

6. Reference

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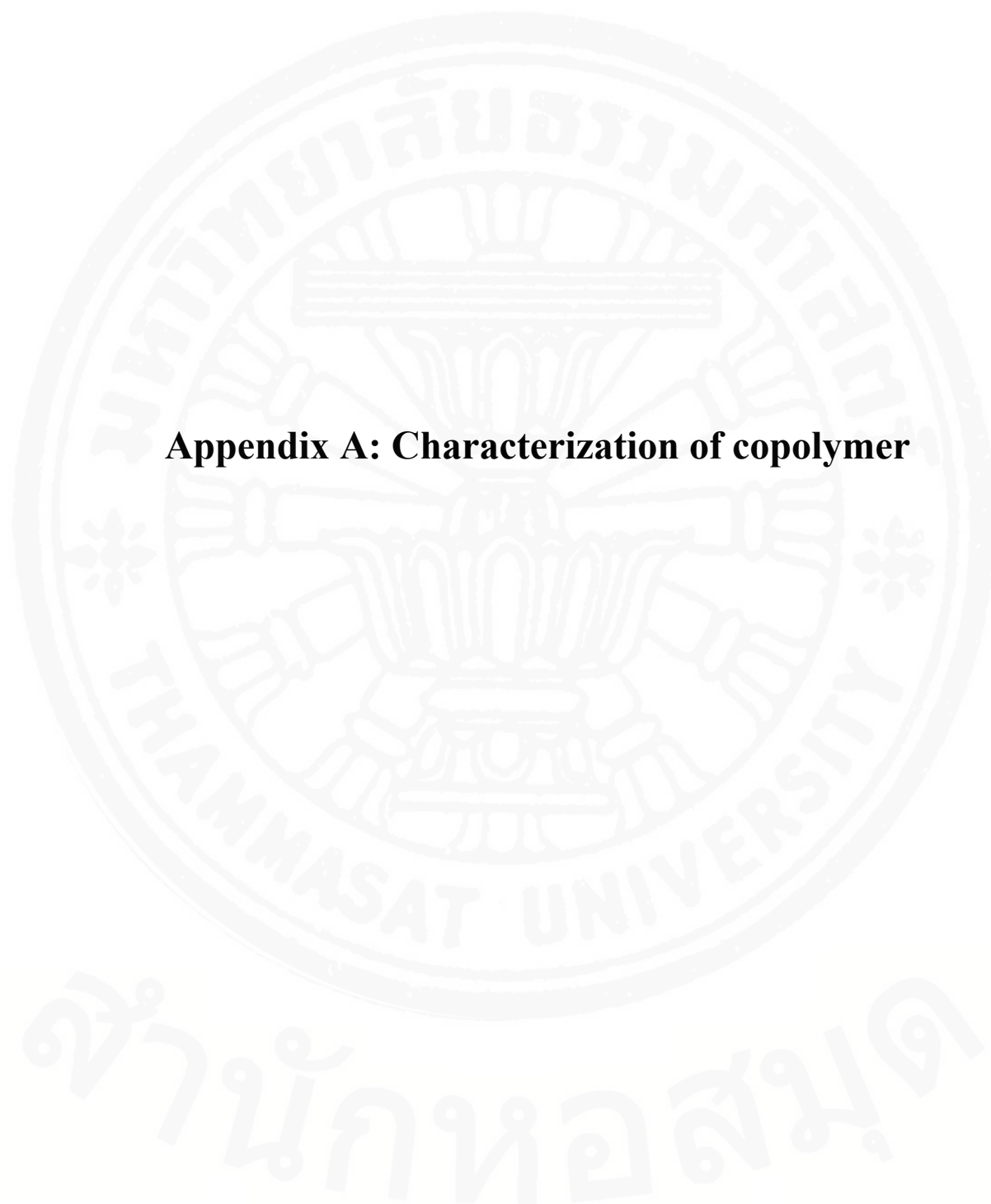
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Appendix

สำนักหอสมุด

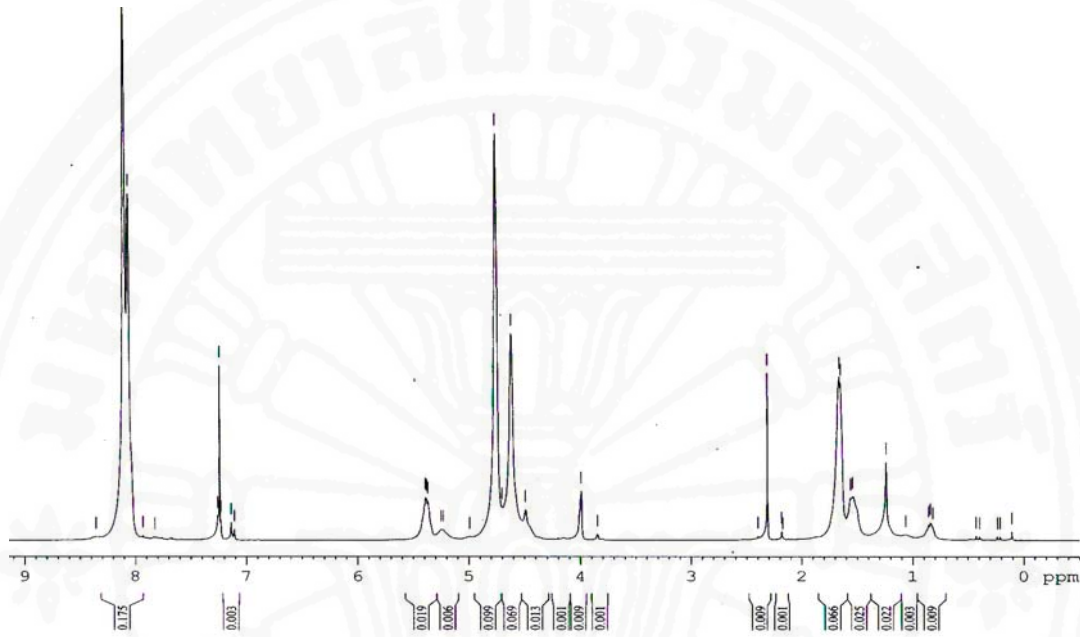


