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Appendix-A

Data from TGA Analysis

Table A-1 %ceramic yield of the product as a function of TIS concentration at
the reaction time of 3 h and the reaction temperature of 200°C (w/o
TETA) (Figure 3.2)

mmol of TIS	% ceramic yield (1)	% ceramic yield (2)	Average	SD.
25	32.8	33.0	32.90	0.141
50	32.0	32.2	32.10	0.141
75	31.5	31.6	31.55	0.071
100	30.5	30.2	30.35	0.212
125	29.9	29.7	29.80	0.141

Table A-2 %ceramic yield of the product as a function of reaction time using
$Al(OH)_3$:TIS = 1:1 and the reaction temperature of 200°C (w/o
TETA) (Figure 3.3)

Reaction time (h)	% ceramic yield (1)	% ceramic yield (2)	Average	SD.
1.0	39.9	40.2	40.05	0.212
1.5	39.4	38.9	39.15	0.354
2.0	36.9	36.6	36.75	0.212
2.5	34.3	34.5	34.40	0.141
3.0	31.6	31.5	31.55	0.071
4.0	30.9	30.7	30.80	0.141

Table A-3 %ceramic yield of the product as a function reaction temperature
using Al(OH)$_3$:TIS = 1:1 and the reaction time of 3 h (w/o TETA)
(Figure 3.4)

Reaction temperature (°C)	% ceramic yield (1)	% ceramic yield (2)	Average	SD.
150	46.1	46.5	46.30	0.283
170	39.8	40.2	40.00	0.283
190	32.5	32.4	32.45	0.071
200	31.5	31.6	31.55	0.071
210	30.2	30.5	30.35	0.212
220	29.1	29.3	29.20	0.141

Table A-4 %ceramic yield of the product as a function of TETA concentration
using Al(OH)$_3$:TIS = 1:1, the reaction time of 3 h and the reaction
temperature of 200°C (Figure 3.5)

mmol of TETA	% ceramic yield (1)	% ceramic yield (2)	Average	SD.
25	29.8	29.5	29.65	0.212
50	27.1	27.4	27.25	0.212
75	26.4	26.8	26.6	0.283
100	25.5	26.2	25.85	0.495
125	25.1	24.8	24.95	0.212
150	25.1	24.6	24.85	0.354

Table B-1 Viscometric data of polymer solutions, measured at 30°C, synthesized from $Al(OH)_3$:TIS = 1:0.5 at reaction time of 3 h and the reaction temperature of 200°C (Figure 3.12 and 3.13)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	712.49	-	-	-	-	-
0.6264	720.34	0.085	1.01	0.011	0.018	0.017
	720.22		1.01	0.011	0.017	0.017
1.2528	728.47	0.021	1.02	0.022	0.018	0.018
	728.50		1.02	0.022	0.018	0.018
2.5056	746.52	0.028	1.05	0.048	0.019	0.019
	746.48		1.05	0.048	0.019	0.019
3.1320	756.42	0.050	1.06	0.062	0.020	0.019
	756.35		1.06	0.062	0.020	0.019
3.7584	766.67	0.057	1.08	0.076	0.020	0.020
	766.59		1.08	0.076	0.020	0.019

Table B-2 Viscometric data of polymer solutions, measured at 30°C, synthesized from $Al(OH)_3$:TIS = 1:1 at reaction time of 3 h and the reaction temperature of 200°C (Figure 3.12 and 3.13)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	706.14	-	-	-	-	-
0.5284	716.07	0.057	1.01	0.014	0.027	0.026
	716.15		1.01	0.014	0.027	0.027
1.0568	726.41	0.042	1.03	0.029	0.027	0.027
	726.35		1.03	0.029	0.027	0.027
1.5852	736.98	0.028	1.04	0.044	0.028	0.027
	737.02		1.04	0.044	0.028	0.027
2.1136	747.96	0.057	1.06	0.060	0.028	0.027
	748.04		1.06	0.060	0.028	0.027
3.1704	770.88	0.042	1.09	0.092	0.029	0.028
	770.94		1.09	0.092	0.029	0.028

Table B-3 Viscometric data of polymer solutions, measured at 30°C,

synthesized from Al(OH)$_3$:TIS = 1:1.5 at reaction time of 3 h and

the reaction temperature 200°C (Figure 3.12 and 3.13)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	710.35	-	-	-	-	-
0.4160	721.87	0.035	1.02	0.016	0.039	0.039
	721.82		1.02	0.016	0.039	0.039
0.8320	733.97	0.035	1.03	0.033	0.040	0.039
	733.92		1.03	0.033	0.040	0.039
1.6640	759.73	0.028	1.07	0.070	0.042	0.040
	759.69		1.07	0.070	0.042	0.040
2.4960	787.67	0.050	1.11	0.109	0.044	0.041
	787.74		1.11	0.109	0.044	0.041
3.3280	817.78	0.050	1.15	0.151	0.045	0.042
	817.85		1.15	0.151	0.045	0.042

Table B-4 Viscometric data of polymer solutions, measured at 30°C,

synthesized from Al(OH)$_3$:TIS = 1:2 at reaction time of 3 h and

the reaction temperature 200°C (Figure 3.12 and 3.13)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	707.12	-	-	-	-	-
0.5120	723.31	0.035	1.02	0.023	0.045	0.044
	723.26		1.02	0.023	0.045	0.044
1.0240	739.69	0.042	1.05	0.046	0.045	0.044
	739.75		1.05	0.046	0.045	0.044
1.5360	756.32	0.064	1.07	0.070	0.045	0.044
	756.41		1.07	0.070	0.045	0.044
2.0480	773.44	0.035	1.09	0.094	0.045	0.044
	773.39		1.09	0.094	0.046	0.044
3.0720	808.21	0.085	1.14	0.143	0.047	0.043
	808.33		1.14	0.143	0.047	0.044

Table B-5 Viscometric data of polymer solutions, measured at 30°C,

synthesized from $Al(OH)_3$:TIS = 1:2.5 at reaction time of 3 h and

the reaction temperature of 200°C (Figure 3.12 and 3.13)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	710.35	-	-	-	-	-
0.3672	722.59	0.042	1.02	0.017	0.047	0.047
	722.53		1.02	0.017	0.047	0.046
0.7344	734.78	0.042	1.03	0.034	0.047	0.046
	734.84		1.03	0.034	0.047	0.046
1.4688	760.29	0.035	1.07	0.070	0.048	0.046
	760.34		1.07	0.070	0.048	0.046
2.2032	786.93	0.042	1.11	0.108	0.049	0.046
	786.87		1.11	0.108	0.049	0.046
2.9376	814.57	0.028	1.15	0.147	0.050	0.047
	814.61		1.15	0.147	0.050	0.047

Table B-6 Viscometric data of polymer solutions, measured at 30°C,

synthesized from Al(OH)₃:TIS = 1:1 at reaction time of 1 h and

the reaction temperature of 200°C (Figure 3.15 and 3.16)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	710.92	-	-	-	-	-
0.3740	713.78	0.035	1.00	0.004	0.011	0.011
	713.73		1.00	0.004	0.011	0.011
0.7480	716.87	0.092	1.01	0.008	0.011	0.011
	716.74		1.01	0.008	0.011	0.011
1.4960	723.69	0.042	1.02	0.018	0.012	0.012
	723.63		1.02	0.018	0.012	0.012
2.2440	731.54	0.042	1.03	0.029	0.013	0.013
	731.48		1.03	0.029	0.013	0.013
2.9920	740.11	0.057	1.04	0.041	0.014	0.014
	740.19		1.04	0.041	0.014	0.014

Table B-7 Viscometric data of polymer solutions, measured at 30°C,

synthesized from Al(OH)₃:TIS = 1:1 at reaction time of 1.5 h and

the reaction temperature 200°C (Figure 3.15 and 3.16)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	710.96	-	-	-	-	-
0.5672	717.93	0.035	1.01	0.010	0.017	0.017
	717.88		1.01	0.010	0.017	0.017
1.1344	725.29	0.042	1.02	0.020	0.018	0.018
	725.35		1.02	0.020	0.018	0.018
1.7016	733.20	0.028	1.03	0.031	0.018	0.018
	733.16		1.03	0.031	0.018	0.018
2.2688	741.52	0.099	1.04	0.043	0.019	0.019
	741.66		1.04	0.043	0.019	0.019
3.4032	758.72	0.042	1.07	0.067	0.020	0.019
	758.66		1.07	0.067	0.020	0.019

Table B-8 Viscometric data of polymer solutions, measured at 30°C, synthesized from Al(OH)$_3$:TIS = 1:1 at reaction time of 2 h and the reaction temperature of 200°C (Figure 3.15 and 3.16)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	713.08	-	-	-	-	-
0.3461	717.84	0.057	1.01	0.007	0.019	0.019
	717.76		1.01	0.007	0.019	0.019
0.6922	722.73	0.050	1.01	0.014	0.020	0.019
	722.66		1.01	0.013	0.019	0.019
1.3843	732.46	0.042	1.03	0.027	0.020	0.019
	732.52		1.03	0.027	0.020	0.019
2.0765	742.50	0.042	1.04	0.041	0.020	0.019
	742.44		1.04	0.041	0.020	0.019
2.7686	752.86	0.064	1.06	0.056	0.020	0.020
	752.77		1.06	0.056	0.020	0.020

Table B-9 Viscometric data of polymer solutions, measured at 30°C, synthesized from Al(OH)$_3$:TIS = 1:1 at reaction time of 2.5 h and the reaction temperature 200°C (Figure 3.15 and 3.16)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	710.80	-	-	-	-	-
0.5160	718.96	0.007	1.01	0.011	0.022	0.022
	718.97		1.01	0.011	0.022	0.022
1.0320	727.57	0.064	1.02	0.024	0.023	0.023
	727.48		1.02	0.023	0.023	0.022
1.5480	736.35	0.050	1.04	0.036	0.023	0.023
	736.28		1.04	0.036	0.023	0.023
2.0640	745.67	0.064	1.05	0.049	0.024	0.023
	745.58		1.05	0.049	0.024	0.023
3.0960	764.63	0.078	1.08	0.076	0.024	0.024
	764.52		1.08	0.076	0.024	0.024

Table B-10 Viscometric data of polymer solutions, measured at 30°C, synthesized from $Al(OH)_3$:TIS = 1:1 at reaction time of 3 h and the reaction temperature of 200°C (Figure 3.15 and 3.16)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	710.35	-	-	-	-	-
0.3520	716.58	0.042	1.01	0.009	0.025	0.025
	716.64		1.01	0.009	0.025	0.025
0.7040	723.21	0.092	1.02	0.018	0.026	0.025
	723.34		1.02	0.018	0.026	0.026
1.4080	737.68	0.085	1.04	0.038	0.027	0.027
	737.56		1.04	0.038	0.027	0.027
2.1120	753.74	0.064	1.06	0.061	0.029	0.028
	753.65		1.06	0.061	0.029	0.028
2.8160	771.43	0.050	1.09	0.086	0.031	0.029
	771.36		1.09	0.086	0.031	0.029

Table B-11 Viscometric data of polymer solutions, measured at 30°C, synthesized from $Al(OH)_3$:TIS = 1:1 at reaction time of 4 h and the reaction temperature 200°C (Figure 3.15 and 3.16)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	709.84	-	-	-	-	-
0.3449	716.31	0.028	1.01	0.009	0.026	0.026
	716.27		1.01	0.009	0.026	0.026
0.6898	722.97	0.057	1.02	0.019	0.027	0.027
	722.89		1.02	0.018	0.027	0.026
1.3795	736.36	0.057	1.04	0.037	0.027	0.027
	736.28		1.04	0.037	0.027	0.027
2.0693	750.26	0.106	1.06	0.057	0.028	0.027
	750.11		1.06	0.057	0.027	0.027
2.7590	764.57	0.042	1.08	0.077	0.028	0.027
	764.63		1.08	0.077	0.028	0.027

Table B-12 Viscometric data of polymer solutions, measured at 30°C, synthesized from Al(OH)$_3$:TIS = 1:1 at reaction time of 3 h and the reaction temperature 150°C (Figure 3.18 and 3.19)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	709.34	-	-	-	-	-
0.2676	713.81	0.028	1.01	0.006	0.024	0.023
	713.77		1.01	0.006	0.023	0.023
0.5352	718.35	0.050	1.01	0.013	0.024	0.023
	718.42		1.01	0.013	0.024	0.024
1.0704	727.69	0.113	1.03	0.026	0.024	0.024
	727.85		1.03	0.026	0.025	0.024
2.1408	747.32	0.148	1.05	0.054	0.025	0.024
	747.11		1.05	0.053	0.026	0.024
3.2112	767.59	0.226	1.08	0.082	0.026	0.025
	767.27		1.08	0.082	0.025	0.024

Table B-13 Viscometric data of polymer solutions, measured at 30°C, synthesized from Al(OH)$_3$:TIS = 1:1 at reaction time of 3 h and the reaction temperature 170°C (Figure 3.18 and 3.19)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	709.34	-	-	-	-	-
0.3715	717.44	0.064	1.01	0.011	0.031	0.031
	717.53		1.01	0.012	0.031	0.031
0.7430	726.13	0.134	1.02	0.024	0.032	0.031
	725.94		1.02	0.023	0.031	0.031
1.4860	743.54	0.099	1.05	0.048	0.032	0.032
	743.68		1.05	0.048	0.033	0.032
2.9720	780.15	0.191	1.10	0.100	0.034	0.032
	780.42		1.10	0.100	0.034	0.032
3.7150	800.65	0.297	1.13	0.129	0.035	0.033
	800.23		1.13	0.128	0.034	0.032

Table B-14 Viscometric data of polymer solutions, measured at 30°C, synthesized from Al(OH)₃:TIS = 1:1 at reaction time of 3 h and the reaction temperature 190°C (Figure 3.18 and 3.19)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	709.34	-	-	-	-	-
0.3372	717.69	0.106	1.01	0.012	0.035	0.035
	717.54		1.01	0.012	0.034	0.034
0.6744	726.48	0.219	1.02	0.024	0.036	0.035
	726.17		1.02	0.024	0.035	0.035
1.3488	745.30	0.184	1.05	0.051	0.038	0.037
	745.56		1.05	0.051	0.038	0.037
2.6976	788.06	0.233	1.11	0.111	0.041	0.039
	788.39		1.11	0.111	0.041	0.039
3.372	812.04	0.148	1.14	0.145	0.043	0.040
	812.25		1.15	0.145	0.043	0.040

Table B-15 Viscometric data of polymer solutions, measured at 30°C, synthesized from Al(OH)₃:TIS = 1:1 at reaction time of 3 h and the reaction temperature 200°C (Figure 3.18 and 3.19)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
Solvent	709.29	-	-	-	-	-
0.3758	719.14	0.035	1.01	0.014	0.037	0.037
	719.19		1.01	0.014	0.037	0.037
0.7517	729.27	0.035	1.03	0.028	0.037	0.037
	729.32		1.03	0.028	0.038	0.037
1.5034	750.91	0.042	1.06	0.059	0.039	0.038
	750.85		1.06	0.059	0.039	0.038
3.0067	795.93	0.085	1.12	0.122	0.041	0.038
	795.81		1.12	0.122	0.041	0.038
4.5101	845.96	0.127	1.19	0.193	0.043	0.039
	845.78		1.19	0.192	0.043	0.039

Table B-16 Viscometric data of polymer solutions, measured at 30°C, synthesized from Al(OH)$_3$:TIS = 1:1 at reaction time of 3 h and the reaction temperature 210°C (Figure 3.18 and 3.19)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	711.54	-	-	-	-	-
0.3704	722.38	0.205	1.02	0.015	0.041	0.041
	722.67		1.02	0.016	0.042	0.042
0.7408	734.50	0.191	1.03	0.032	0.044	0.043
	734.23		1.03	0.032	0.043	0.042
1.4816	762.55	0.099	1.07	0.072	0.048	0.047
	762.69		1.07	0.072	0.049	0.047
2.2224	795.84	0.085	1.12	0.118	0.053	0.050
	795.72		1.12	0.118	0.053	0.050
3.7040	877.25	0.156	1.23	0.233	0.063	0.057
	877.47		1.23	0.233	0.063	0.057

Table B-17 Viscometric data of polymer solutions, measured at 30°C, synthesized from Al(OH)$_3$:TIS = 1:1 at reaction time of 3 h and the reaction temperature 220°C (Figure 3.18 and 3.19)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	709.34	-	-	-	-	-
0.3528	720.41	0.106	1.02	0.016	0.044	0.044
	720.56		1.02	0.016	0.045	0.044
0.7056	731.91	0.050	1.03	0.032	0.045	0.044
	731.84		1.03	0.032	0.045	0.044
1.4112	756.20	0.092	1.07	0.066	0.047	0.045
	756.33		1.07	0.066	0.047	0.045
2.8224	809.95	0.184	1.14	0.142	0.050	0.047
	809.69		1.14	0.141	0.050	0.047
3.5280	839.41	0.120	1.18	0.183	0.052	0.048
	839.58		1.18	0.184	0.052	0.048

Table B-18 Viscometric data of polymer solutions, measured at 30°C,

synthesized from Al(OH)$_3$:TIS:TETA = 1:1:0.5 at reaction time of

3 h and the reaction temperature of 200°C (Figure 3.21 and 3.22)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	712.98	-	-	-	-	-
0.4416	717.91	0.050	1.01	0.007	0.016	0.016
	717.98		1.01	0.007	0.016	0.016
0.8832	723.18	0.035	1.01	0.014	0.016	0.016
	723.23		1.01	0.014	0.016	0.016
1.7664	734.48	0.057	1.03	0.030	0.017	0.017
	734.56		1.03	0.030	0.017	0.017
2.2080	740.59	0.120	1.04	0.039	0.018	0.017
	740.42		1.04	0.039	0.018	0.017
3.5328	760.25	0.064	1.07	0.066	0.019	0.018
	760.34		1.07	0.066	0.019	0.018

Table B-19 Viscometric data of polymer solutions, measured at 30°C,

synthesized from Al(OH)$_3$:TIS:TETA = 1:1:1 at reaction time of

3 h and the reaction temperature 200°C (Figure 3.21 and 3.22)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	709.66	-	-	-	-	-
0.4680	715.74	0.014	1.01	0.009	0.018	0.018
	715.76		1.01	0.009	0.018	0.018
0.7800	720.12	0.028	1.01	0.015	0.019	0.019
	720.08		1.01	0.015	0.019	0.019
1.5600	731.95	0.064	1.03	0.031	0.020	0.020
	731.86		1.03	0.031	0.020	0.020
3.1200	759.85	0.064	1.07	0.071	0.022	0.022
	759.76		1.07	0.071	0.022	0.022
3.9000	775.81	0.085	1.09	0.093	0.024	0.023
	775.93		1.09	0.093	0.024	0.023

