25
8	0.44	0.47	-4.37
10	0.44	0.48	-3.85
12	0.43	0.49	-3.44
14	0.43	0.51	-3.15
16	0.43	0.51	-3.12
18	0.43	0.53	-2.86
27	0.40	0.58	-2.21
28	0.40	0.60	-2.10
30	0.40	0.60	-2.09
32	0.40	0.61	-1.97
34	0.39	0.63	-1.85
36	0.39	0.64	-1.79
38	0.38	0.65	-1.69
40	0.37	0.66	-1.64
42	0.37	0.67	-1.57
45	0.36	0.68	-1.52
47	0.35	0.70	-1.40
50	0.35	0.71	-1.34
53	0.34	0.73	-1.25
55	0.33	0.75	-1.14
58	0.33	0.76	-1.10
60	0.31	0.78	-1.00
63	0.31	0.80	-0.91
66	0.30	0.81	-0.86
69	0.29	0.82	-0.82
72	0.28	0.84	-0.76
75	0.26	0.85	-0.70
78	0.25	0.87	-0.63
82	0.24	0.88	-0.59
85	0.23	0.90	-0.53
88	0.22	0.92	-0.47
90	0.20	0.92	-0.44
93	0.20	0.93	-0.42
96	0.18	0.94	-0.38
99	0.16	0.95	-0.36
105	0.15	0.96	-0.32
113	0.12	0.98	-0.26
115	0.08	1.00	-0.18
120	0.07	1.01	-0.16
125	0.04	1.02	-0.13
130	0.00	1.03	-0.10

3. Poly[(methyl methacrylate)-co-divinylbenzene] at 0.1% divinylbenzene

time(s)	radius internal(mm.)	radius external(mm.)	$\ln\left(1-\left(r_e^3-r_\infty^3/r_{e,\infty}^3\right)\right)$
9	0.56	0.59	-3.93
12	0.56	0.60	-3.59
16	0.55	0.61	-3.30
20	0.55	0.63	-3.04
24	0.55	0.64	-2.80
28	0.54	0.66	-2.57
32	0.54	0.67	-2.42
36	0.53	0.68	-2.32
40	0.52	0.71	-2.09
44	0.51	0.71	-2.02
48	0.51	0.72	-1.96
52	0.51	0.73	-1.84
56	0.50	0.75	-1.72
60	0.49	0.76	-1.63
66	0.48	0.78	-1.51
72	0.47	0.80	-1.40
78	0.47	0.82	-1.30
84	0.45	0.84	-1.20
90	0.44	0.86	-1.09
96	0.43	0.88	-1.03
102	0.42	0.90	-0.93
109	0.41	0.92	-0.85
115	0.40	0.94	-0.77
121	0.38	0.96	-0.69
127	0.37	0.98	-0.64
133	0.35	0.99	-0.59
140	0.33	1.01	-0.51
150	0.32	1.04	-0.43
160	0.30	1.06	-0.36
171	0.26	1.09	-0.27
180	0.25	1.10	-0.24
190	0.22	1.12	-0.19
210	0.17	1.14	-0.12
230	0.12	1.16	-0.05
250	0.03	1.17	-0.03
270	0.00	1.18	-0.01
290	0.00	1.18	0.00
300	0.00	1.18	0.00

4. Poly[(methyl methacrylate)-co-divinylbenzene] at 0.15% divinylbenzene

time(s)	radius internal(mm.)	radius external(mm.)	$\ln\left(1-\left(r_e^3-r_\infty^3/r_{e,\infty}^3\right)\right)$
18	0.58	0.62	-3.56
22	0.58	0.62	-3.46
26	0.58	0.63	-3.27
30	0.58	0.64	-3.11
34	0.58	0.65	-2.94
38	0.57	0.65	-2.80
42	0.57	0.67	-2.57
46	0.56	0.68	-2.41
50	0.56	0.69	-2.32
54	0.56	0.70	-2.19
58	0.55	0.71	-2.10
63	0.54	0.71	-2.01
69	0.54	0.73	-1.87
80	0.52	0.75	-1.70
86	0.51	0.78	-1.47
92	0.50	0.80	-1.37
98	0.49	0.81	-1.27
104	0.48	0.84	-1.15
110	0.46	0.86	-1.03
116	0.45	0.88	-0.95
125	0.44	0.89	-0.87
135	0.41	0.92	-0.75
145	0.39	0.95	-0.65
155	0.36	0.97	-0.55
165	0.34	1.00	-0.46
175	0.32	1.02	-0.38
190	0.30	1.04	-0.33
210	0.24	1.08	-0.20
230	0.18	1.10	-0.12
250	0.11	1.12	-0.07
270	0.00	1.14	-0.03
300	0.00	1.15	0.00

APPENDIX C

Data for calculation of toluene absorbency

1. Methyl methcrylate-divinylbenzene-alkyl (meth)acrylate terpolymer

Runs	Number	Before swelling			After swelling		Toluene absorbency	
		W-tube(g)	W-s+t(g)	W-sample(g)	W-s+t(g)	W-sample(g)	By weight	By volume
MMA-BMA	1	14.06	14.51	0.45	22.97	8.90	18.78	24.76
	2	13.43	13.94	0.51	23.86	10.43	19.33	25.45
	3	15.90	16.41	0.51	26.39	10.49	19.61	25.81
	average						19.24	25.34
MMA-LMA	1	14.42	14.96	0.53	23.13	8.70	15.36	19.25
	2	14.46	14.97	0.50	22.59	8.12	15.11	18.96
	3	14.48	14.94	0.46	22.13	7.66	15.66	19.61
	average						15.38	19.28
MMA-DA	1	17.07	17.50	0.44	25.33	8.26	17.89	22.04
	2	17.20	17.79	0.59	28.47	11.27	18.09	22.28
	3	15.86	16.31	0.46	24.49	8.63	17.87	22.02
	average						17.95	22.11
MMA-SA	1	13.03	13.54	0.51	21.81	8.79	16.11	19.84
	2	17.14	17.64	0.50	25.73	8.59	16.20	19.94
	3	16.89	17.34	0.46	24.77	7.88	16.24	19.99
	average						16.18	19.92

VITA

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