Appendix A: Characterization of copolymer

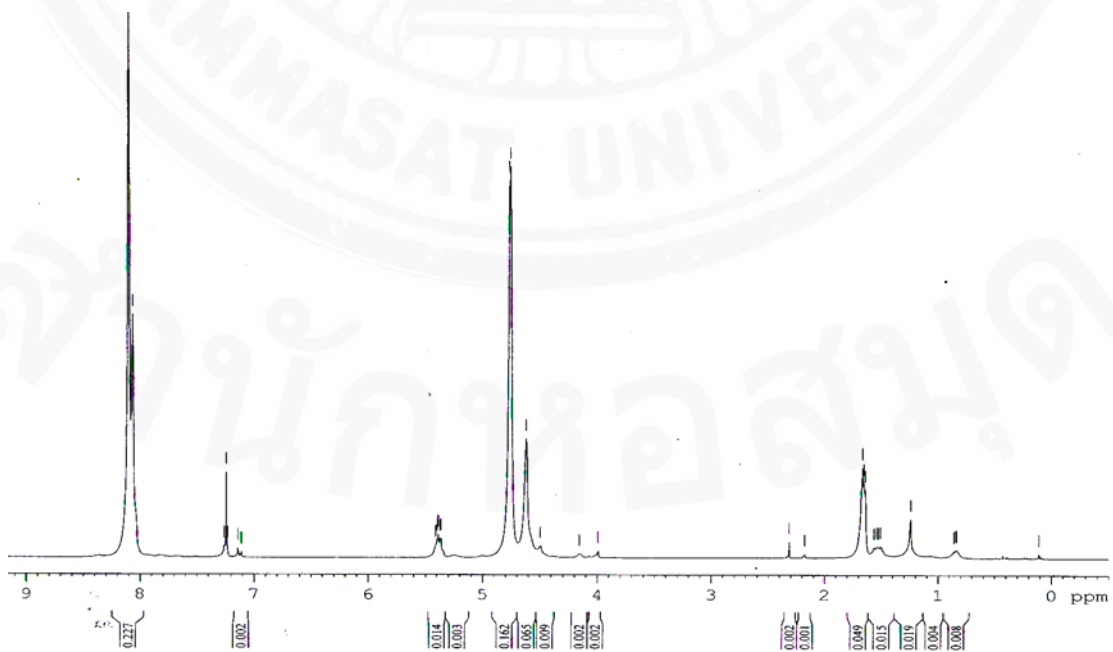
Appendix A1

^1H NMR spectra of PLA-based Aliphatic-Aromatic Copolyesters

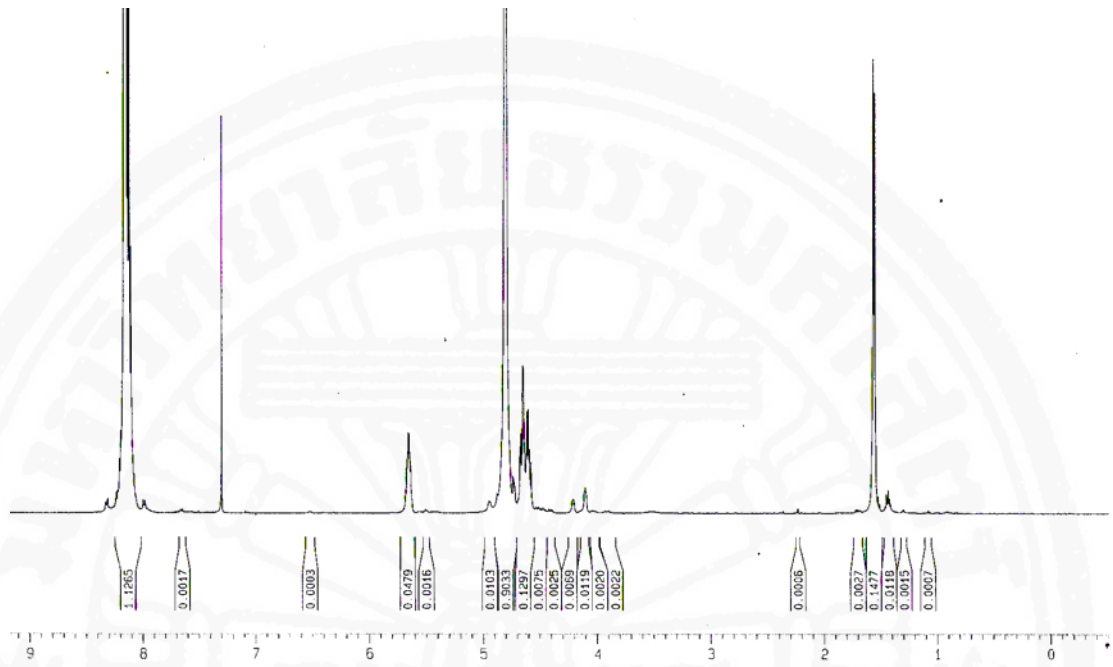
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