Table B-20 Viscometric data of polymer solutions, measured at 30°C, synthesized from $Al(OH)_3$:TIS:TETA = 1:1:2 at reaction time of 3 h and the reaction temperature of 200°C (Figure 3.21 and 3.22)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	713.65	-	-	-	-	-
0.4160	719.73	0.028	1.01	0.009	0.020	0.020
	719.69		1.01	0.008	0.020	0.020
0.8320	726.03	0.057	1.02	0.017	0.021	0.021
	726.11		1.02	0.017	0.021	0.021
1.6640	739.58	0.050	1.04	0.036	0.022	0.021
	739.65		1.04	0.036	0.022	0.022
2.4960	754.46	0.035	1.06	0.057	0.023	0.022
	754.51		1.06	0.057	0.023	0.022
3.3280	770.65	0.042	1.08	0.080	0.024	0.023
	770.71		1.08	0.080	0.024	0.023

Table B-21 Viscometric data of polymer solutions, measured at 30°C, synthesized from $Al(OH)_3$:TIS:TETA = 1:1:2.5 at reaction time of 3 h and the reaction temperature 200°C (Figure 3.21 and 3.22)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	714.77	-	-	-	-	-
0.3946	720.92	0.028	1.01	0.009	0.022	0.022
	720.96		1.01	0.009	0.022	0.022
0.7891	727.47	0.035	1.02	0.018	0.023	0.022
	727.42		1.02	0.018	0.022	0.022
1.5782	741.58	0.035	1.04	0.038	0.024	0.023
	741.63		1.04	0.038	0.024	0.023
2.3674	757.03	0.035	1.06	0.059	0.025	0.024
	757.08		1.06	0.059	0.025	0.024
3.1565	773.85	0.000	1.08	0.083	0.026	0.025
	773.85		1.08	0.083	0.026	0.025

Table B-22 Viscometric data of polymer solutions, measured at 30°C,

synthesized from Al(OH)$_3$:TIS:TETA = 1:1:3 at reaction time of

3 h and the reaction temperature of 200°C (Figure 3.21 and 3.22)

Concentration (g/l)	Time (sec)	SD.	η_r	η_{sp}	η_{red} (l/g)	η_{inh} (l/g)
solvent	714.47	-	-	-	-	-
0.3127	720.04	0.007	1.01	0.008	0.027	0.027
	720.05		1.01	0.008	0.027	0.027
0.6254	725.80	0.057	1.02	0.016	0.028	0.028
	725.72		1.02	0.016	0.028	0.027
1.2509	750.73	0.078	1.05	0.051	0.030	0.029
	750.84		1.05	0.051	0.030	0.029
1.8763	778.80	0.057	1.09	0.090	0.032	0.030
	778.88		1.09	0.090	0.032	0.030
3.1272	793.96	0.064	1.11	0.111	0.032	0.031
	793.87		1.11	0.111	0.032	0.031

Appendix-C

Data from Light Scattering measurements

Table C-1 Al(OH)$_3$:TIS:TETA = 100:100:0 mmol, reaction time 3 h, reaction temperature of 200°C, C$_p$ = 0.7538 g/l (Figure C-1a)

Angle (°)	Sample time (μs)	R$_H$ (nm)	D$_{app}$ (cm^2/s)	In Range	Merit	Poly-dispersity
60	110	22.9	0.6e-8	95.2	21.4	.2086
	110	22.6	0.6e-8	94.7	22.7	.2249
	110	23.4	0.6e-8	92.0	26.9	.2226
	110	24.1	0.6e-8	96.8	23.5	.2220
	110	19.8	0.7e-8	94.1	24.5	.2087
Average	110	22.6	0.62e-8	94.6	23.8	.2170
SD.	-	1.64	0.45e-9	1.75	2.07	.0080
75	75	21.6	0.6e-8	93.5	26.8	.2071
	75	22.0	0.6e-8	92.0	23.5	.2016
	75	21.5	0.6e-8	94.7	22.7	.1984
	75	20.6	0.6e-8	91.6	26.5	.1993
	75	18.7	0.7e-8	92.5	24.1	.2043
Average	75	20.9	0.62e-8	92.9	24.7	.2020
SD.	-	1.32	0.45e-9	1.25	1.83	.0036
90	55	22.0	0.6e-8	94.2	22.9	.1984
	55	21.4	0.6e-8	93.5	30.5	.1867
	55	17.3	0.7e-8	89.7	34.1	.1930
	55	20.9	0.6e-8	96.2	33.0	.2011
	55	18.0	0.7e-8	95.1	30.5	.1964
Average	55	19.9	0.64e-8	93.7	30.2	.1950
SD.	-	2.12	0.55e-9	2.47	4.37	.0056
105	30	17.7	0.7e-8	94.2	22.1	.1946
	30	22.3	0.6e-8	84.6	24.2	.1874
	30	21.5	0.6e-8	95.5	23.6	.1890
	30	21.4	0.6e-8	97.1	23.1	.2011
	30	18.9	0.7e-8	90.2	20.7	.1934
Average	30	20.4	0.64e-8	92.3	22.7	.1930
SD.	-	1.96	0.55e-9	5.01	1.37	.0054

Table C-2 Al(OH)$_3$:TIS:TETA = 100:100:0 mmol, reaction time 3 h, reaction temperature of 200°C, C$_p$ = 1.2564 g/l (Figure C-1b)

Angle (°)	Sample time (µs)	R$_H$ (nm)	D$_{app}$ (cm^2/s)	In Range	Merit	Poly-dispersity
60	110	21.5	0.6e-8	90.4	23.5	.2176
	110	21.3	0.6e-8	91.1	26.4	.2308
	110	20.9	0.6e-8	93.2	24.7	.2245
	110	24.7	0.5e-8	95.4	25.8	.2319
	110	25.1	0.5e-8	92.0	23.1	.2361
Average	110	22.7	0.56e-8	92.4	24.7	.2280
SD.	-	2.02	0.55e-9	1.97	1.42	.0072
75	70	25.1	0.5e-8	94.7	26.8	.2176
	70	25.3	0.5e-8	96.2	25.7	.2159
	70	24.1	0.6e-8	96.5	24.9	.2045
	70	23.6	0.6e-8	91.0	26.4	.2101
	70	22.8	0.6e-8	93.5	22.3	.2165
Average	70	24.2	0.56e-8	94.4	25.2	.2130
SD.	-	1.04	0.55e-9	2.24	1.79	.0055
90	50	22.0	0.6e-8	89.7	31.5	.2106
	50	23.1	0.6e-8	89.6	30.2	.2087
	50	21.6	0.6e-8	94.6	34.3	.2064
	50	20.9	0.6e-8	95.3	31.6	.2038
	50	21.4	0.6e-8	93.4	33.0	.2094
Average	50	21.8	0.6e-8	92.5	32.1	.2080
SD.	-	0.83	-	2.70	1.57	.0027
105	28	21.6	0.6e-8	94.2	29.8	.1942
	28	21.3	0.6e-8	93.1	26.7	.1987
	28	20.8	0.6e-8	92.5	25.8	.2063
	28	20.7	0.6e-8	92.3	23.9	.1876
	28	22.9	0.6e-8	90.0	22.4	.1938
Average	28	21.5	0.6e-8	92.4	25.7	.1960
SD.	-	0.88	-	1.54	2.83	.0069

Table C-3 Al(OH)₃:TIS:TETA = 100:100:0 mmol. reaction time 3 h, reaction temperature of 200°C. C_p = 1.7589 g/l (Figure C-1c)
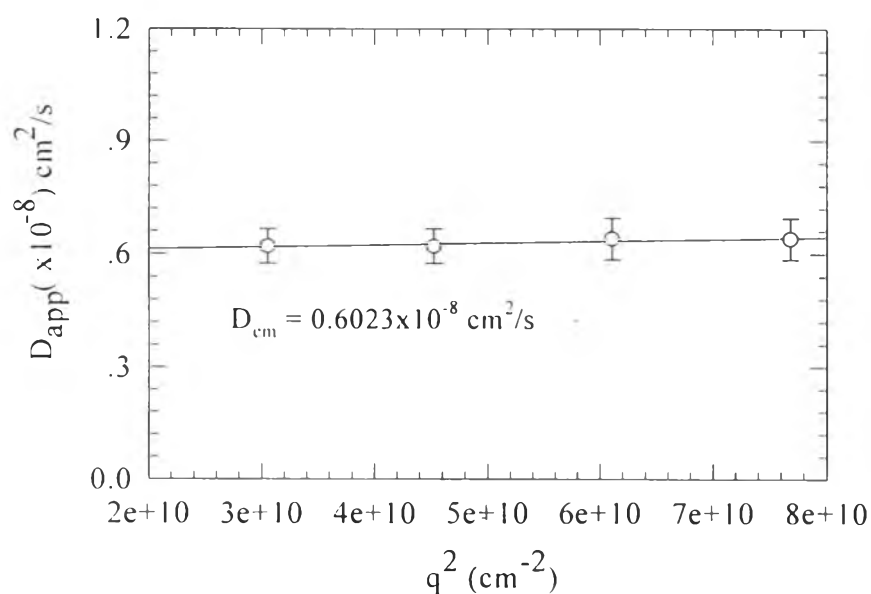
Angle (°)	Sample time (μs)	R_H (nm)	D_{app} (cm²/s)	In Range	Merit	Poly-dispersity
60	110	29.8	0.4e-8	92.7	23.6	.4259
	110	28.7	0.4e-8	95.1	28.7	.4089
	110	27.6	0.5e-8	93.8	29.4	.4306
	110	27.3	0.5e-8	93.7	26.5	.4312
	110	26.8	0.5e-8	91.6	23.7	.4074
Average	110	28.0	0.46e-8	93.4	26.4	.4210
SD.	-	1.20	0.55e-9	1.31	2.71	.0117
75	73	28.3	0.4e-8	93.6	23.4	.4189
	73	27.9	0.4e-8	97.1	28.1	.4076
	73	26.5	0.5e-8	95.8	24.7	.4135
	73	26.4	0.5e-8	93.7	29.3	.4203
	73	25.8	0.5e-8	95.5	25.8	.4164
Average	73	27.0	0.46e-8	95.1	26.3	.4150
SD.	-	1.07	0.55e-9	1.49	2.42	.0050
90	55	25.2	0.5e-8	94.2	30.2	.4113
	55	28.1	0.4e-8	92.7	37.6	.4067
	55	26.4	0.5e-8	96.9	34.1	.4098
	55	25.1	0.5e-8	93.5	29.8	.4017
	55	25.0	0.5e-8	94.2	31.9	.4038
Average	55	26.0	0.48e-8	94.3	32.7	.4070
SD.	-	1.32	0.45e-9	1.58	3.21	.0040
105	35	27.8	0.4e-8	89.7	29.2	.3987
	35	26.1	0.5e-8	89.3	32.1	.3941
	35	24.9	0.5e-8	92.6	34.6	.4011
	35	25.3	0.5e-8	94.8	30.7	.3876
	35	26.1	0.5e-8	93.5	28.7	.3957
Average	35	26.0	0.48e-8	92.0	31.1	.3950
SD.	-	1.11	0.45e-9	2.40	2.39	.0051

Table C-4 Al(OH)$_3$:TIS:TETA = 100:100:0 mmol, reaction time 3 h, reaction temperature = 200°C, C$_p$ = 2.5128 g/l (Figure C-1d)

Angle (°)	Sample time (µs)	R$_H$ (nm)	D$_{app}$ (cm^2/s)	ln Range	Merit	Poly-dispersity
60	100	29.4	0.4e-8	92.5	23.7	.4559
	100	28.4	0.4e-8	91.4	24.8	.4687
	100	29.7	0.4e-8	96.2	26.9	.4779
	100	27.6	0.4e-8	93.5	34.5	.4632
	100	28.5	0.4e-8	90.0	32.1	.4736
Average	100	28.7	0.4e-8	92.7	28.4	.4679
SD.	-	0.84	-	2.34	4.70	.0086
75	70	25.5	0.5e-8	88.7	33.5	.4630
	70	27.3	0.4e-8	87.6	36.4	.4576
	70	28.0	0.4e-8	92.7	32.1	.4498
	70	27.4	0.4e-8	96.5	32.9	.4530
	70	27.6	0.4e-8	94.2	35.0	.4500
Average	70	27.2	0.42e-8	91.9	34.0	.4547
SD.	-	0.97	0.55e-9	3.73	1.72	.0056
90	50	24.7	0.5e-8	96.3	29.4	.4438
	50	26.9	0.4e-8	98.1	27.6	.4396
	50	27.0	0.4e-8	90.8	29.1	.4376
	50	27.6	0.4e-8	91.6	30.2	.4412
	50	27.1	0.4e-8	95.4	32.7	.4307
Average	50	26.7	0.42e-8	94.4	29.8	.4386
SD.	-	1.13	0.45e-9	3.13	1.87	.0050
105	30	27.8	0.4e-8	90.5	26.4	.4274
	30	28.0	0.4e-8	89.6	29.7	.4302
	30	24.1	0.5e-8	92.5	32.0	.4265
	30	25.2	0.5e-8	93.4	34.6	.4378
	30	28.7	0.5e-8	97.1	31.5	.4259
Average	30	26.8	0.46e-8	92.6	30.8	.4296
SD.	-	1.99	0.55e-9	2.93	3.04	.0049

Figure C-1 The relation between the apparent diffusion coefficient, D_{app}, and q^2 of the product synthesized using $Al(OH)_3$:TIS:TETA = 100:100:0 mmol, the reaction time of 3 h, the reaction temperature of 200°C; (a) C_p = 0.7538 g/l, (b) C_p = 1.2564 g/l, (c) C_p = 1.7589 g/l, (d) C_p = 2.5128 g/l.
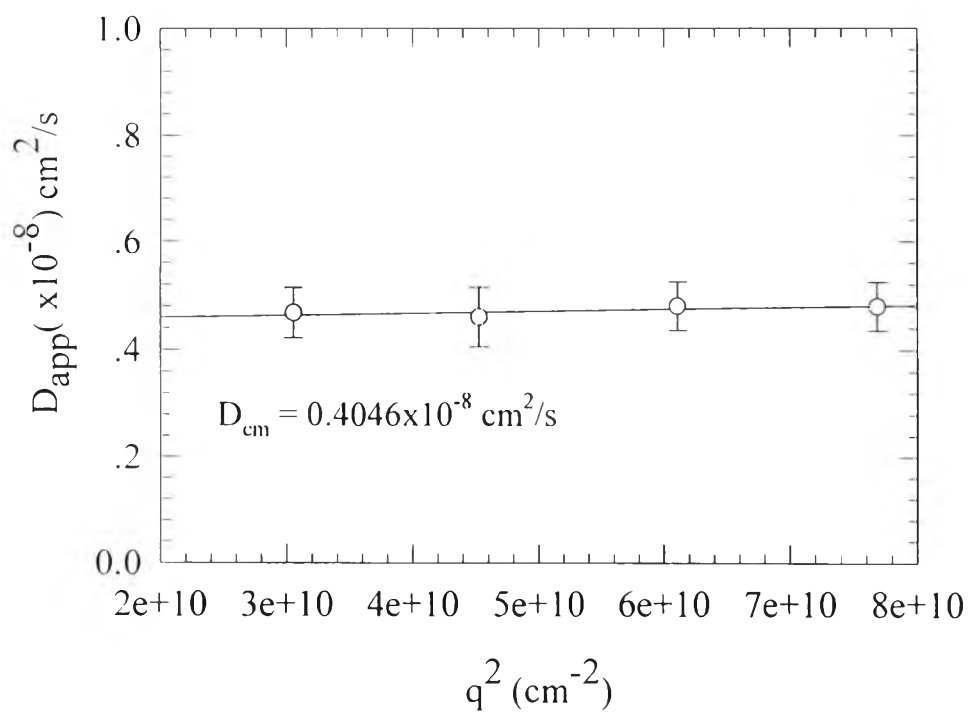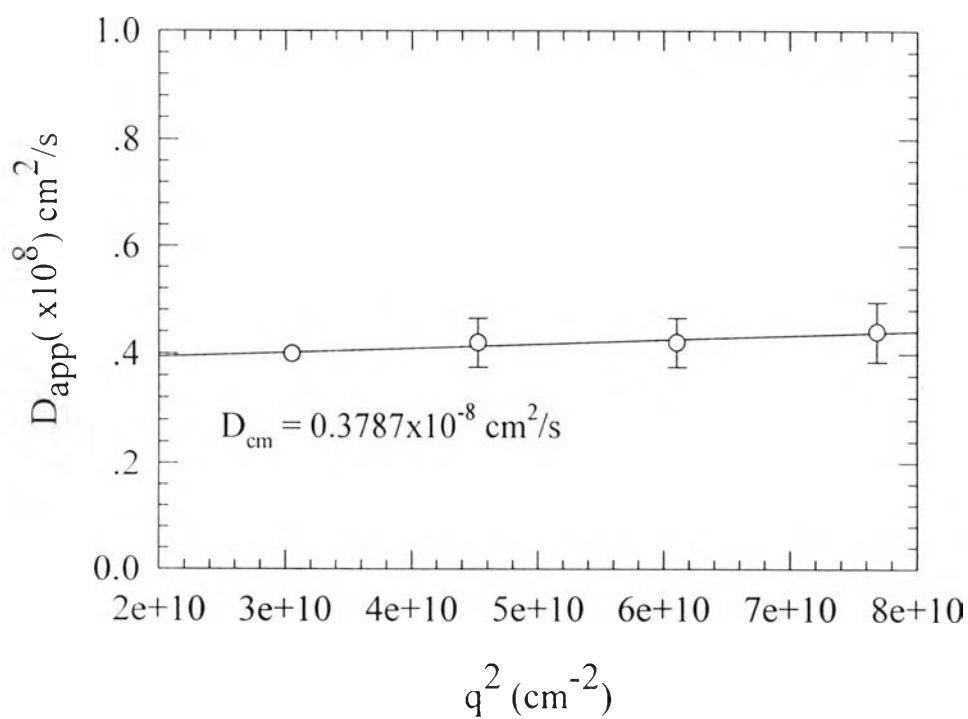
(a) C_p = 0.7538 g/l


(b) C_p = 1.2564 g/l

(c) C_p = 1.7589 g/l

D_{cm} = 0.4046x10^{-8} cm^2/s

(d) C_p = 2.5128 g/l

D_{cm} = 0.3787x10^{-8} cm^2/s
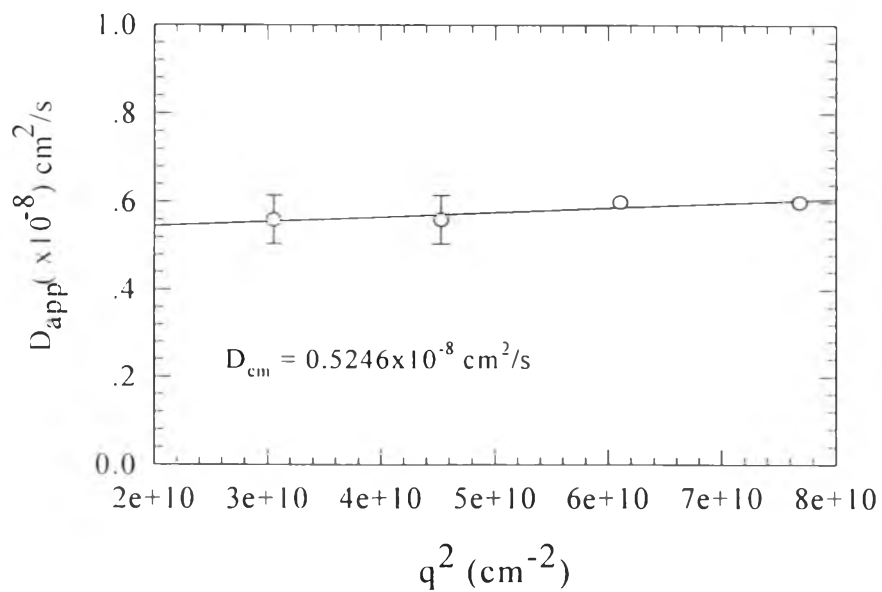
Table C-5 The center of mass diffusion coefficient (D_{cm}) as a function of polymer
concentration of the product synthesized using $Al(OH)_3$:TIS:TETA =
100:100:0 mmol. reaction time of 3 h, the reaction temperature of 200°C
(Figure C-2)

Polymer concentration, C_p (g/l)	D_{cm} (cm^2/s)
0.7538	0.60e-8
1.2564	0.52e-8
1.7589	0.40e-8
2.5128	0.38e-8

Figure C-2 The center of mass diffusion coefficient (D_{cm}) as a function of polymer
concentration of the product synthesized using $Al(OH)_3$:TIS:TETA =
100:100:0 mmol, reaction time of 3 h, the reaction temperature of 200°C

$D_o = 0.69 \times 10^{-8}$ cm^2/s
slope = -0.13
$R^2 = 0.90$
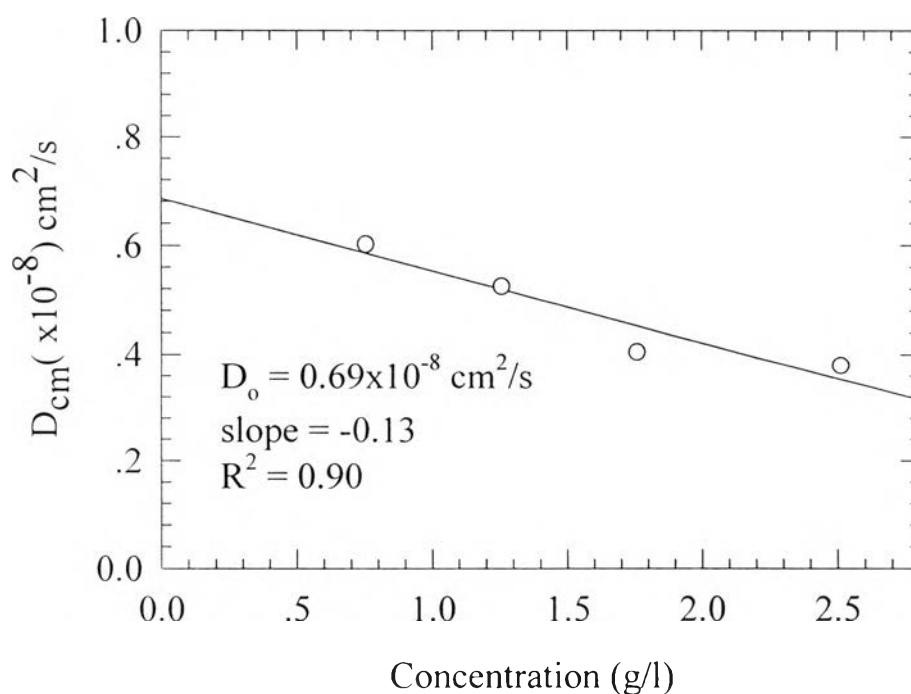
Table C-6 Al(OH)$_3$:TIS:TETA = 100:100:50 mmol, reaction time 3 h,

reaction temperature = 200°C, C$_p$ = 0.7043 g/l (Figure C-3a)

Angle (°)	Sample time (μs)	R$_H$ (nm)	D$_{app}$ (cm^2/s)	In Range	Merit	Poly-dispersity
60	100	26.8	0.5e-8	91.5	35.4	.2200
	100	25.9	0.5e-8	93.4	34.0	.1870
	100	23.8	0.6e-8	92.3	32.3	.2340
	100	24.0	0.6e-8	93.7	36.4	.2259
	100	23.5	0.6e-8	94.2	31.5	.1972
Average	100	24.8	0.56e-8	93.0	33.9	.2128
SD.	-	1.46	0.55e-9	1.10	2.05	.0199
75	72	23.1	0.6e-8	92.6	33.5	.2036
	72	24.6	0.5e-8	95.4	32.6	.1947
	72	22.5	0.6e-8	96.1	31.8	.1853
	72	23.7	0.6e-8	93.0	29.9	.2033
	72	23.6	0.6e-8	95.7	32.7	.1909
Average	72	23.5	0.58e-8	94.6	32.1	.1956
SD.	-	0.78	0.45e-9	1.63	1.37	.0079
90	45	22.4	0.6e-8	92.5	30.4	.1843
	45	22.6	0.6e-8	94.6	30.9	.1987
	45	23.0	0.6e-8	93.7	33.6	.2011
	45	21.3	0.6e-8	92.0	31.5	.1865
	45	22.9	0.6e-8	93.6	30.8	.1996
Average	45	22.4	0.6e-8	93.3	31.4	.1940
SD.	-	0.68	-	1.03	1.27	.0080
105	28	22.4	0.6e-8	90.7	29.7	.1813
	28	21.3	0.6e-8	96.7	29.6	.1856
	28	20.7	0.6e-8	95.4	25.9	.1832
	28	21.6	0.6e-8	93.5	32.0	.1947
	28	20.5	0.6e-8	91.6	31.9	.1983
Average	28	21.3	0.6e-8	93.6	29.8	.1886
SD.	-	0.76	-	2.51	2.48	.0075

Table C-7 Al(OH)₃:TIS:TETA = 100:100:50 mmol, reaction time 3 h,

reaction temperature = 200°C, C_p = 1.1738 g/l (Figure C-3b)

Angle (°)	Sample time (μs)	R_H (nm)	D_{app} (cm²/s)	In Range	Merit	Poly-dispersity
60	110	37.6	0.3e-8	93.5	29.6	.2370
	110	34.0	0.4e-8	92.3	28.9	.2020
	110	34.9	0.4e-8	90.0	27.6	.2200
	110	34.1	0.4e-8	96.1	32.0	.2186
	110	33.6	0.4e-8	91.6	34.0	.2079
Average	110	34.8	0.38e-8	92.7	30.4	.2171
SD.	-	1.61	0.45	2.28	2.56	.0134
75	75	35.2	0.3e-8	92.5	33.8	.2040
	75	30.0	0.4e-8	94.2	31.4	.1989
	75	32.7	0.4e-8	93.8	32.6	.2131
	75	30.6	0.4e-8	94.9	31.9	.2056
	75	33.9	0.4e-8	96.7	30.8	.2078
Average	75	32.5	0.38e-8	94.4	32.1	.2059
SD.	-	2.19	0.45e-9	1.54	1.16	.0052
90	50	27.0	0.5e-8	92.6	27.6	.1875
	50	28.6	0.4e-8	95.6	29.4	.1963
	50	29.4	0.4e-8	93.6	26.8	.2013
	50	28.9	0.4e-8	93.0	31.0	.1946
	50	30.3	0.4e-8	92.4	32.6	.1859
Average	50	28.8	0.42e-8	93.4	29.5	.1931
SD.	-	1.21	0.45e-9	1.29	2.39	.0064
105	30	25.5	0.5e-8	94.6	28.0	.1841
	30	27.3	0.4e-8	95.0	29.4	.1763
	30	27.4	0.4e-8	90.8	26.9	.1934
	30	28.0	0.4e-8	97.0	27.2	.1895
	30	27.5	0.4e-8	93.2	31.0	.1872
Average	30	27.1	0.42e-8	94.1	28.5	.1861
SD.	-	0.96	0.45e-9	2.30	1.70	.0064

Table C-8 Al(OH)₃:TIS:TETA = 100:100:50 mmol, reaction time 3 h,

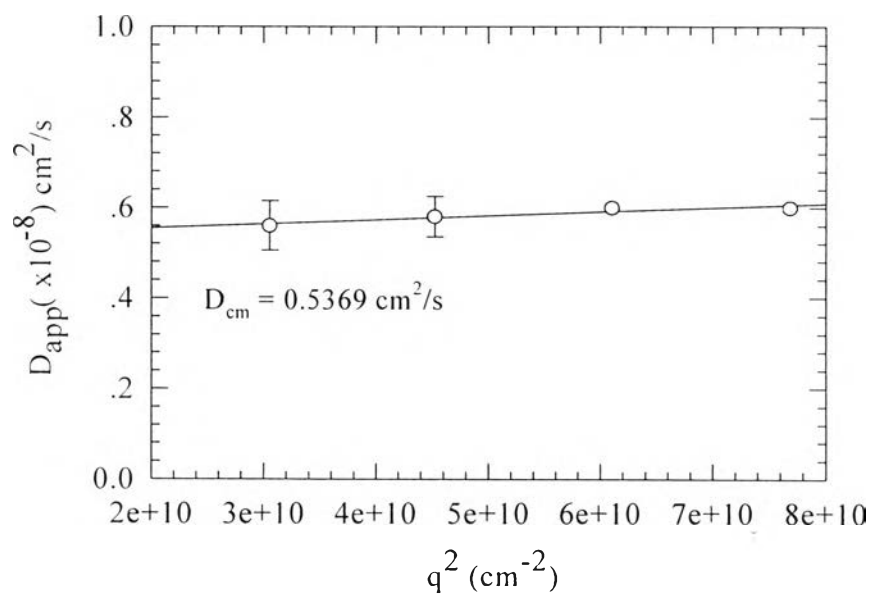reaction temperature = 200°C, C_p = 1.6433 g/l (Figure C-3c)

Angle (°)	Sample time (μs)	R_H (nm)	D_{app} (cm²/s)	In Range	Merit	Poly-dispersity
60	110	35.4	0.3e-8	93.5	26.9	.4230
	110	34.7	0.4e-8	94.1	28.8	.4240
	110	33.9	0.4e-8	92.5	32.0	.3800
	110	33.7	0.4e-8	94.7	31.4	.3975
	110	34.1	0.4e-8	93.2	33.5	.4156
Average	110	34.4	0.38e-8	93.6	30.5	.4080
SD.	-	0.69	0.45e-9	0.84	2.64	.0189
75	80	33.2	0.4e-8	93.2	30.8	.3926
	80	30.8	0.4e-8	91.0	31.4	.3875
	80	30.6	0.4e-8	93.6	31.9	.4039
	80	31.5	0.4e-8	95.4	30.0	.4057
	80	32.9	0.4e-8	94.3	35.1	.3966
Average	80	31.8	0.40e-8	93.5	31.8	.3973
SD.	-	1.91	-	1.63	1.96	.0076
90	65	26.7	0.5e-8	96.1	29.9	.3846
	65	28.4	0.4e-8	92.0	32.5	.3798
	65	28.6	0.4e-8	93.5	32.3	.3912
	65	25.4	0.5e-8	97.0	30.4	.3846
	65	26.8	0.5e-8	93.5	31.6	.3874
Average	65	27.2	0.46e-8	94.4	31.3	.3855
SD.	-	1.33	0.55e-9	2.06	1.15	.0042
105	40	25.5	0.5e-8	92.5	31.0	.3714
	40	24.1	0.5e-8	94.0	30.9	.3659
	40	23.2	0.5e-8	96.4	35.1	.3842
	40	22.6	0.5e-8	95.1	32.6	.3746
	40	23.5	0.5e-8	91.6	31.8	.3599
Average	40	23.8	0.5e-8	93.9	32.3	.3712
SD.	-	1.10	-	1.93	1.72	.0092

Table C-9 Al(OH)$_3$:TIS:TETA = 100:100:50 mmol, reaction time 3 h,

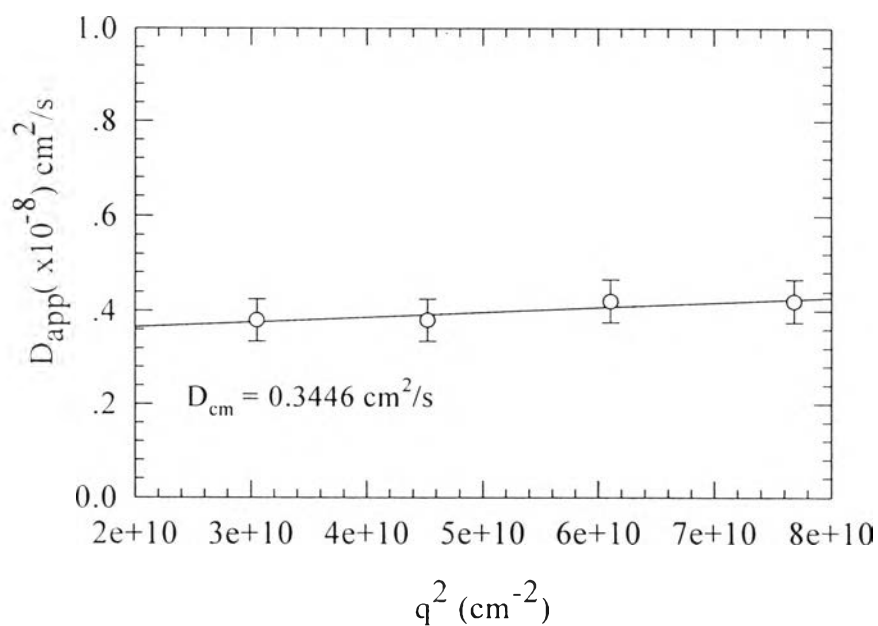reaction temperature = 200°C, C$_p$ = 2.3476 g/l (Figure C-3d)

Angle (°)	Sample time (µs)	R$_H$ (nm)	D$_{app}$ (cm^2/s)	In Range	Merit	Poly-dispersity
60	110	49.8	0.2e-8	93.2	26.8	.4360
	110	50.5	0.2e-8	91.5	29.9	.4560
	110	48.6	0.2e-8	94.2	31.0	.4350
	110	50.7	0.2e-8	94.6	31.6	.4476
	110	55.3	0.2e-8	93.0	30.5	.4544
Average	110	51.0	0.2e-8	93.3	30.0	.4458
SD.	-	2.55	-	1.21	1.87	.0099
75	70	48.8	0.2e-8	91.2	29.7	.4315
	70	45.1	0.3e-8	92.6	36.1	.4069
	70	49.8	0.2e-8	95.0	35.0	.4285
	70	50.5	0.2e-8	93.8	34.0	.4375
	70	51.0	0.2e-8	93.1	33.9	.4429
Average	70	49.0	0.22e-8	93.1	33.7	.4294
SD.	-	2.35	0.45e-9	1.41	2.43	.0138
90	55	48.9	0.2e-8	92.1	35.7	.4208
	55	48.2	0.2e-8	92.7	32.8	.4136
	55	47.3	0.2e-8	93.6	34.8	.4032
	55	44.6	0.3e-8	91.8	31.6	.4169
	55	45.2	0.3e-8	92.0	35.0	.4294
Average	55	46.8	0.24e-8	92.4	34.0	.4168
SD.	-	1.87	0.55e-9	0.73	1.71	.0096
105	30	40.6	0.3e-8	93.6	31.2	.4023
	30	42.8	0.3e-8	94.0	35.1	.4089
	30	43.9	0.3e-8	92.5	32.5	.3997
	30	42.1	0.3e-8	93.0	31.9	.3864
	30	40.4	0.3e-8	94.6	30.6	.4169
Average	30	42.0	0.3e-8	93.5	32.3	.4028
SD.	-	1.48	-	0.82	1.74	.0113