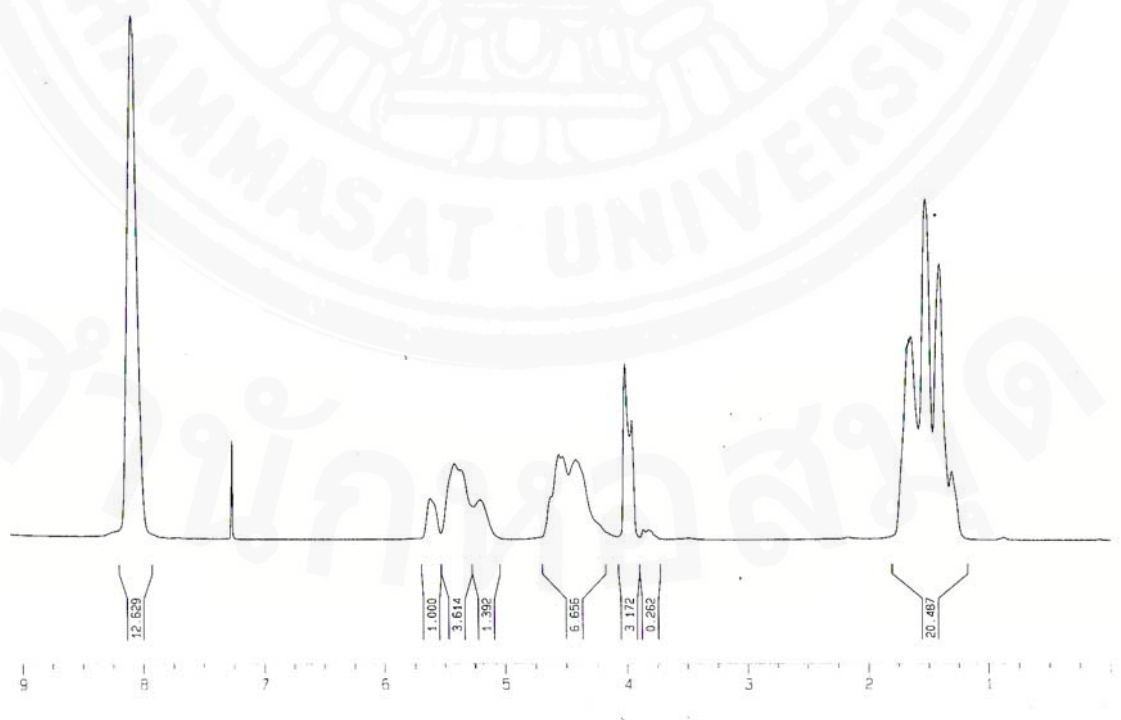
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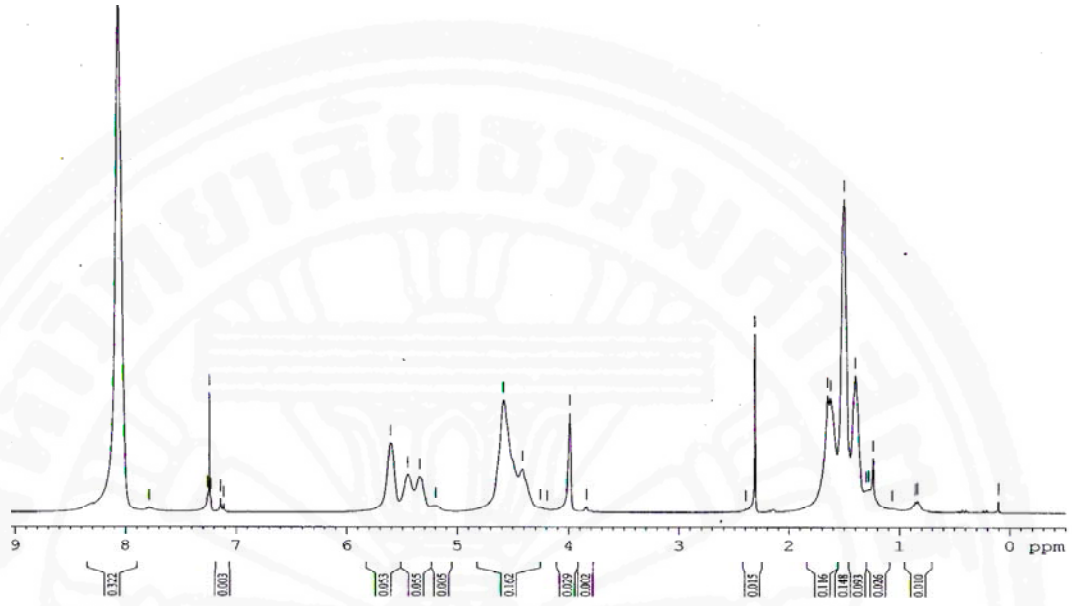
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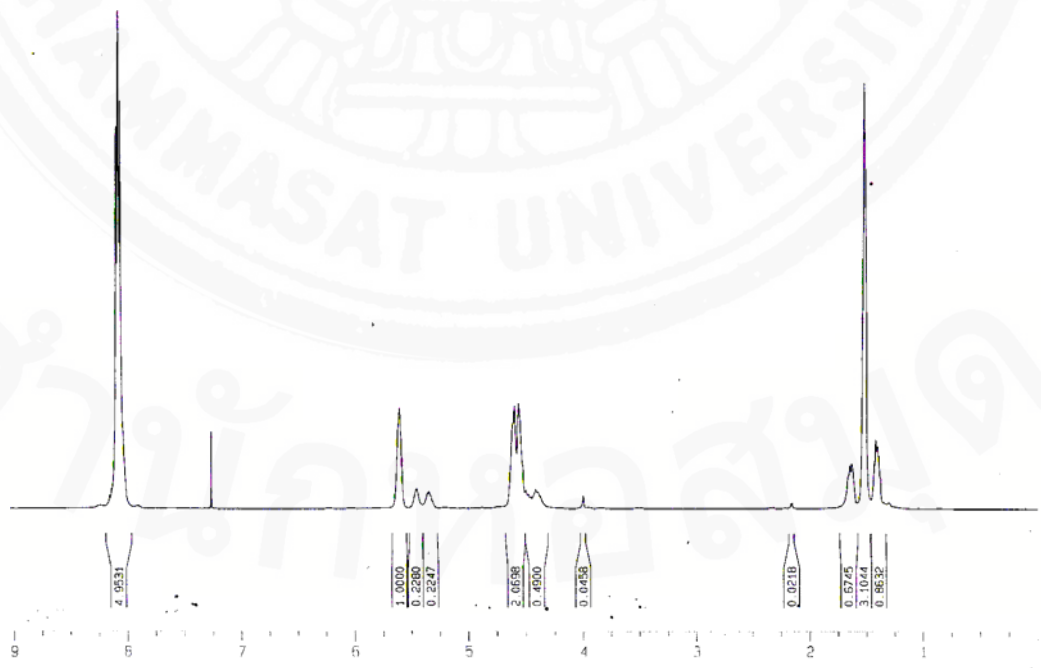
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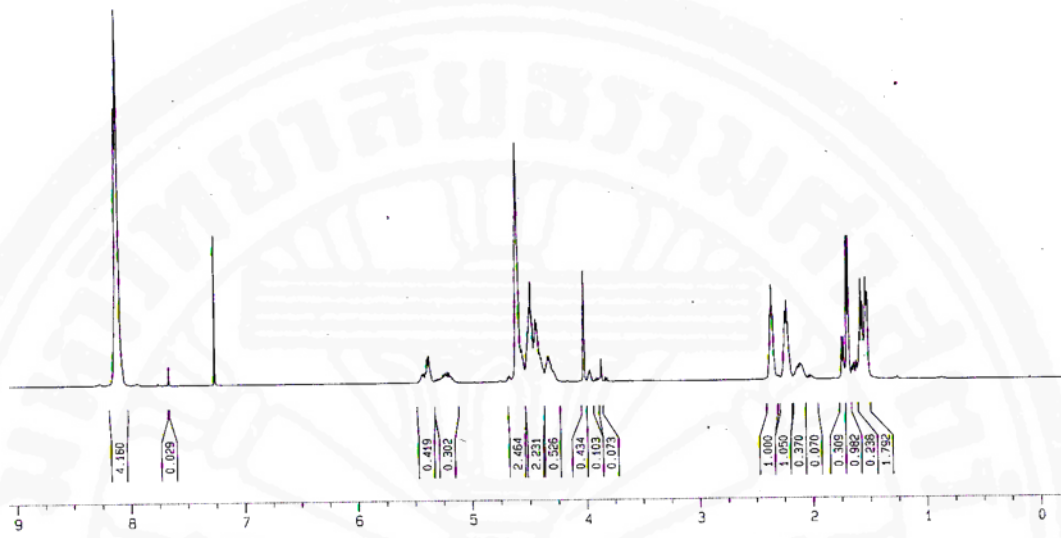
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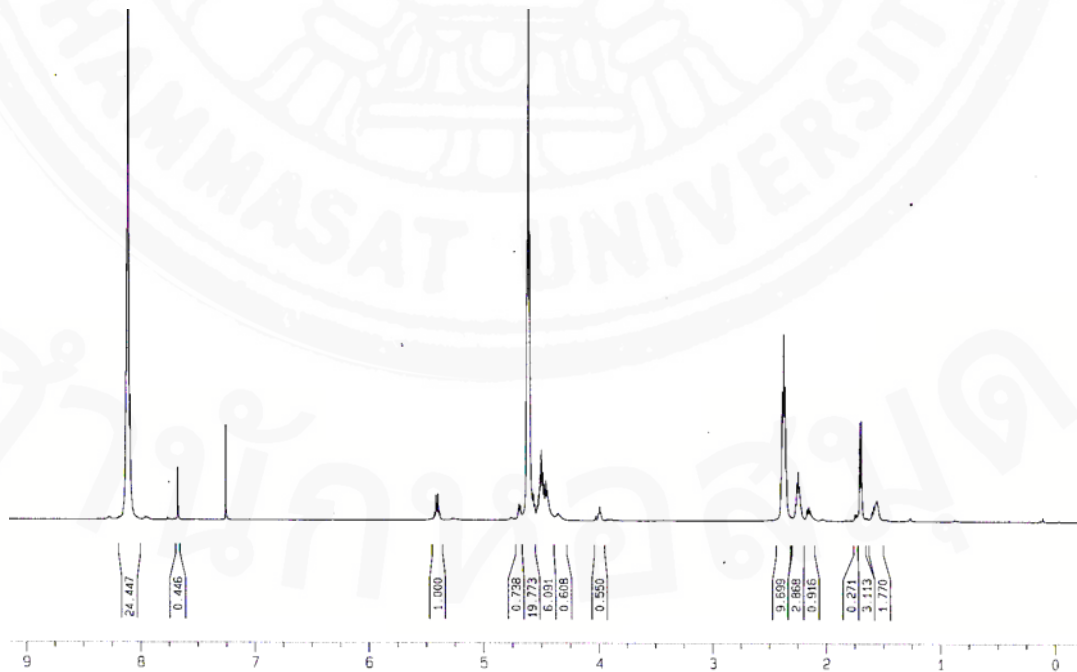
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