Figure C-3 The relation between the apparent diffusion coefficient, D_{app}, and q^2 of
the product synthesized using $Al(OH)_3$:TIS:TETA = 100:100:50 mmol,
the reaction time of 3 h, the reaction temperature of 200°C; (a) C_p =
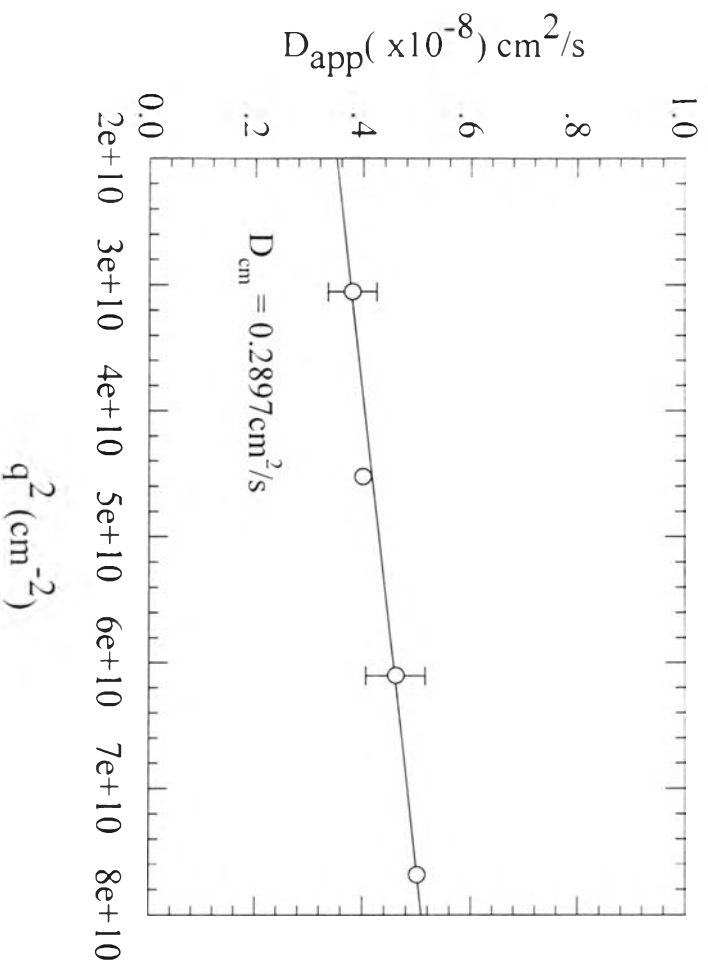0.7043 g/l, (b) C_p = 1.1738 g/l, (c) C_p = 1.6433 g/l, (d) C_p = 2.3476 g/l.
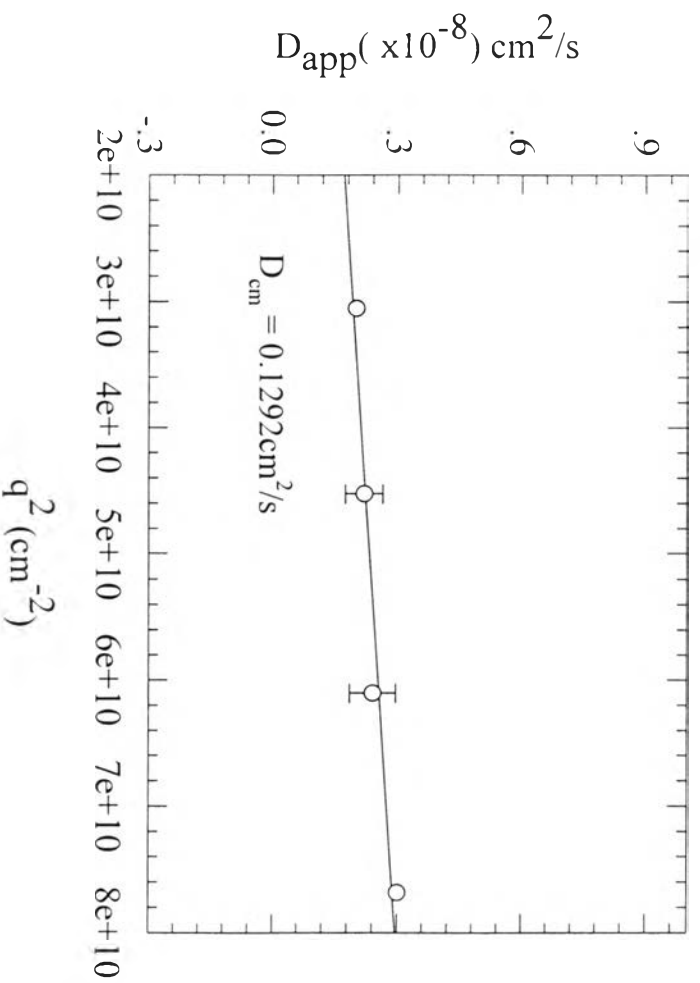
(a) Cp = 0.7043 g/l


(b) C_p = 1.1738 g/l

(c) $C_p = 1.6433$ g/l

$D_{cm} = 0.2897$ cm^2/s

$D_{app}(\times 10^{-8})$ cm^2/s

q^2 (cm^{-2})

(d) $C_p = 2.3476$ g/l

$D_{cm} = 0.1292$ cm^2/s

$D_{app}(\times 10^{-8})$ cm^2/s

q^2 (cm^{-2})

Table C-10 The center of mass diffusion coefficient (D_{cm}) as a function of polymer concentration of the product synthesized using $Al(OH)_3$:TIS:TETA = 100:100:50 mmol, reaction time 3 h, the reaction temperature of 200°C (Figure C-4)

Polymer concentration, C_p (g/l)	D_{cm} (cm^2/s)
0.7043	0.54e-8
1.1738	0.34e-8
1.6433	0.29e-8
2.3476	0.13e-8

Figure C-4 The center of mass diffusion coefficient (D_{cm}) as a function of polymer concentration of the product synthesized using $Al(OH)_3$:TIS:TETA = 100:100:50 mmol, reaction time 3 h, the reaction temperature of 200°C
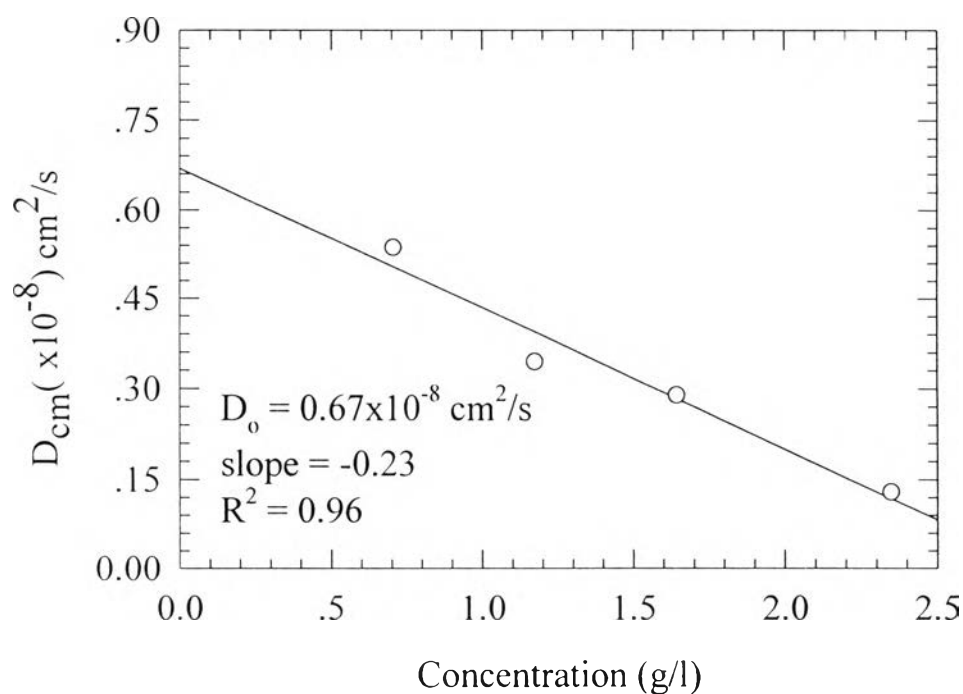
Table C-11 Al(OH)$_3$:TIS:TETA = 100:100:75 mmol, reaction time 3 h,

reaction temperature = 200°C, C$_p$ = 0.6384 g/l (Figure C-5a)

Angle (°)	Sample time (μs)	R$_H$ (nm)	D$_{app}$ (cm^2/s)	In Range	Merit	Poly-dispersity
60	120	25.0	0.5e-8	92.5	26.9	.1941
	120	26.7	0.5e-8	93.1	32.1	.1832
	120	24.0	0.6e-8	94.7	32.0	.1855
	120	23.9	0.6e-8	93.8	35.1	.1876
	120	23.8	0.6e-8	95.0	29.8	.1964
Average	120	24.7	0.56e-8	93.8	31.2	.1894
S.D.	-	1.23	0.55e-9	1.05	3.04	.0056
75	75	24.5	0.5e-8	91.5	32.1	.1798
	75	22.5	0.6e-8	90.8	32.6	.1869
	75	23.7	0.6e-8	94.6	30.1	.1756
	75	23.6	0.6e-8	93.3	28.8	.1968
	75	21.8	0.6e-8	92.7	27.6	.1846
Average	75	23.2	0.58e-8	92.6	30.2	.1847
S.D.	-	1.07	0.45e-9	1.50	2.13	.0080
90	45	20.9	0.6e-8	91.8	25.8	.1764
	45	22.5	0.6e-8	96.2	26.9	.1798
	45	21.6	0.6e-8	94.2	32.6	.1802
	45	21.5	0.6e-8	93.0	34.8	.1798
	45	19.8	0.7e-8	95.1	31.9	.1835
Average	45	21.3	0.62e-8	94.1	30.4	.1799
S.D.	-	0.99	0.45e-9	1.73	3.87	.0025
105	25	18.8	0.7e-8	95.0	25.4	.1764
	25	17.6	0.7e-8	93.0	26.9	.1658
	25	20.8	0.6e-8	94.6	25.8	.1741
	25	21.1	0.6e-8	93.8	27.7	.1732
	25	20.6	0.6e-8	93.7	28.4	.1689
Average	25	19.8	0.64e-8	94.0	26.8	.1717
S.D.	-	1.51	0.55e-9	0.79	1.26	.0043

Table C-12 Al(OH)₃:TIS:TETA = 100:100:75 mmol. reaction time 3 h. reaction temperature = 200°C, C_p = 1.064 g/l (Figure C-5b)

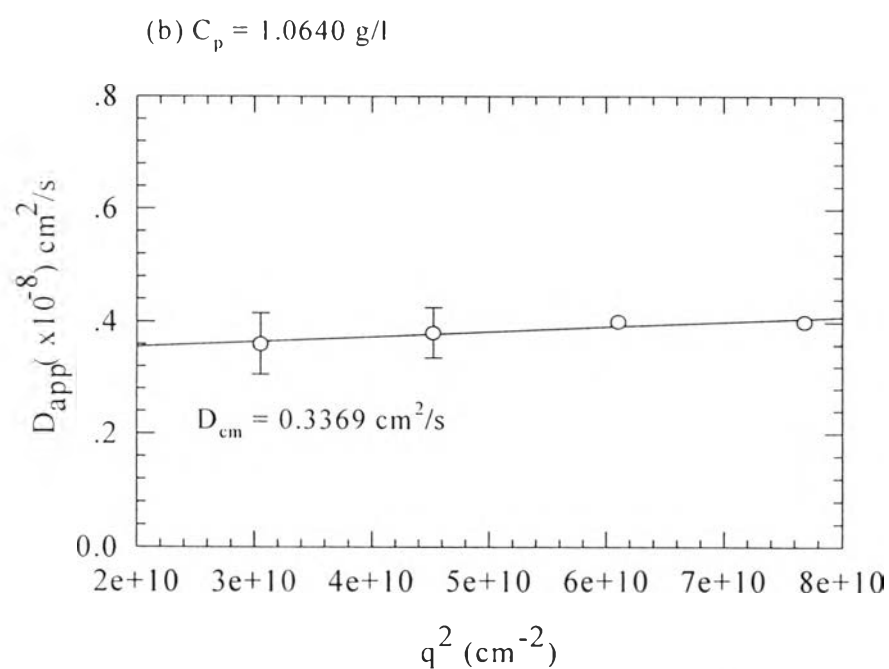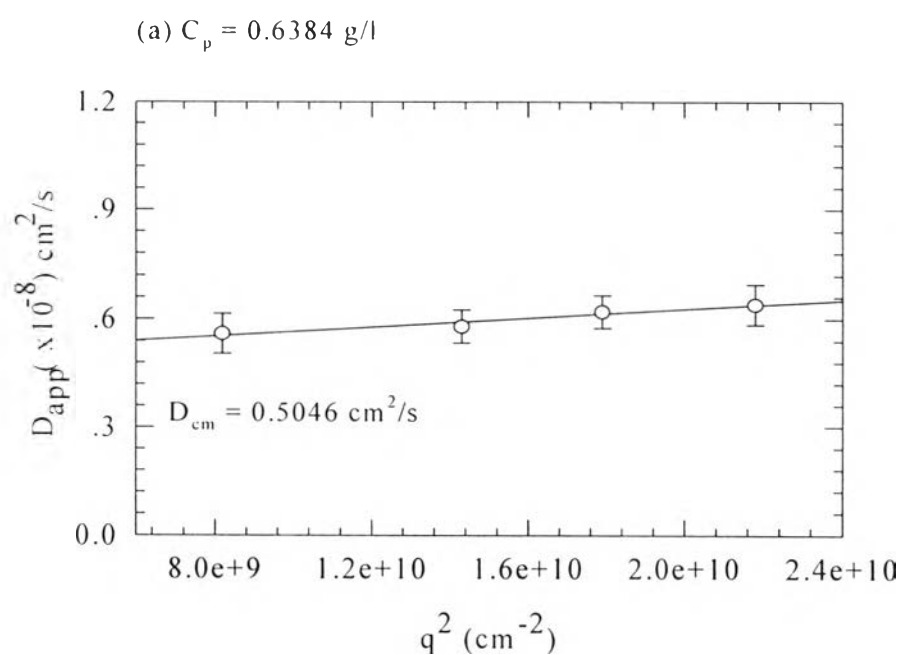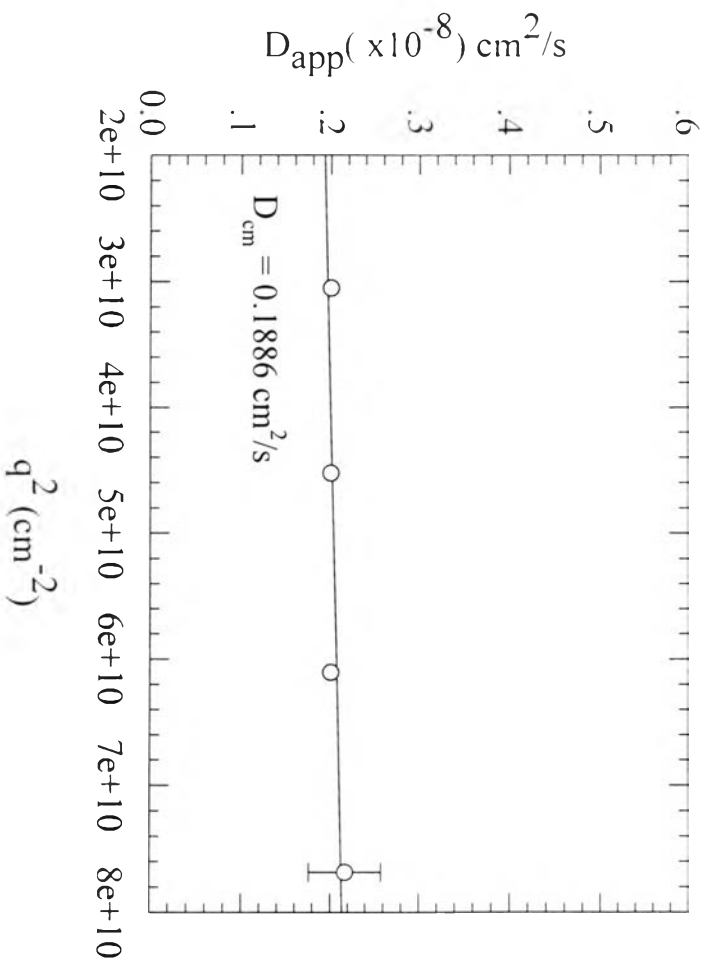| Angle (°)	Sample time (µs)	R_H (nm)	D_{app} (cm²/s)	In Range	Merit	Poly-dispersity
60	110	34.9	0.4e-8	92.5	32.0	.2197
	110	35.0	0.4e-8	94.6	31.6	.2245
	110	36.4	0.4e-8	93.2	35.1	.2266
	110	37.2	0.3e-8	90.5	33.8	.2147
	110	36.9	0.3e-8	97.3	30.5	.2269
Average	110	36.1	0.36e-8	93.6	32.6	.2225
SD.	-	1.07	0.55e-9	2.53	1.83	.0052
75	75	35.5	0.3e-8	89.7	29.6	.2149
	75	33.8	0.4e-8	88.6	29.8	.2206
	75	34.0	0.4e-8	92.4	32.5	.2075
	75	32.5	0.4e-8	92.6	34.1	.2148
	75	31.6	0.4e-8	93.0	30.9	.2230
Average	75	33.5	0.38e-8	91.3	31.4	.2162
SD.	-	1.50	0.45e-9	1.98	1.91	.0060
90	50	30.8	0.4e-8	92.6	35.4	.2014
	50	29.5	0.4e-8	94.6	32.0	.1974
	50	29.7	0.4e-8	93.8	36.1	.1899
	50	28.1	0.4e-8	93.0	30.9	.2045
	50	30.4	0.4e-8	92.8	33.4	.2133
Average	50	29.7	0.4e-8	93.4	33.6	.2013
SD.	-	1.04	-	0.83	2.20	.0087
105	40	27.4	0.4e-8	95.4	33.8	.1974
	40	28.1	0.4e-8	96.0	31.6	.1872
	40	27.0	0.4e-8	93.8	32.0	.1935
	40	29.3	0.4e-8	97.6	36.9	.1855
	40	28.9	0.4e-8	92.2	35.4	.2002
Average	40	28.1	0.4e-8	95.0	33.9	.1928
SD.	-	0.97	-	2.07	2.24	.0063

Table C-13 $Al(OH)_3$:TIS:TETA = 100:100:75 mmol, reaction time 3 h,

reaction temperature = 200°C, C_p = 1.4896 g/l (Figure C-5c)

Angle (°)	Sample time (μs)	R_H (nm)	D_{app} (cm^2/s)	In Range	Merit	Poly-dispersity
60	110	55.2	0.2e-8	95.4	33.0	.3618
	110	53.7	0.2e-8	92.0	31.6	.3469
	110	58.4	0.2e-8	96.4	32.6	.3545
	110	55.4	0.2e-8	97.0	33.9	.3578
	110	52.3	0.2e-8	93.0	30.4	.3641
Average	110	55.0	0.2e-8	94.8	32.3	.3570
SD.	-	2.28	-	2.17	1.35	.0068
75	70	50.9	0.2e-8	93.2	30.5	.3451
	70	51.4	0.2e-8	95.6	29.7	.3398
	70	57.2	0.2e-8	96.1	32.1	.3478
	70	53.6	0.2e-8	91.4	30.6	.3514
	70	50.5	0.2e-8	93.8	32.8	.3467
Average	70	52.7	0.2e-8	94.0	31.1	.3462
SD.	-	2.78	-	1.90	1.27	.0042
90	55	51.4	0.2e-8	91.5	28.8	.3385
	55	52.6	0.2e-8	94.8	29.6	.3264
	55	53.8	0.2e-8	92.7	31.4	.3297
	55	52.9	0.2e-8	93.0	32.6	.3456
	55	50.5	0.2e-8	90.6	33.0	.3375
Average	55	52.2	0.2e-8	92.5	31.1	.3355
SD.	-	1.30	-	1.60	1.84	.0076
105	30	49.8	0.2e-8	98.0	29.7	.3214
	30	45.0	0.3e-8	93.0	31.6	.3068
	30	50.0	0.2e-8	91.6	30.5	.3164
	30	51.3	0.2e-8	93.5	29.8	.3205
	30	52.0	0.2e-8	93.7	32.1	.3154
Average	30	49.6	0.22e-8	94.0	30.7	.3161
SD.	-	2.74	0.45e-9	2.40	1.07	.0058

Table C-14 Al(OH)$_3$:TIS:TETA = 100:100:75 mmol, reaction time 3 h,

reaction temperature = 200°C, C$_p$ = 2.128 g/l (Figure C-5d)

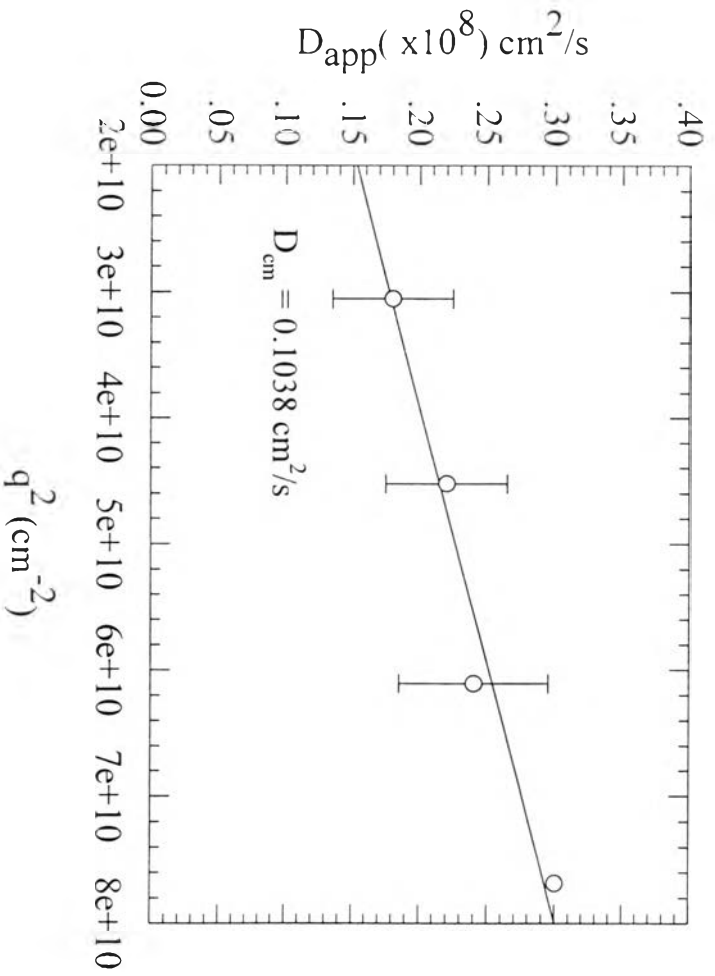| Angle (°)	Sample time (µs)	R$_H$ (nm)	D$_{app}$ (cm^2/s)	In Range	Merit	Poly-dispersity
60	110	70.3	0.1e-8	94.7	32.2	.3703
	110	60.8	0.2e-8	91.6	30.5	.3645
	110	59.7	0.2e-8	93.8	28.7	.3750
	110	60.5	0.2e-8	92.0	32.1	.3612
	110	57.6	0.2e-8	95.1	30.6	.3741
Average	110	61.8	0.18e-8	93.4	30.8	.3690
SD.	-	4.92	0.45e-9	1.58	1.43	.0060
75	65	56.4	0.2e-8	91.4	28.9	.3618
	65	44.5	0.3e-8	97.0	29.3	.3541
	65	50.8	0.2e-8	92.0	32.4	.3567
	65	52.6	0.2e-8	93.8	30.9	.3602
	65	53.0	0.2e-8	90.9	32.7	.3419
Average	65	51.5	0.22e-8	93.0	30.8	.3549
SD.	-	4.39	0.45e-9	2.48	1.73	.0079
90	40	53.8	0.2e-8	92.5	29.6	.3610
	40	51.7	0.2e-8	95.8	32.1	.3552
	40	53.1	0.2e-8	90.6	31.0	.3448
	40	48.9	0.3e-8	92.2	31.6	.3505
	40	47.7	0.3e-8	93.1	35.0	.3410
Average	40	51.0	0.24e-8	92.8	31.9	.3505
SD.	-	2.65	0.55e-9	1.90	1.99	.0080
105	20	45.3	0.3e-8	91.7	33.7	.3410
	20	41.5	0.3e-8	94.6	31.6	.3428
	20	43.6	0.3e-8	96.8	34.9	.3309
	20	45.0	0.3e-8	92.0	30.8	.3358
	20	43.1	0.3e-8	93.3	33.6	.3467
Average	20	43.7	0.3e-8	93.7	32.9	.3394
SD.	-	1.54	-	2.09	1.68	.0062

Figure C-5 The relation between the apparent diffusion coefficient, D_{app}, and q^2 of the product synthesized using $Al(OH)_3$:TIS:TETA = 100:100:75 mmol, the reaction time of 3 h, the reaction temperature of 200°C; (a) C_p = 0.6384 g/l, (b) C_p = 1.0640 g/l, (c) C_p = 1.4896 g/l, (d) C_p = 2.1280 g/l.

(a) C_p = 0.6384 g/l

(b) C_p = 1.0640 g/l

(c) $C_p = 1.4896$ g/l

$D_{cm} = 0.1886$ cm^2/s

$D_{app}(\times 10^{-8})$ cm^2/s

q^2 (cm^{-2})

(d) $C_p = 2.1280$ g/l

$D_{cm} = 0.1038$ cm^2/s

$D_{app}(\times 10^8)$ cm^2/s

q^2 (cm^{-2})

Table C-15 The center of mass diffusion coefficient (D_{cm}) as a function of polymer concentration of the product synthesized using $Al(OH)_3$:TIS:TETA = 100:100:75 mmol, reaction time 3 h, the reaction temperature of 200°C (Figure C-6)

Polymer concentration, C_p (g/l)	D_{cm} (cm^2/s)
0.6384	0.50e-8
1.0640	0.34e-8
1.4896	0.19e-8
2.1280	0.10e-8

Figure C-6 The center of mass diffusion coefficient (D_{cm}) as a function of polymer concentration of the product synthesized using $Al(OH)_3$:TIS:TETA = 100:100:75 mmol, reaction time 3 h, the reaction temperature of 200°C
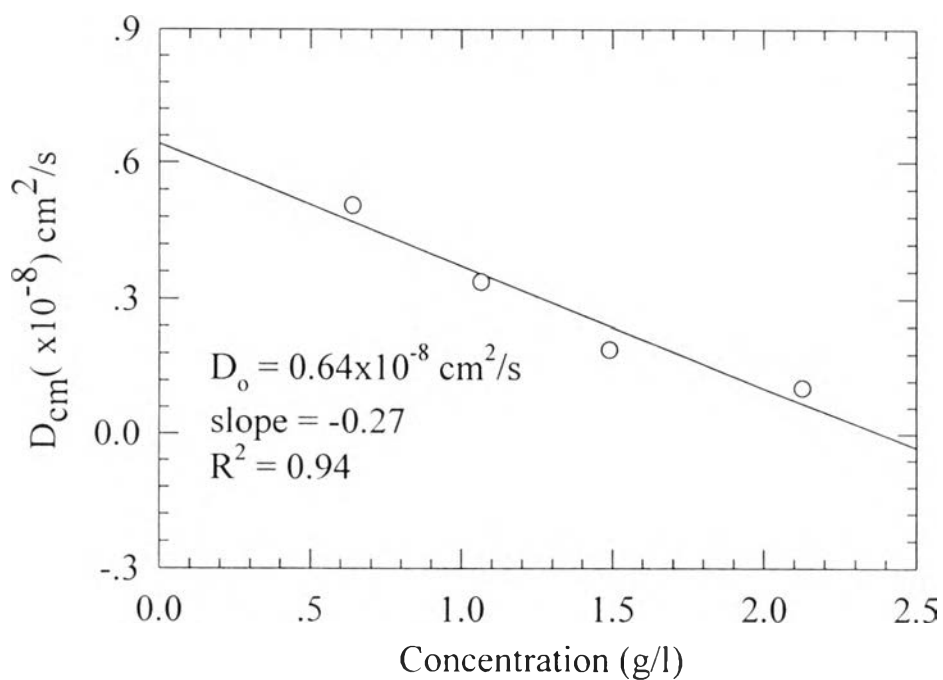
Table C-16 Al(OH)$_3$:TIS:TETA = 100:100:100 mmol, reaction time 3 h,

reaction temperature = 200°C, C$_p$ = 0.7572 g/l (Figure C-7a)

Angle (°)	Sample time (μs)	R$_H$ (nm)	D$_{app}$ (cm^2/s)	In Range	Merit	Poly-dispersity
60	98	23.7	0.6e-8	94.0	24.9	.1897
	98	25.9	0.5e-8	93.7	26.8	.1962
	98	26.4	0.5e-8	92.0	28.7	.1913
	98	29.1	0.5e-8	96.1	29.3	.1924
	98	28.1	0.5e-8	94.8	30.0	.1947
Average	98	26.6	0.52e-8	94.1	27.9	.1929
SD.	-	2.09	0.45e-9	1.51	2.07	.0026
75	72	23.3	0.6e-8	93.5	31.9	.1874
	72	24.9	0.5e-8	97.1	32.5	.1946
	72	26.5	0.5e-8	92.6	32.9	.1876
	72	27.0	0.5e-8	94.8	30.0	.1862
	72	26.0	0.5e-8	93.1	34.1	.1879
Average	72	25.5	0.52e-8	94.2	32.1	.1887
SD.	-	1.47	0.45e-9	1.80	1.69	.0033
90	45	22.5	0.6e-8	92.0	29.8	.1812
	45	25.1	0.5e-8	93.6	27.9	.1796
	45	24.3	0.5e-8	91.9	34.0	.1864
	45	20.5	0.6e-8	94.6	31.9	.1778
	45	21.8	0.6e-8	93.3	30.5	.1894
Average	45	22.8	0.56e-8	93.1	30.8	.1829
SD.	-	1.86	0.55e-9	1.14	2.29	.0049
105	25	20.9	0.6e-8	94.6	32.4	.1768
	25	21.5	0.6e-8	91.0	31.6	.1842
	25	20.6	0.6e-8	92.8	33.5	.1763
	25	22.2	0.5e-8	93.7	30.8	.1874
	25	21.3	0.5e-8	91.6	31.9	.1789
Average	25	21.3	0.56e-8	92.7	32.0	.1807
SD.	-	0.61	0.55e-9	1.48	1.00	.0049

Table C-17 Al(OH)$_3$:TIS:TETA = 100:100:100 mmol, reaction time 3 h.

reaction temperature = 200°C, C$_p$ = 1.262 g/l (Figure C-7b)

Angle (°)	Sample time (μs)	R$_H$ (nm)	D$_{app}$ (cm^2/s)	In Range	Merit	Poly-dispersity
60	100	28.5	0.4e-8	95.1	26.4	.2204
	100	29.1	0.4e-8	94.6	28.7	.2169
	100	26.4	0.5e-8	94.8	29.4	.2218
	100	25.6	0.5e-8	93.0	30.1	.2016
	100	26.6	0.5e-8	93.5	34.6	.2147
Average	100	27.2	0.46e-8	94.2	29.8	.2151
SD.	-	1.49	0.55e-9	0.90	3.00	.0080
75	69	25.1	0.5e-8	91.6	29.8	.2047
	69	26.2	0.5e-8	93.7	33.5	.2069
	69	25.8	0.5e-8	94.6	31.9	.2110
	69	26.1	0.5e-8	93.0	31.0	.1987
	69	27.2	0.4e-8	92.9	35.6	.1963
Average	69	26.1	0.48e-8	93.2	32.4	.2035
SD.	-	0.76	0.45e-9	1.11	2.26	.0060
90	50	26.8	0.5e-8	95.8	29.4	.1952
	50	25.3	0.5e-8	91.8	34.6	.1861
	50	25.5	0.5e-8	90.3	31.9	.1939
	50	23.1	0.6e-8	96.4	32.7	.1988
	50	22.0	0.6e-8	94.1	33.6	.1878
Average	50	24.5	0.54e-8	93.7	32.4	.1924
SD.	-	1.94	0.55e-9	2.60	1.98	.0053
105	33	23.9	0.6e-8	89.7	29.3	.1844
	33	20.8	0.6e-8	94.2	32.3	.1769
	33	21.7	0.6e-8	93.8	31.6	.1856
	33	23.4	0.6e-8	96.1	35.7	.1911
	33	22.4	0.6e-8	94.7	30.9	.1789
Average	33	22.4	0.6e-8	93.7	32.0	.1833
SD.	-	1.25	-	2.40	2.37	.0056

Table C-18 Al(OH)₃:TIS:TETA = 100:100:100 mmol, reaction time 3 h, reaction temperature = 200°C, C_p = 1.7668 g/l (Figure C-7c)
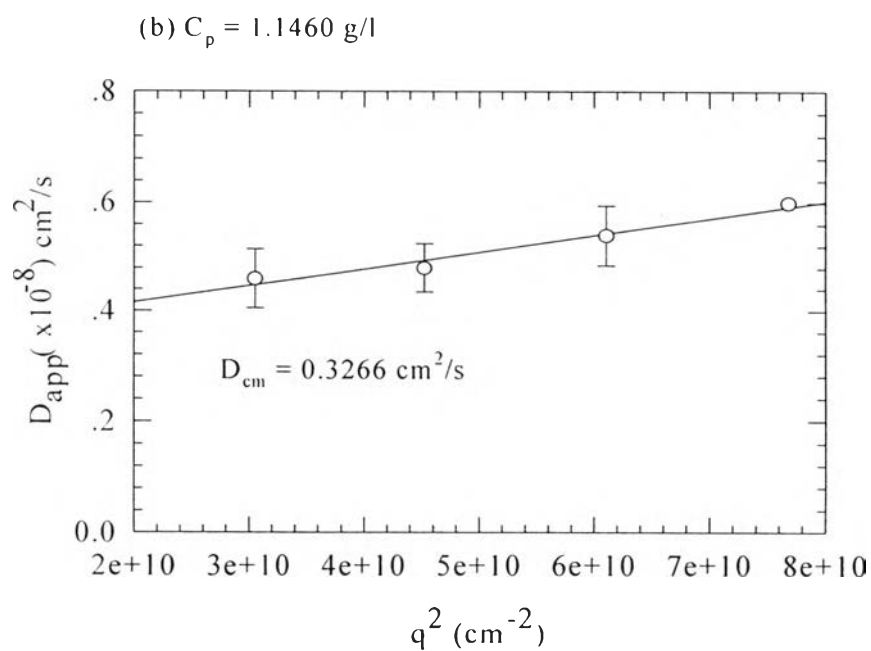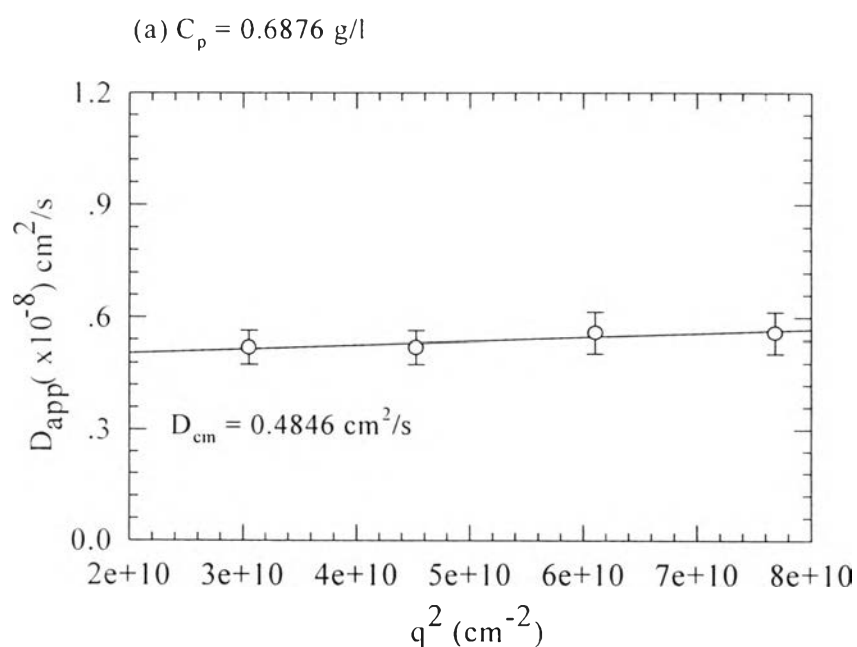
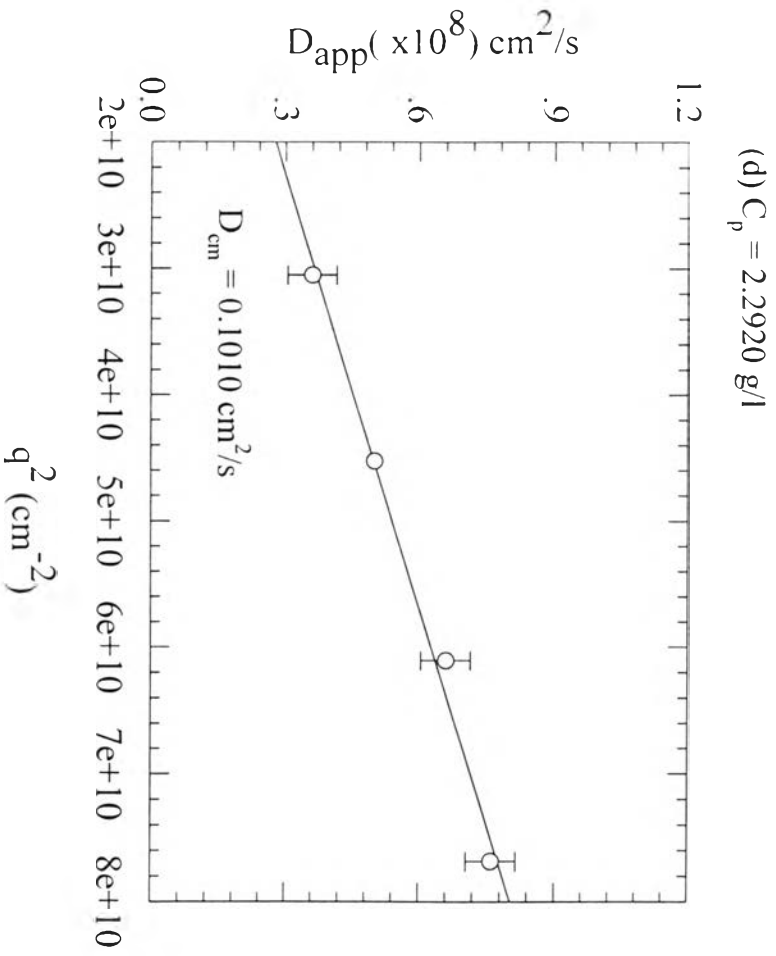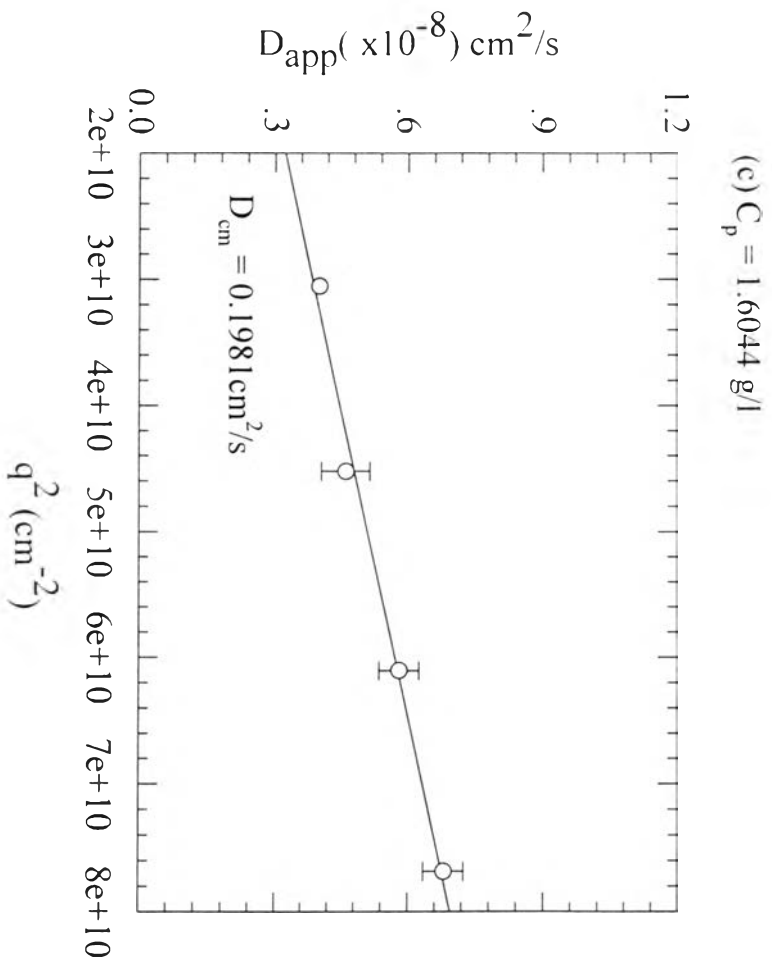| Angle (°)	Sample time (µs)	R_H (nm)	D_{app} (cm²/s)	In Range	Merit	Poly-dispersity
60	110	28.8	0.4e-8	95.4	29.7	.2831
	110	27.5	0.4e-8	91.5	32.0	.2743
	110	27.1	0.4e-8	93.7	31.6	.2784
	110	29.6	0.4e-8	92.0	32.3	.2844
	110	28.0	0.4e-8	93.1	35.9	.2721
Average	110	28.2	0.4e-8	93.1	32.3	.2785
SD.	-	1.01	-	1.53	2.25	.0054
75	75	27.5	0.4e-8	94.0	29.7	.2665
	75	29.4	0.4e-8	95.4	32.1	.2578
	75	26.3	0.5e-8	96.1	30.6	.2784
	75	25.5	0.5e-8	94.9	33.4	.2669
	75	26.2	0.5e-8	97.0	31.5	.2687
Average	75	27.0	0.46e-8	95.5	31.5	.2677
SD.	-	1.53	0.55e-9	1.14	1.41	.0073
90	55	22.6	0.6e-8	92.8	30.9	.2588
	55	23.9	0.6e-8	93.1	33.0	.2671
	55	23.0	0.6e-8	94.6	32.8	.2543
	55	20.9	0.6e-8	93.3	37.6	.2687
	55	26.1	0.5e-8	96.5	35.4	.2615
Average	55	23.3	0.58e-8	94.1	33.9	.2621
SD.	-	1.91	0.45e-9	1.53	2.60	.0059
105	30	23.4	0.6e-8	92.0	33.9	.2587
	30	18.9	0.7e-8	93.0	31.0	.2569
	30	19.9	0.7e-8	94.1	33.8	.2641
	30	18.0	0.7e-8	93.9	31.6	.2533
	30	17.8	0.7e-8	95.4	32.9	.2654
Average	30	19.6	0.68e-8	93.7	32.6	.2597
SD.	-	2.28	0.45e-9	1.27	1.30	.0050