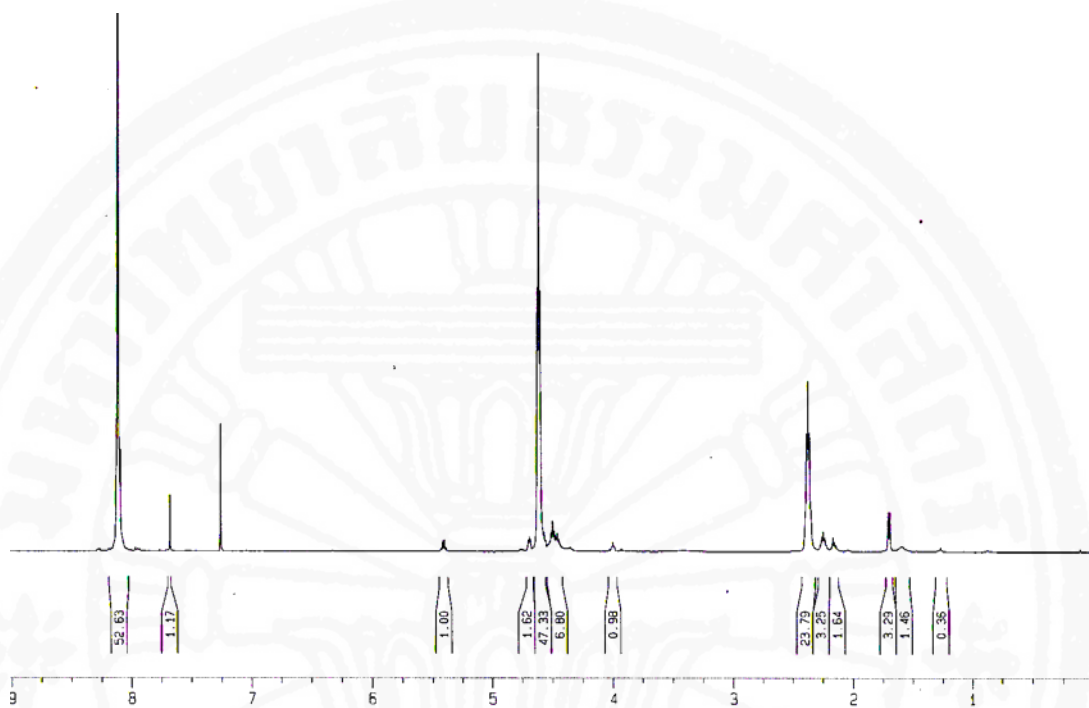
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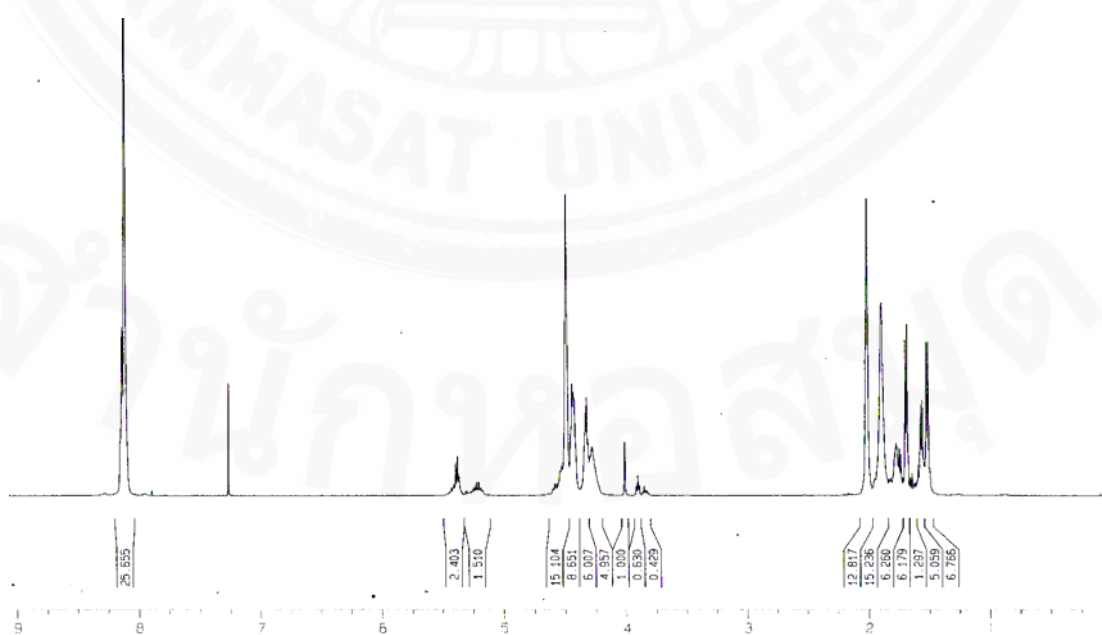
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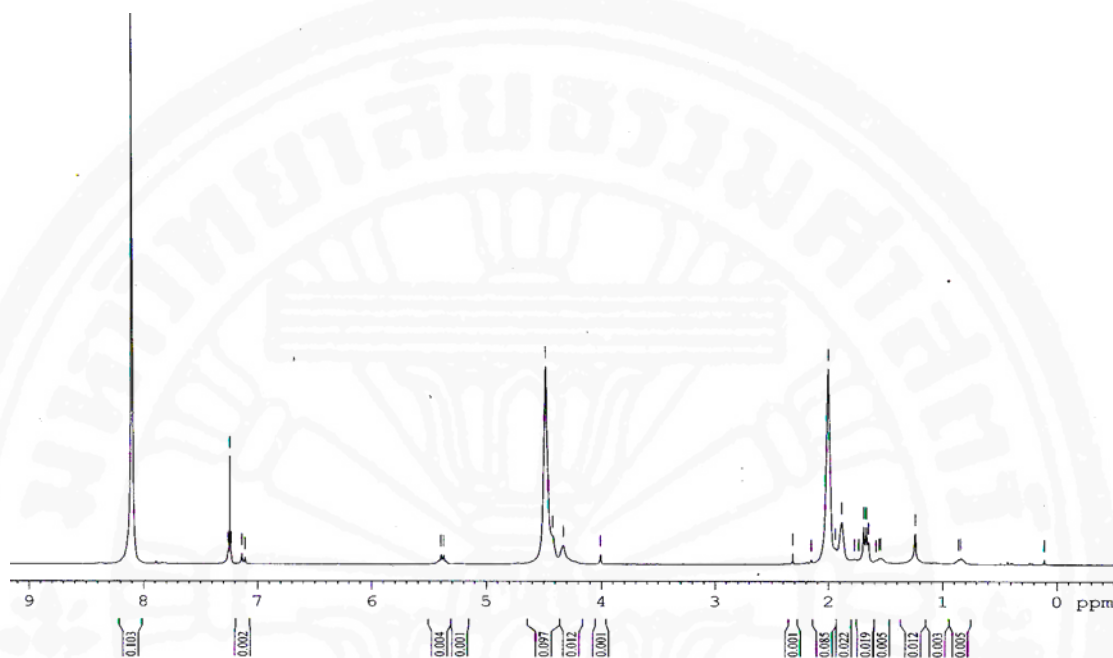