Table C-19 Al(OH)$_3$:TIS:TETA = 100:100:100 mmol, reaction time 3 h,
reaction temperature = 200°C, C$_p$ = 2.128 g/l (Figure C-7d)

Angle (°)	Sample time (μs)	R$_H$ (nm)	D$_{app}$ (cm^2/s)	In Range	Merit	Poly-Dispersity
60	120	33.5	0.4e-8	94.5	28.7	.3599
	120	33.6	0.4e-8	93.0	32.5	.3748
	120	30.8	0.4e-8	92.6	31.6	.3708
	120	37.0	0.3e-8	94.8	33.6	.3698
	120	36.5	0.3e-8	96.3	30.9	.3614
Average	120	34.3	0.36e-8	94.2	31.5	.3673
SD.	-	2.53	0.55e-9	1.49	1.84	.0064
75	75	26.1	0.5e-8	92.0	34.7	.3505
	75	25.4	0.5e-8	93.9	30.9	.3412
	75	26.7	0.5e-8	94.0	31.8	.3566
	75	26.0	0.5e-8	91.6	33.7	.3469
	75	25.3	0.5e-8	91.5	30.5	.3489
Average	75	25.9	0.5e-8	92.6	32.3	.3488
SD.	-	0.57	-	1.25	1.81	.0056
90	53	19.9	0.7e-8	90.9	32.7	.3341
	53	18.7	0.7e-8	94.1	33.8	.3269
	53	20.6	0.7e-8	89.9	30.0	.3354
	53	22.3	0.6e-8	87.6	29.9	.3256
	53	21.1	0.6e-8	94.2	28.7	.3384
Average	53	20.5	0.66e-8	91.3	31.0	.3321
SD.	-	1.34	0.55e-9	2.83	2.13	.0056
105	35	16.9	0.8e-8	91.9	26.4	.3217
	35	15.2	0.8e-8	94.8	31.2	.3198
	35	16.3	0.8e-8	93.0	30.7	.3309
	35	18.9	0.7e-8	95.5	32.3	.3132
	35	17.8	0.7e-8	92.7	31.4	.3264
Average	35	17.0	0.76e-8	93.6	30.4	.3224
SD.	-	1.41	0.55e-9	1.51	2.31	.0067

Figure C-7 The relation between the apparent diffusion coefficient, D_{app}, and q^2 of the product synthesized using $Al(OH)_3$:TIS:TETA = 100:100:100 mmol, the reaction time of 3 h, the reaction temperature of 200°C; (a) C_p = 0.6876 g/l, (b) C_p = 1.1460 g/l, (c) C_p = 1.6044 g/l, (d) C_p = 2.2920 g/l.

(a) C_p = 0.6876 g/l

(b) C_p = 1.1460 g/l

(c) $C_p = 1.6044$ g/l

$D_{cm} = 0.1981 cm^2/s$

$D_{app}(\times 10^{-8})$ cm^2/s

q^2 (cm^{-2})

(d) $C_p = 2.2920$ g/l

$D_{cm} = 0.1010$ cm^2/s

$D_{app}(\times 10^8)$ cm^2/s

q^2 (cm^{-2})

Table C-20 The center of mass diffusion coefficient (D_{cm}) as a function of polymer
concentration of the product synthesized using $Al(OH)_3$:TIS:TETA =
100:100:100 mmol, reaction time 3 h, the reaction temperature of 200°C
(Figure C-8)

Polymer concentration, C_p (g/l)	D_{cm} (cm^2/s)
0.6876	0.40e-8
1.1460	0.29e-8
1.6044	0.23e-8
2.2920	0.10e-8

Figure C-8 The center of mass diffusion coefficient (D_{cm}) as a function of polymer
concentration of the product synthesized using $Al(OH)_3$:TIS:TETA =
100:100:100 mmol, reaction time 3 h, the reaction temperature of 200°C
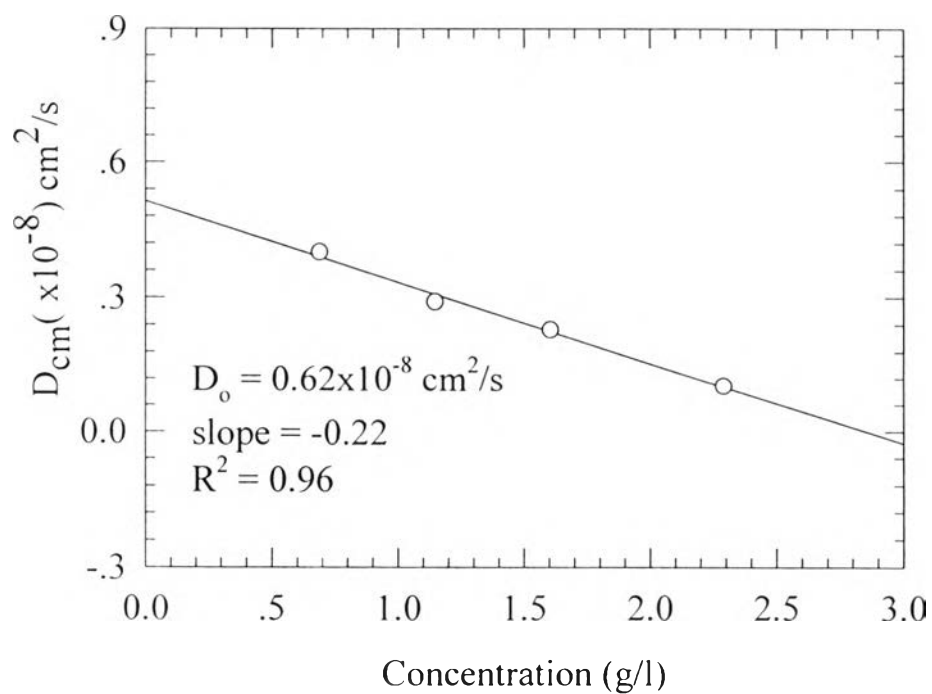
Table C-21 Al(OH)$_3$:TIS:TETA = 100:100:125 mmol, reaction time 3 h,

reaction temperature = 200°C, C$_p$ = 0.7572 g/l (Figure C-9a)

Angle (°)	Sample time (μs)	R$_H$ (nm)	D$_{app}$ (cm^2/s)	In Range	Merit	Poly-dispersity
60	92	26.1	0.5e-8	92.1	31.3	.1945
	92	25.5	0.5e-8	90.8	34.2	.2006
	92	24.9	0.5e-8	94.3	32.5	.2010
	92	25.6	0.5e-8	87.6	30.8	.2074
	92	26.1	0.5e-8	91.0	32.3	.1987
Average	92	25.6	0.5e-8	91.2	32.2	.2004
SD.	-	0.50	-	2.43	1.31	.0047
75	68	24.8	0.5e-8	92.2	30.9	.1984
	68	23.0	0.6e-8	95.1	31.6	.1874
	68	25.0	0.5e-8	91.3	31.7	.1963
	68	24.1	0.5e-8	90.4	32.8	.1952
	68	24.4	0.5e-8	95.6	30.3	.1831
Average	68	24.3	0.52e-8	92.9	31.5	.1921
SD.	-	0.79	0.45e-9	2.31	0.94	.0065
90	61	25.0	0.5e-8	92.6	31.7	.1843
	61	21.4	0.6e-8	93.7	30.6	.1763
	61	23.6	0.6e-8	96.8	32.3	.1852
	61	22.9	0.6e-8	90.1	34.0	.1897
	61	21.8	0.6e-8	90.8	31.3	.1799
Average	61	22.9	0.58e-8	92.8	32.0	.1831
SD.	-	1.44	0.45e-9	2.65	1.29	.0051
105	45	21.5	0.6e-8	87.7	33.6	.1712
	45	22.0	0.6e-8	90.5	32.1	.1668
	45	21.6	0.6e-8	91.1	33.2	.1792
	45	20.7	0.6e-8	88.9	30.9	.1745
	45	21.0	0.6e-8	93.7	31.5	.1763
Average	45	21.4	0.6e-8	90.4	32.3	.1831
SD.	-	0.51	-	2.29	1.13	.0051

Table C-22 Al(OH)$_3$:TIS:TETA = 100:100:125 mmol, reaction time 3 h,

reaction temperature = 200°C, C_p = 1.2620 g/l (Figure C-9b)

Angle (°)	Sample time (μs)	R_H (nm)	D_{app} (cm^2/s)	In Range	Merit	Poly-dispersity
60	100	30.2	0.4e-8	89.7	35.3	.2226
	100	30.7	0.4e-8	90.6	32.4	.2187
	100	36.0	0.3e-8	94.1	32.8	.1989
	100	32.7	0.4e-8	91.2	34.6	.2017
	100	30.9	0.4e-8	87.8	32.5	.2136
Average	100	32.1	0.38e-8	90.7	33.5	.2111
SD.	-	2.38	0.45e-9	2.30	1.34	.0104
75	86	29.8	0.4e-8	91.9	33.1	.2016
	86	28.5	0.4e-8	89.3	33.8	.1987
	86	30.1	0.4e-8	92.7	34.6	.1968
	86	31.6	0.4e-8	93.0	32.5	.2045
	86	33.0	0.4e-8	91.6	31.7	.2100
Average	86	30.6	0.4e-8	91.7	33.1	.2023
SD.	-	1.74	-	1.46	1.23	.0052
90	72	26.5	0.4e-8	94.5	30.1	.1925
	72	27.0	0.4e-8	93.6	34.0	.1963
	72	25.5	0.5e-8	90.9	32.1	.1845
	72	29.1	0.4e-8	92.8	32.6	.2003
	72	26.1	0.5e-8	90.7	33.0	.1933
Average	72	26.8	0.44e-8	92.5	32.4	.1934
SD.	-	1.38	0.55e-9	1.67	1.44	.0058
105	60	26.9	0.5e-8	91.3	33.0	.1847
	60	26.1	0.5e-8	95.6	33.2	.1756
	60	25.5	0.5e-8	90.7	34.0	.1921
	60	26.3	0.5e-8	88.3	35.5	.1863
	60	24.9	0.5e-8	89.9	32.3	.1825
Average	60	25.9	0.5e-8	91.2	33.6	.1842
SD.	-	0.77	-	2.73	1.22	.0060

Table C-23 Al(OH)$_3$:TIS:TETA = 100:100:125 mmol, reaction time 3 h,

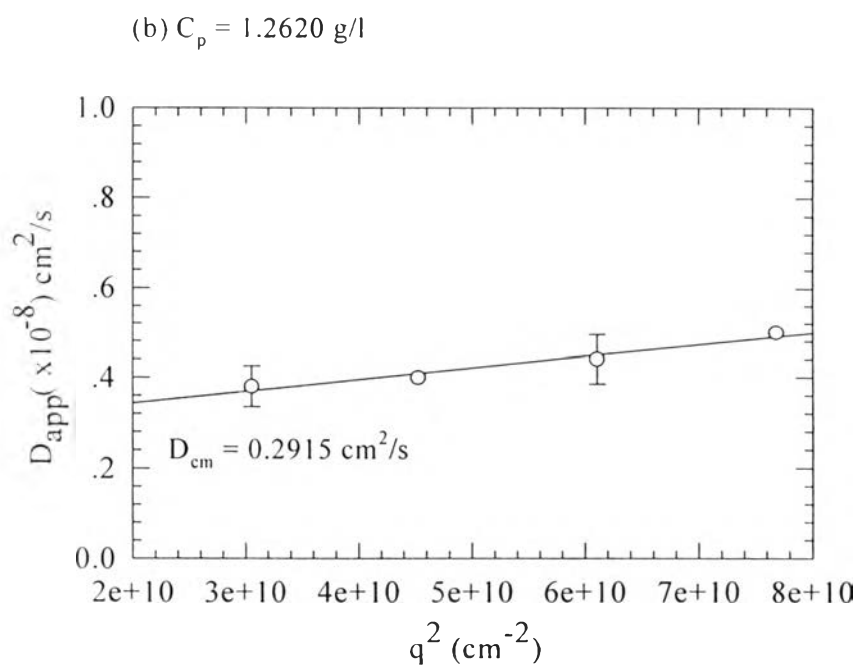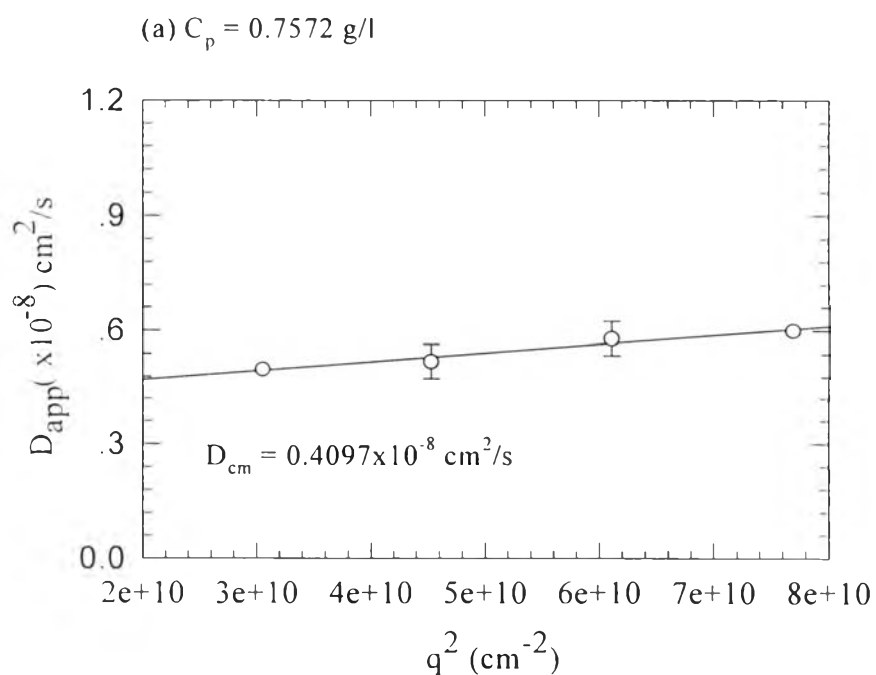reaction temperature = 200°C, C$_p$ = 1.7668 g/l (Figure C-9c)

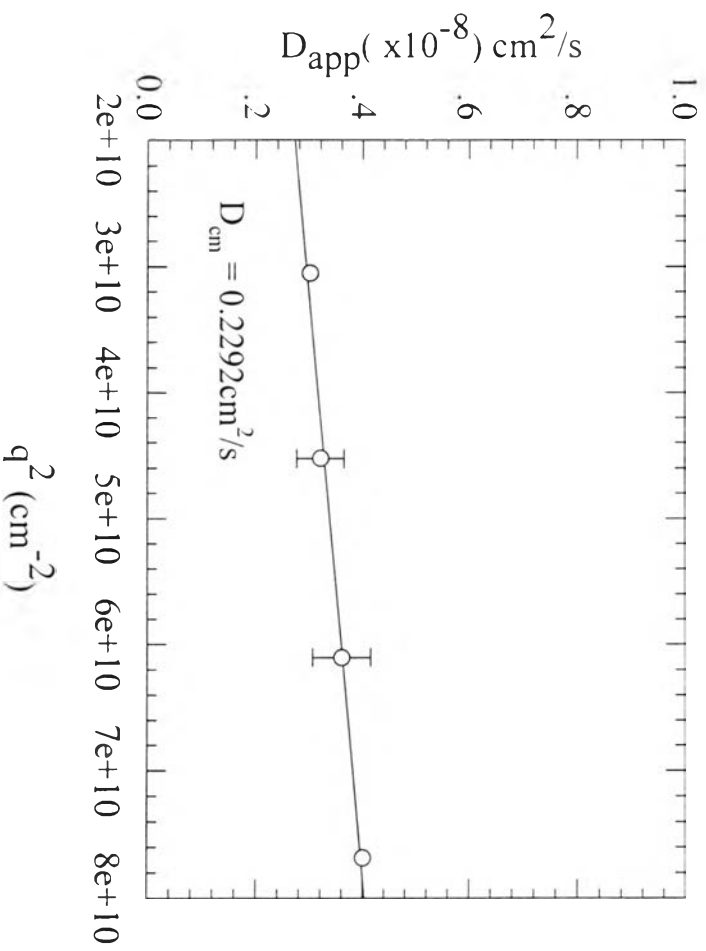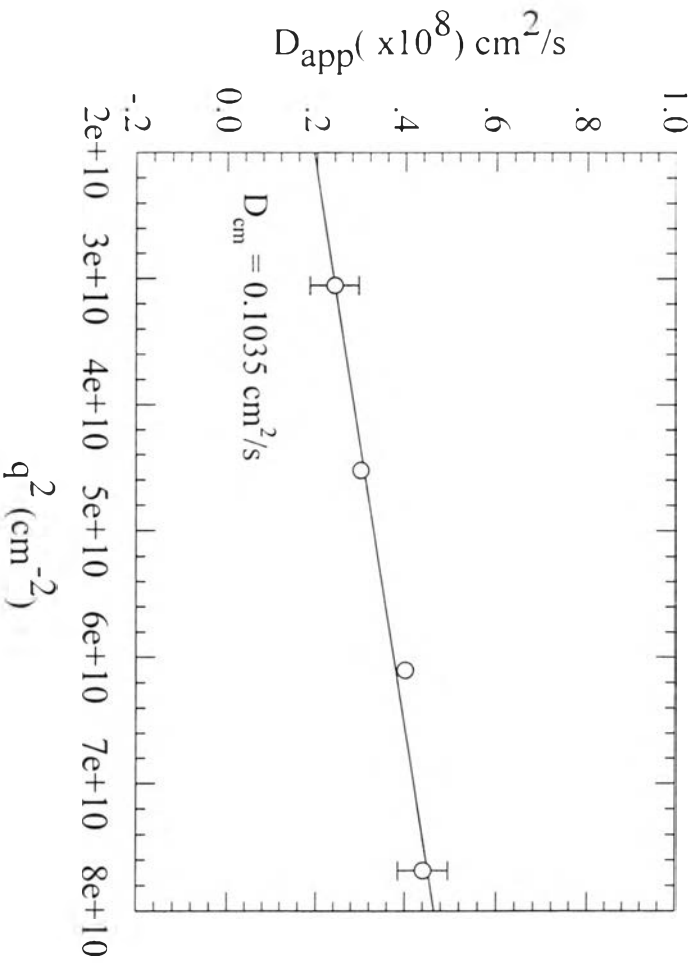| Angle (°)	Sample time (μs)	R$_H$ (nm)	D$_{app}$ (cm^2/s)	In Range	Merit	Poly-dispersity
60	110	36.7	0.3e-8	91.5	31.7	.2642
	110	39.5	0.3e-8	90.7	31.5	.2588
	110	40.2	0.3e-8	88.4	32.7	.2717
	110	41.6	0.3e-8	93.5	34.2	.2649
	110	42.5	0.3e-8	94.7	34.0	.2657
Average	110	40.1	0.3e-8	91.8	32.8	.2651
SD.	-	2.23	-	2.46	1.26	.0046
75	95	36.1	0.3e-8	89.6	33.7	.2533
	95	34.6	0.4e-8	92.1	32.5	.2456
	95	37.5	0.3e-8	95.3	30.9	.2378
	95	36.9	0.3e-8	94.7	30.3	.2571
	95	40.0	0.3e-8	90.9	33.3	.2436
Average	95	34.0	0.32e-8	92.5	32.1	.2475
SD.	-	1.99	0.45e-9	2.44	1.49	.0077
90	71	29.7	0.4e-8	87.8	33.7	.2412
	71	35.0	0.3e-8	85.9	34.0	.2468
	71	35.4	0.3e-8	89.1	32.5	.2463
	71	30.8	0.4e-8	90.3	32.7	.2458
	71	35.1	0.3e-8	97.2	34.3	.2445
Average	71	33.2	0.34e-8	90.1	33.4	.2449
SD.	-	2.72	0.55e-9	4.31	0.80	.0022
105	59	29.9	0.4e-8	93.9	34.2	.2315
	59	30.3	0.4e-8	92.5	31.7	.2356
	59	32.5	0.4e-8	90.9	33.5	.2204
	59	31.6	0.4e-8	93.4	34.2	.2068
	59	30.8	0.4e-8	92.5	33.9	.2154
Average	59	31.0	0.4e-8	92.6	33.5	.2219
SD.	-	1.04	-	1.14	1.05	.0117

Table C-24 Al(OH)$_3$:TIS:TETA = 100:100:125 mmol, reaction time 3 h,
reaction temperature = 200°C, C_p = 2.5240 g/l (Figure C-9d)

Angle (°)	Sample time (µs)	R_H (nm)	D_{app} (cm^2/s)	In Range	Merit	Poly-dispersity
60	100	49.5	0.2e-8	92.8	33.8	.3347
	100	44.6	0.3e-8	92.4	33.0	.3481
	100	41.8	0.3e-8	98.1	33.0	.3420
	100	47.5	0.2e-8	91.6	34.2	.3269
	100	48.3	0.2e-8	98.5	32.3	.3451
Average	100	46.3	0.24e-8	94.7	33.3	.3394
SD.	-	3.11	0.55e-9	3.33	0.74	.0086
75	78	39.5	0.3e-8	93.5	31.7	.3271
	78	42.1	0.3e-8	94.6	31.9	.3302
	78	40.6	0.3e-8	98.0	32.0	.3164
	78	43.5	0.3e-8	85.1	31.0	.3287
	78	38.7	0.3e-8	92.3	30.9	.3169
Average	78	40.9	0.3e-8	92.7	31.5	.3239
SD.	-	1.94	-	4.75	0.51	.0067
90	72	30.5	0.4e-8	87.3	30.6	.3165
	72	31.8	0.4e-8	98.8	30.5	.3302
	72	34.7	0.4e-8	98.0	30.6	.3214
	72	35.0	0.4e-8	84.7	30.6	.3068
	72	33.6	0.4e-8	88.6	30.6	.3146
Average	72	33.1	0.4e-8	91.5	30.6	.3179
SD.	-	1.93	-	6.48	0.04	.0087
105	49	28.4	0.4e-8	83.0	30.7	.3114
	49	26.9	0.5e-8	91.6	30.5	.3206
	49	26.4	0.5e-8	83.7	30.7	.3059
	49	28.6	0.4e-8	87.0	30.7	.3045
	49	30.0	0.4e-8	82.2	30.6	.3015
Average	49	28.1	0.44e-8	85.5	30.6	.3088
SD.	-	1.44	0.55e-9	3.87	0.09	.0075

Figure C-9 The relation between the apparent diffusion coefficient, D_{app}, and q^2 of
the product synthesized using $Al(OH)_3$:TIS:TETA = 100:100:125 mmol,
the reaction time of 3 h, the reaction temperature of 200°C; (a) C_p =
0.7572 g/l, (b) C_p = 1.2620 g/l, (c) C_p = 1.7668 g/l, (d) C_p = 2.5240 g/l.

(a) C_p = 0.7572 g/l

(b) C_p = 1.2620 g/l

(c) $C_p = 1.7668$ g/l

$D_{cm} = 0.2292 cm^2/s$

$D_{app}(\times 10^{-8})$ cm^2/s

q^2 (cm^{-2})

(d) $C_p = 2.5240$ g/l

$D_{cm} = 0.1035$ cm$^2/s$

$D_{app}(\times 10^8)$ cm^2/s

q^2 (cm^{-2})

Table C-25 The center of mass diffusion coefficient (D_{cm}) as a function of polymer
concentration of the product synthesized using $Al(OH)_3$:TIS:TETA =
100:100:125 mmol, reaction time 3 h, the reaction temperature of 200°C
(Figure C-10)

Polymer concentration, C_p (g/l)	D_{cm} (cm^2/s)
0.7572	0.43e-8
1.2620	0.33e-8
1.7668	0.20e-8
2.5240	0.10e-8

Figure C-10 The center of mass diffusion coefficient (D_{cm}) as a function of polymer
concentration of the product synthesized using $Al(OH)_3$:TIS:TETA =
100:100:125 mmol, reaction time 3 h, the reaction temperature of 200°C

$D_o = 0.56 \times 10^{-8}$ cm^2/s
slope = -0.19
$R^2 = 0.98$
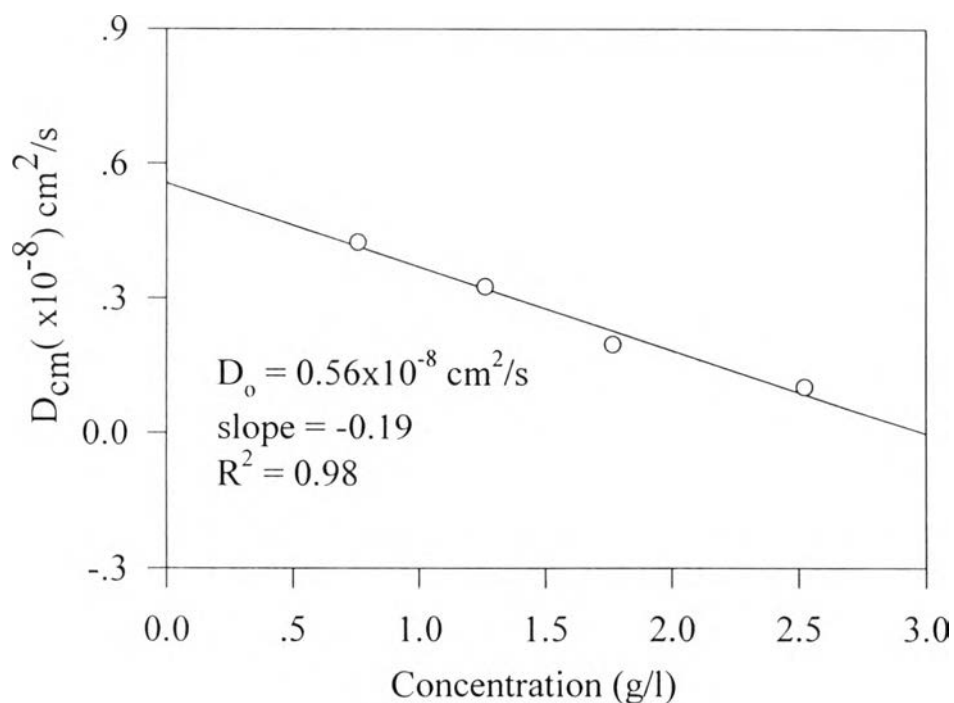
Table C-26 Al(OH)$_3$:TIS:TETA = 100:100:150 mmol, reaction time 3 h,

reaction temperature = 200°C, C$_p$ = 0.7307 g/l (Figure C-11a)

Angle (°)	Sample time (μs)	R$_H$ (nm)	D$_{app}$ (cm^2/s)	In Range	Merit	Poly-dispersity
60	98	24.9	0.5e-8	92.1	31.0	.2058
	98	25.1	0.5e-8	93.6	32.0	.2103
	98	26.6	0.5e-8	89.7	31.4	.1897
	98	25.8	0.5e-8	96.4	30.6	.2103
	98	26.1	0.5e-8	93.2	29.5	.2065
Average	98	25.7	0.5e-8	93.0	30.9	.2045
SD.	-	0.70	-	2.43	0.94	.0085
75	72	25.9	0.5e-8	96.4	26.7	.1948
	72	23.5	0.6e-8	95.1	29.4	.1852
	72	26.4	0.5e-8	90.3	32.3	.1963
	72	25.0	0.5e-8	93.0	35.1	.2034
	72	26.9	0.5e-8	91.9	32.0	.1887
Average	72	25.5	0.52e-8	93.3	31.1	.1936
SD.	-	1.34	0.45e-9	2.44	3.18	.0071
90	45	26.8	0.5e-8	96.5	29.7	.1874
	45	23.3	0.6e-8	94.7	24.8	.1796
	45	22.7	0.6e-8	89.4	35.0	.1863
	45	20.3	0.6e-8	97.3	31.4	.1720
	45	20.9	0.6e-8	92.0	31.0	.1843
Average	45	22.8	0.58e-8	94.0	30.4	.1819
SD.	-	2.56	0.45e-9	3.27	3.69	.0063
105	25	19.7	0.7e-8	94.7	36.2	.1756
	25	22.5	0.6e-8	95.0	30.5	.1894
	25	21.0	0.6e-8	92.9	30.2	.2001
	25	21.9	0.6e-8	93.6	30.4	.1879
	25	20.8	0.6e-8	91.5	33.4	.1765
Average	25	21.2	0.62e-8	93.5	32.1	.1859
SD.	-	1.08	0.45e-9	1.42	2.62	.0101

Table C-27 $Al(OH)_3$:TIS:TETA = 100:100:150 mmol, reaction time 3 h,

reaction temperature = 200°C, C_p = 1.2178 g/l (Figure C-11b)

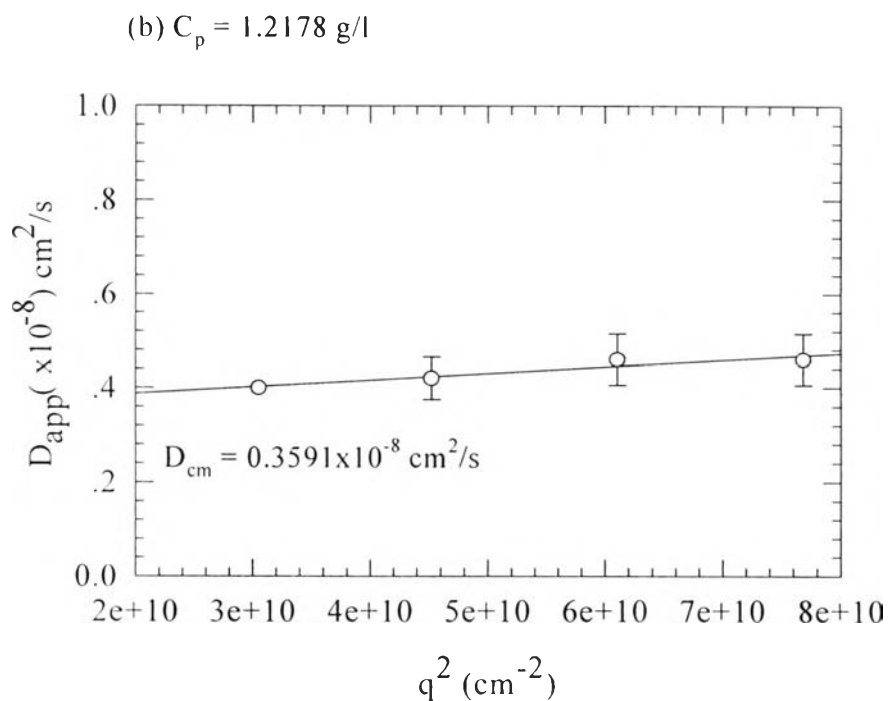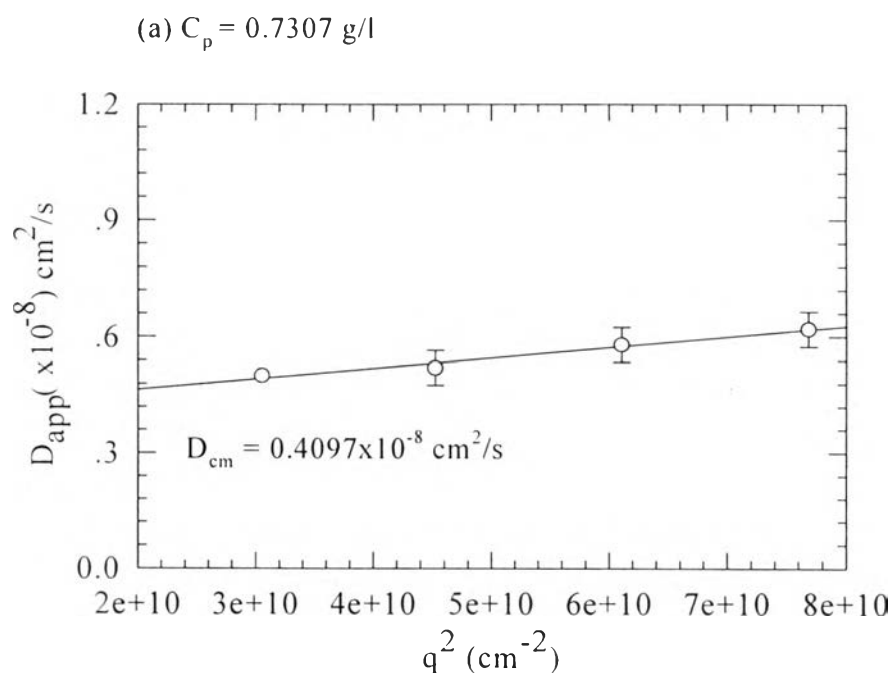| Angle (°)	Sample time (μs)	R_H (nm)	D_{app} (cm²/s)	In Range	Merit	Poly-dispersity
60	100	29.6	0.4e-8	91.4	29.7	.2214
	100	30.3	0.4e-8	92.6	26.4	.2003
	100	31.5	0.4e-8	97.0	32.1	.1988
	100	32.4	0.4e-8	93.4	31.6	.2057
	100	28.6	0.4e-8	96.5	34.0	.2168
Average	100	30.5	0.4e-8	94.2	30.8	.2086
SD.	-	1.51	-	2.46	2.88	.0100
75	70	26.8	0.5e-8	93.6	31.7	.1968
	70	31.8	0.4e-8	94.7	36.4	.1846
	70	30.4	0.4e-8	95.6	33.6	.1932
	70	29.1	0.4e-8	91.0	34.9	.2008
	70	27.8	0.4e-8	92.9	30.5	.2056
Average	70	29.2	0.42e-8	94.2	33.4	.1962
SD.	-	1.20	0.45e-9	1.19	2.38	.0080
90	65	30.3	0.4e-8	92.8	30.7	.1825
	65	29.5	0.4e-8	94.3	29.8	.1769
	65	26.7	0.5e-8	91.6	24.8	.1835
	65	25.8	0.5e-8	92.8	33.1	.1905
	65	27.3	0.5e-8	91.8	31.6	.1901
Average	65	27.9	0.46e-8	92.7	30.0	.1847
SD.	-	1.91	0.55e-9	1.07	3.15	.0057
105	30	28.9	0.4e-8	98.1	31.8	.1756
	30	27.4	0.4e-8	93.0	33.8	.1932
	30	25.5	0.5e-8	94.6	34.7	.1852
	30	26.3	0.5e-8	92.0	32.6	.1779
	30	25.1	0.5e-8	93.5	31.9	.1863
Average	30	26.6	0.46e-8	94.2	33.0	.1836
SD.	-	1.54	0.55e-9	2.35	1.36	.0070