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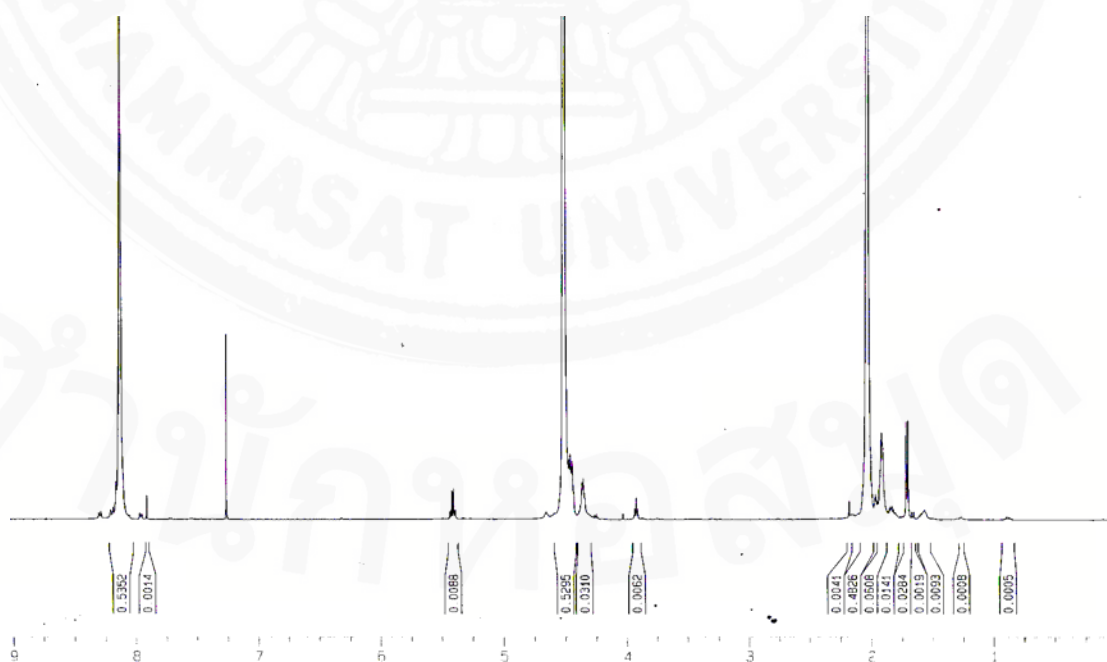
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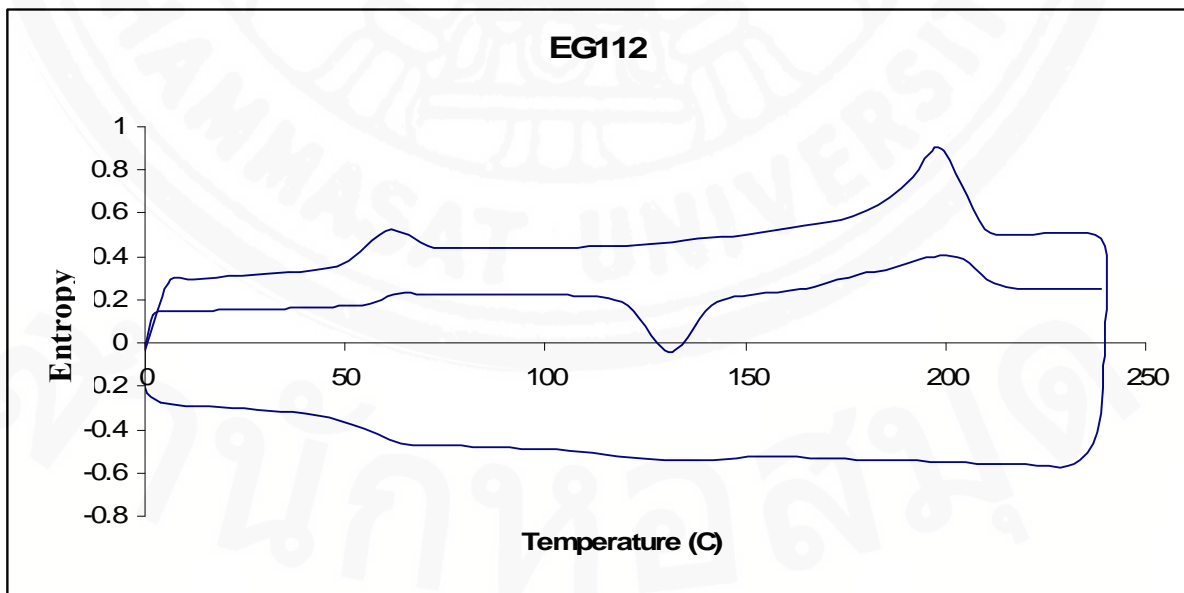
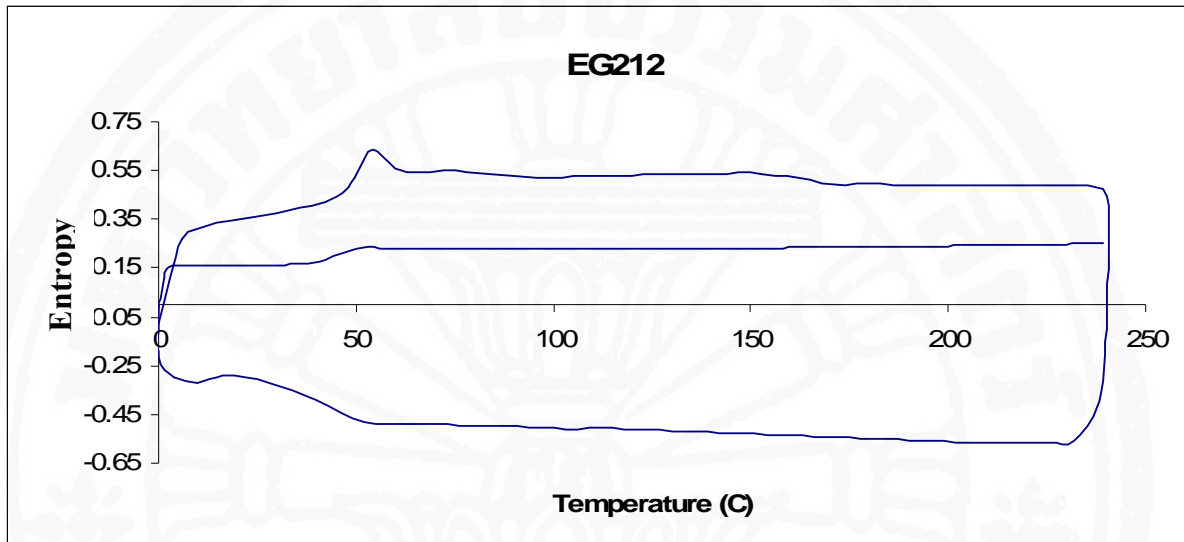


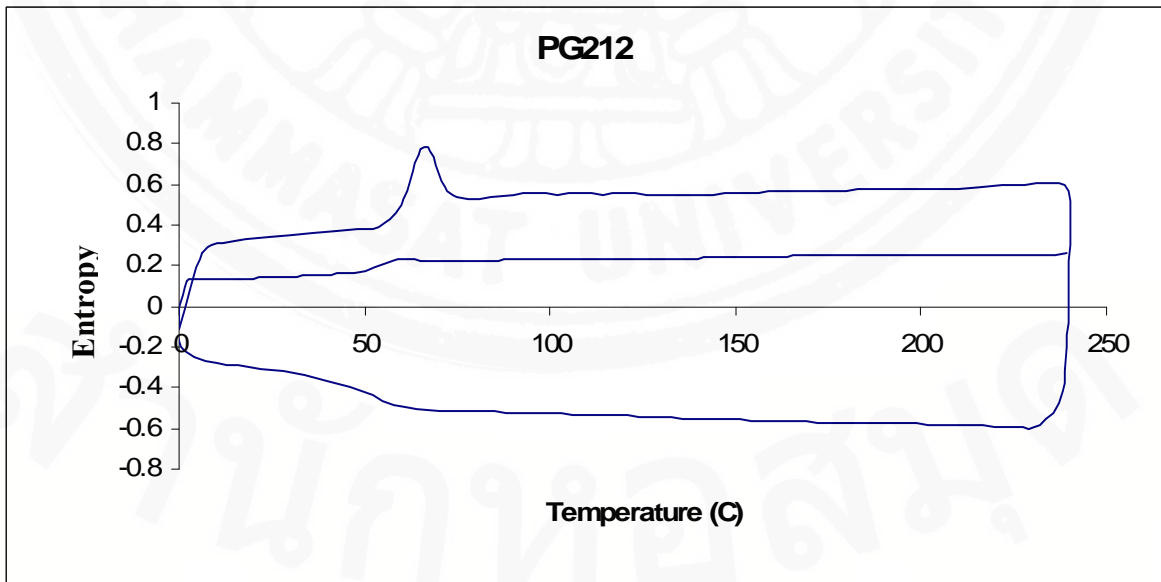
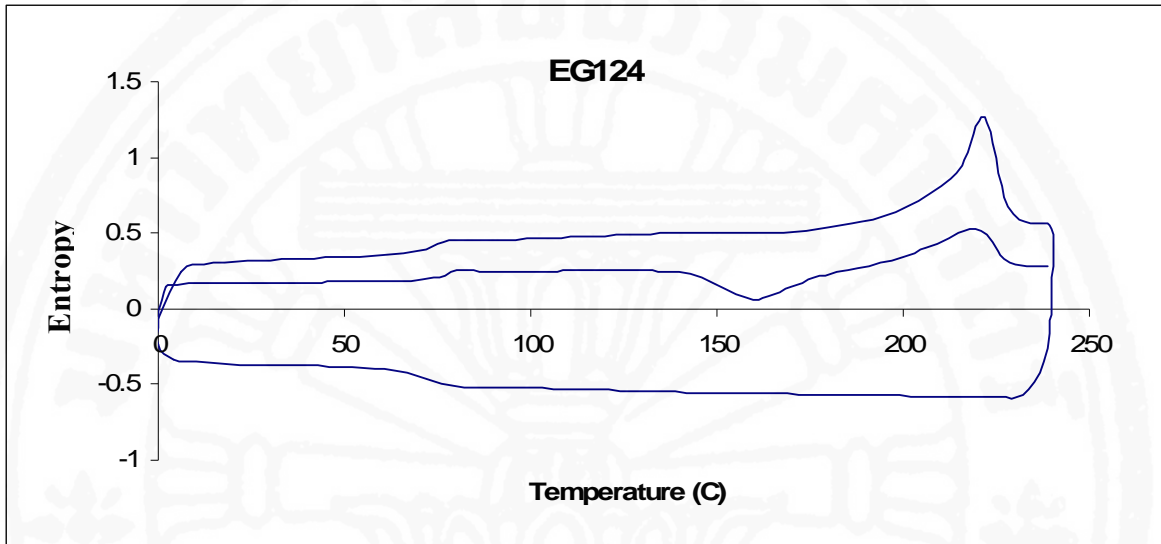
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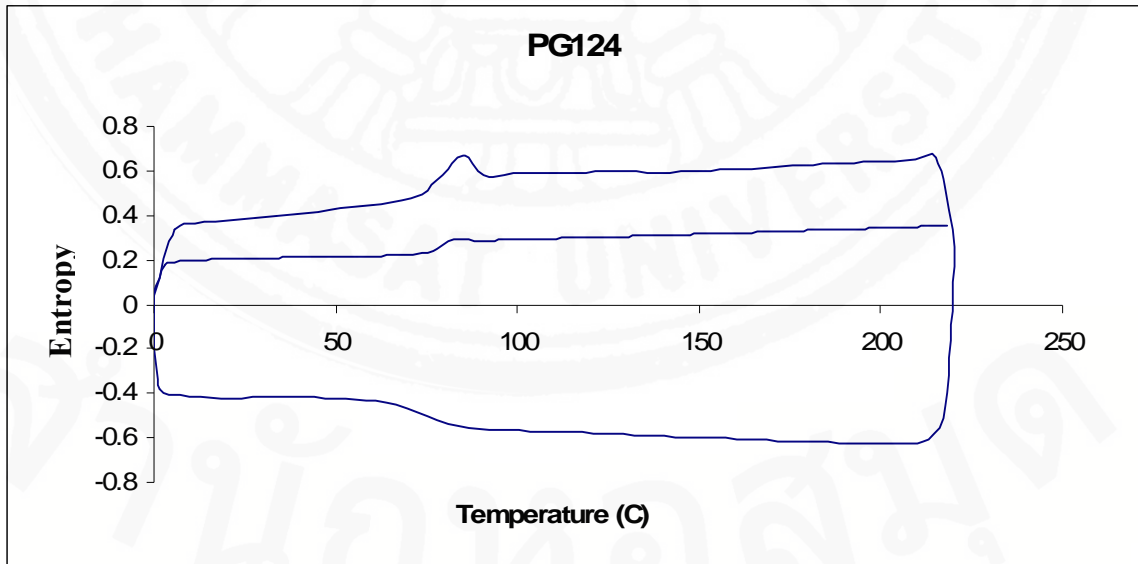
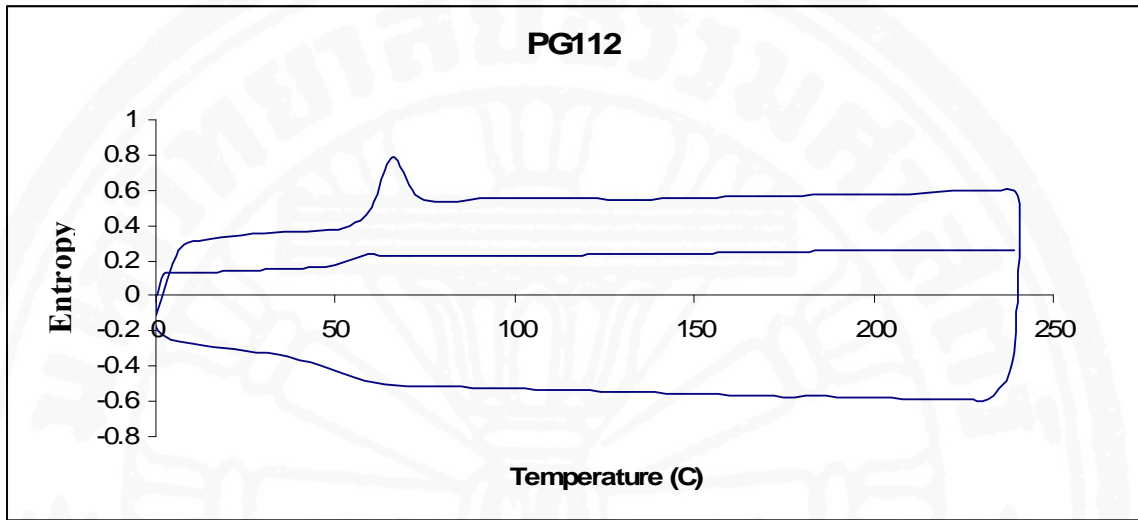


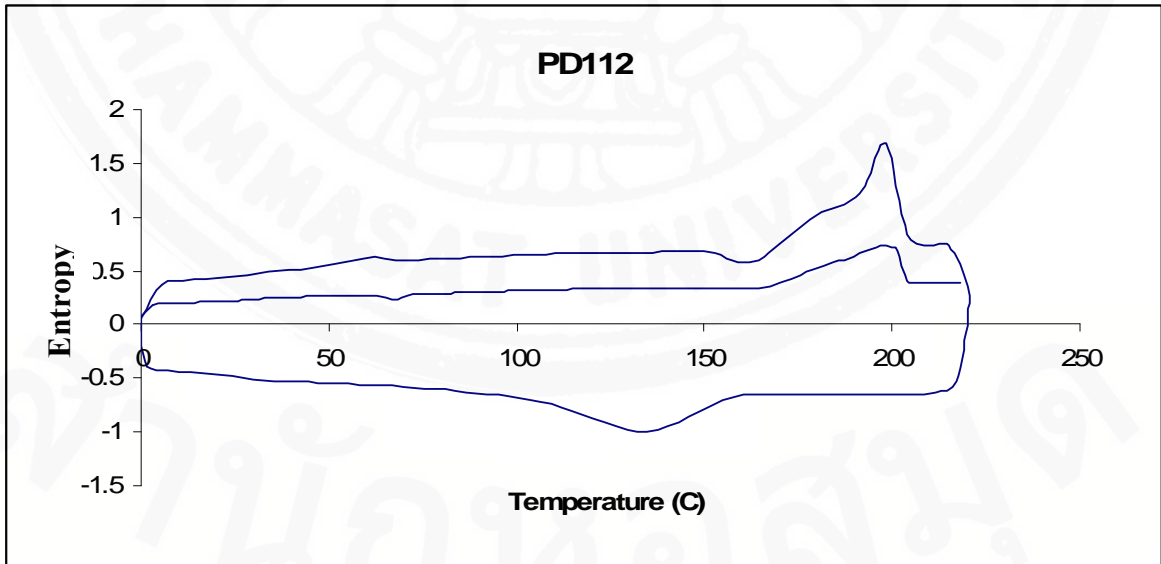