Table C-28 Al(OH)$_3$:TIS:TETA = 100:100:150 mmol, reaction time 3 h,

reaction temperature = 200°C, C$_p$ = 1.7049 g/l (Figure C-11c)

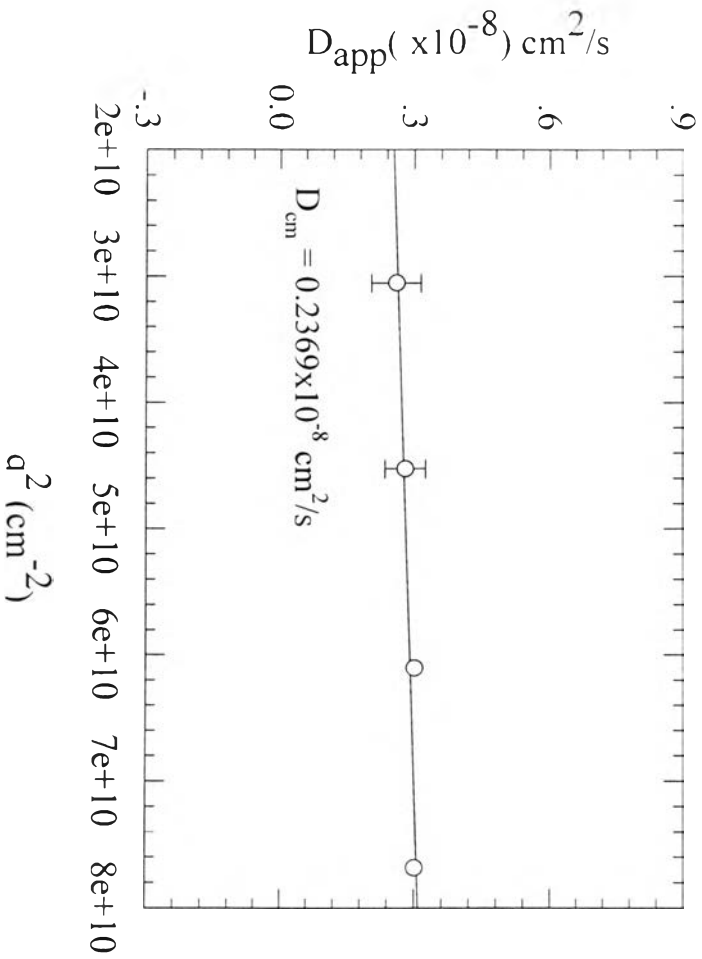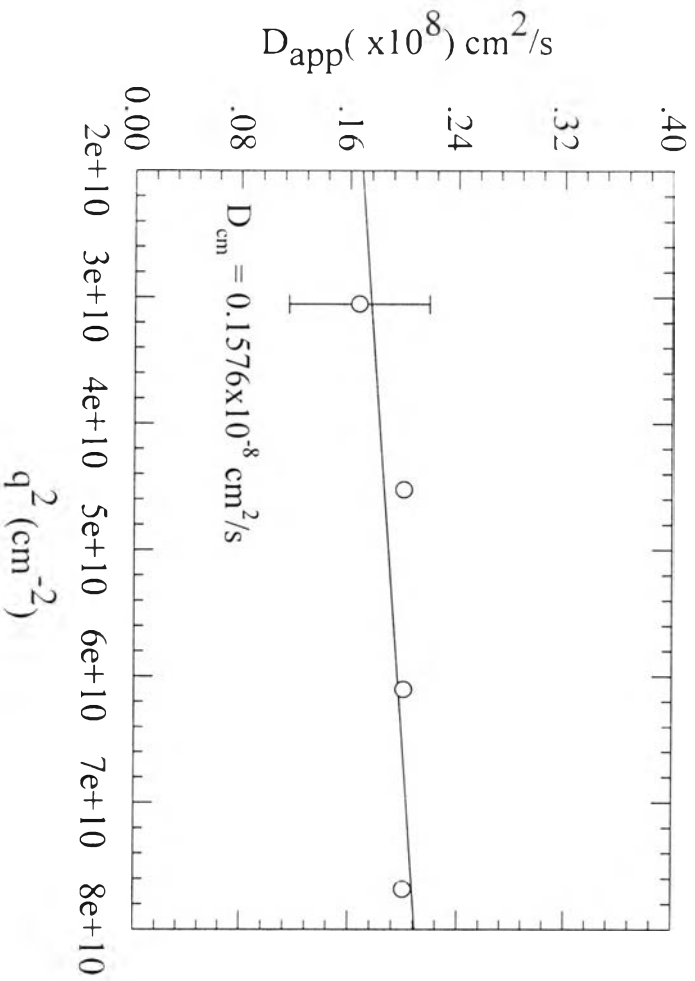| Angle (°)	Sample time (µs)	R$_H$ (nm)	D$_{app}$ (cm^2/s)	In Range	Merit	Poly-dispersity
60	90	47.9	0.2e-8	92.7	25.4	.2768
	90	49.1	0.2e-8	93.5	26.7	.2246
	90	44.6	0.3e-8	91.6	30.0	.2587
	90	43.2	0.3e-8	94.6	31.7	.2367
	90	42.9	0.3e-8	91.8	26.9	.2507
Average	90	45.5	0.26e-8	92.8	28.1	.2495
SD.	-	2.81	0.55e-9	1.24	2.61	.0200
75	85	47.7	0.2e-8	94.8	32.1	.2314
	85	42.1	0.3e-8	91.5	31.6	.2298
	85	40.5	0.3e-8	94.3	34.0	.2241
	85	41.9	0.3e-8	90.9	33.5	.2371
	85	40.7	0.3e-8	94.7	30.8	.2169
Average	85	42.6	0.28e-8	93.2	32.4	.2279
SD.	-	2.95	0.45e-9	1.88	1.33	.0077
90	60	35.5	0.3e-8	94.8	31.6	.2156
	60	36.9	0.3e-8	91.6	31.9	.2298
	60	35.8	0.3e-8	94.0	32.0	.2350
	60	38.7	0.3e-8	95.8	30.9	.2104
	60	40.0	0.3e-8	92.3	31.7	.2008
Average	60	37.4	0.3e-8	93.7	31.6	.2183
SD.	-	1.93	-	1.74	0.43	.0140
105	30	35.4	0.3e-8	91.0	33.0	.2056
	30	36.8	0.3e-8	94.0	34.7	.2131
	30	37.1	0.3e-8	92.6	32.9	.2069
	30	36.8	0.3e-8	95.8	31.0	.2117
	30	35.7	0.3e-8	94.0	35.0	.2005
Average	30	36.4	0.3e-8	93.5	33.3	.2076
SD.	-	0.76	-	1.79	1.61	.0050

Table C-29 Al(OH)$_3$:TIS:TETA = 100:100:150 mmol, reaction time 3 h, reaction temperature = 200°C, C$_p$ = 2.4356 g/l (Figure C-11d)

Angle (°)	Sample time (µs)	R$_H$ (nm)	D$_{app}$ (cm^2/s)	In Range	Merit	Poly-dispersity
60	100	65.8	0.1e-8	91.0	27.5	.3220
	100	64.7	0.1e-8	92.5	29.8	.3390
	100	59.8	0.2e-8	93.0	31.2	.3250
	100	57.8	0.2e-8	91.4	33.4	.3315
	100	59.3	0.2e-8	97.3	31.6	.3078
Average	100	61.5	0.16e-8	93.0	30.7	.3251
SD.	-	3.54	0.55e-9	2.51	2.20	.0117
75	75	59.8	0.2e-8	98.1	34.7	.3145
	75	57.1	0.2e-8	93.5	39.5	.3016
	75	56.9	0.2e-8	91.9	34.0	.3215
	75	55.8	0.2e-8	94.6	31.6	.3005
	75	56.9	0.2e-8	92.4	32.5	.3165
Average	75	57.3	0.2e-8	94.1	32.5	.3109
SD.	-	1.49	-	2.47	3.07	.0094
90	45	55.4	0.2e-8	94.0	37.0	.3056
	45	51.9	0.2e-8	90.8	31.9	.2996
	45	50.4	0.2e-8	95.2	33.5	.3015
	45	50.6	0.2e-8	91.9	36.4	.2897
	45	48.9	0.2e-8	92.8	34.0	.2945
Average	45	51.4	0.2e-8	92.9	34.6	.2982
SD.	-	2.46	-	1.73	2.11	.0062
105	30	50.7	0.2e-8	94.3	33.5	.2845
	30	49.6	0.2e-8	92.6	31.6	.2960
	30	47.8	0.2e-8	91.5	34.0	.2789
	30	48.6	0.2e-8	94.0	35.7	.2854
	30	50.1	0.2e-8	93.0	34.8	.2830
Average	30	49.4	0.2e-8	93.1	33.9	.2856
SD.	-	1.16	-	1.13	1.54	.0063

Figure C-11 The relation between the apparent diffusion coefficient, D_{app}, and q^2 of
the product synthesized using $Al(OH)_3$:TIS:TETA = 100:100:150 mmol,
the reaction time of 3 h, the reaction temperature of 200°C; (a) C_p =
0.7307 g/l, (b) C_p = 1.2178g/l, (c) C_p = 1.7049 g/l, (d) C_p = 2.4356 g/l.

(a) C_p = 0.7307 g/l

D_{cm} = 0.4097x10^{-8} cm^2/s

(b) C_p = 1.2178 g/l

D_{cm} = 0.3591x10^{-8} cm^2/s

(c) $C_p = 1.7049$ g/l

$D_{cm} = 0.2369 \times 10^{-8}$ cm^2/s

(d) $C_p = 2.4356$ g/l

$D_{cm} = 0.1576 \times 10^{-8}$ cm^2/s

Table C-30 The center of mass diffusion coefficient (D_{cm}) as a function of polymer concentration of the product synthesized using $Al(OH)_3$:TIS:TETA = 100:100:150 mmol, reaction time 3 h, the reaction temperature of 200°C (Figure C-12)

| Polymer concentration, C_p (g/l)	D_{cm} (cm^2/s)
0.7307	0.41e-8
1.2178	0.36e-8
1.7049	0.24e-8
2.4356	0.16e-8

Figure C-12 The center of mass diffusion coefficient (D_{cm}) as a function of polymer concentration of the product synthesized using $Al(OH)_3$:TIS:TETA = 100:100:150 mmol, reaction time 3 h, the reaction temperature of 200°C

$D_o = 0.53 \times 10^{-8}$ cm^2/s

slope = -0.16

$R^2 = 0.97$
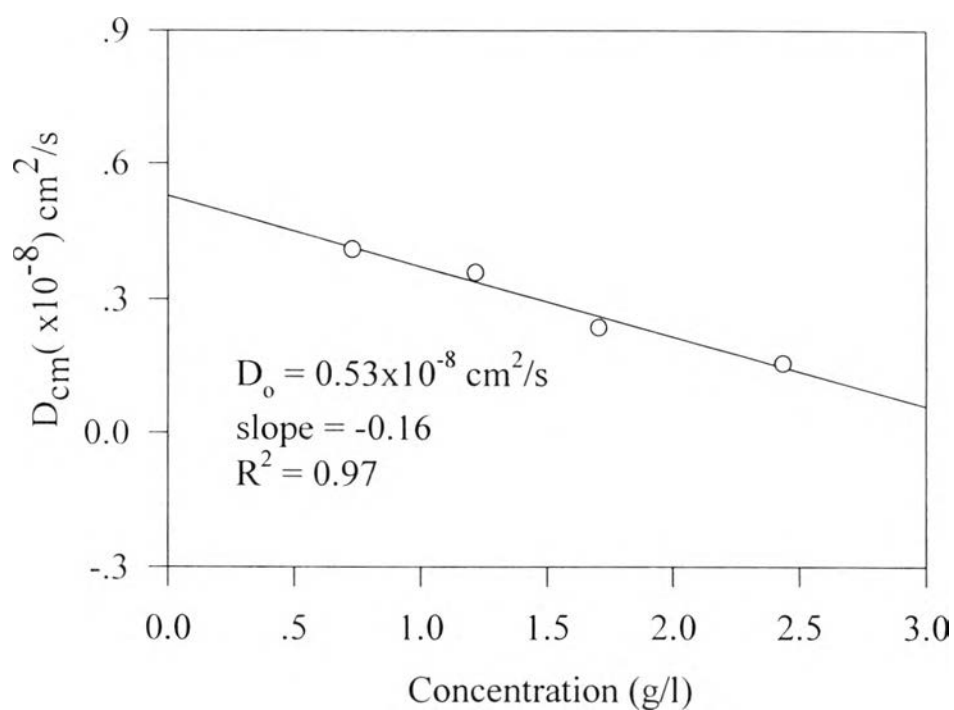
Table C-31 The intrinsic viscosity ([η]), diffusion coefficient (D_o), and the hydrodynamic radius (R_H) as a function of TETA concentration at the reaction time of 3 h, the reaction temperature of 200°C

mmol of TETA	[η] (l/g)	D_o (cm^2/s)	R_H (nm)
0	0.015	0.69e-8	18.6
50	0.018	0.67e-8	19.0
75	0.019	0.64e-8	20.0
100	0.020	0.62e-8	20.6
125	0.021	0.56e-8	23.0
150	0.027	0.53e-8	24.2

Figure C-13 Polydispersity of relaxation time for the product at 60° as a function of polymer concentration at 30°C
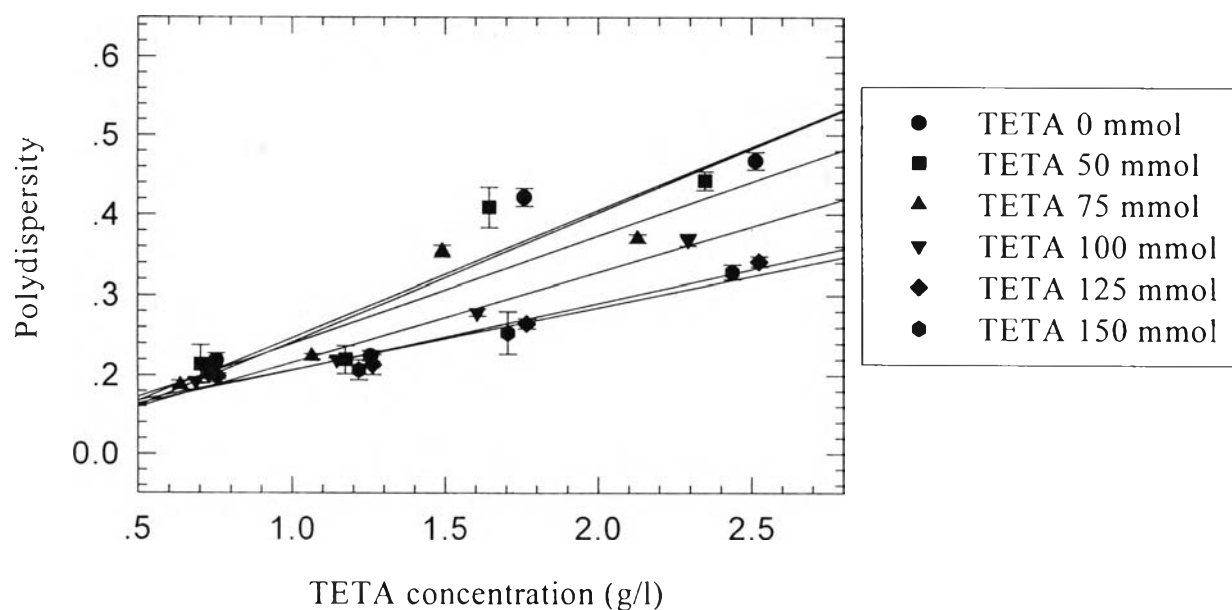
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