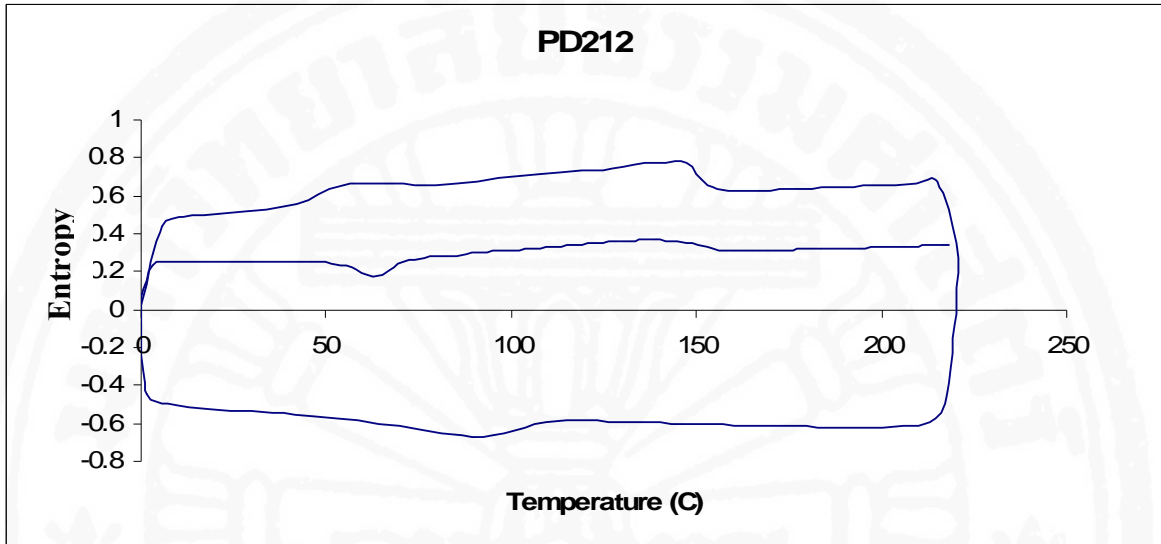
Appendix A2

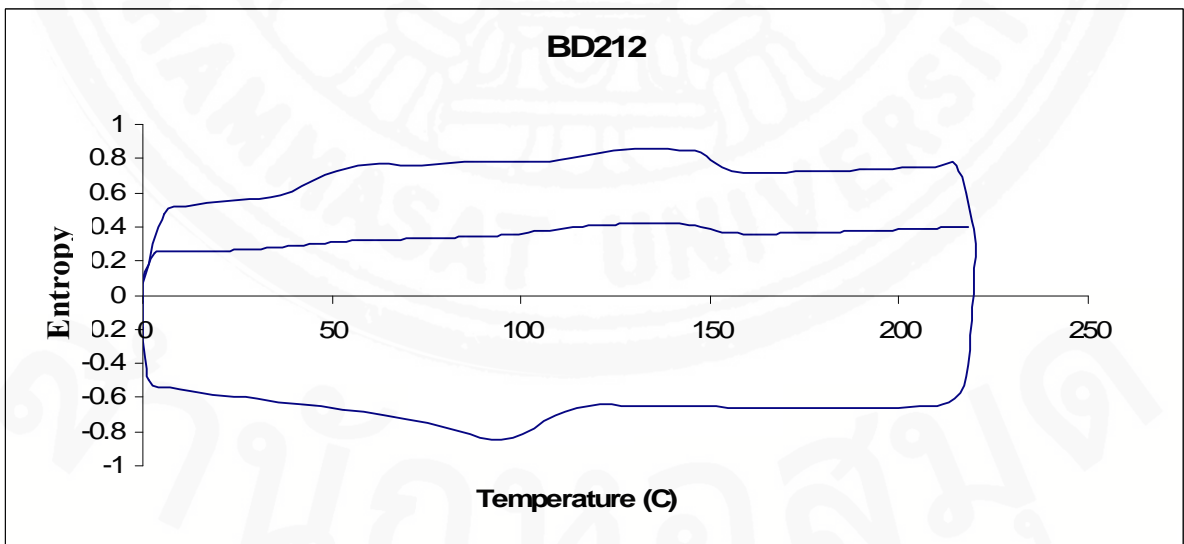
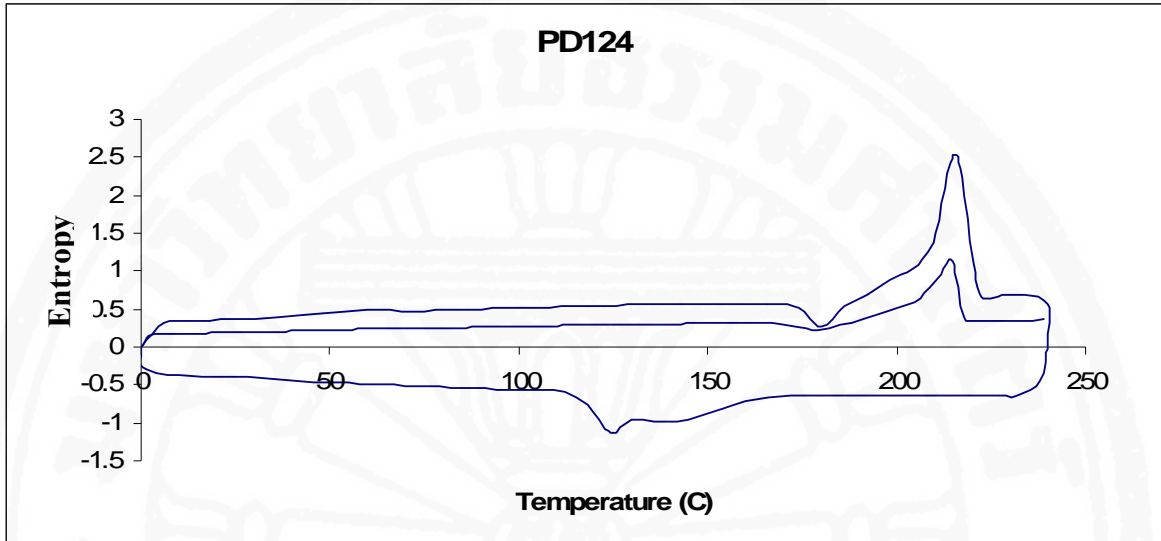
Differential scanning calorimetry (DSC) of PLA-based Aliphatic-Aromatic Copolyesters

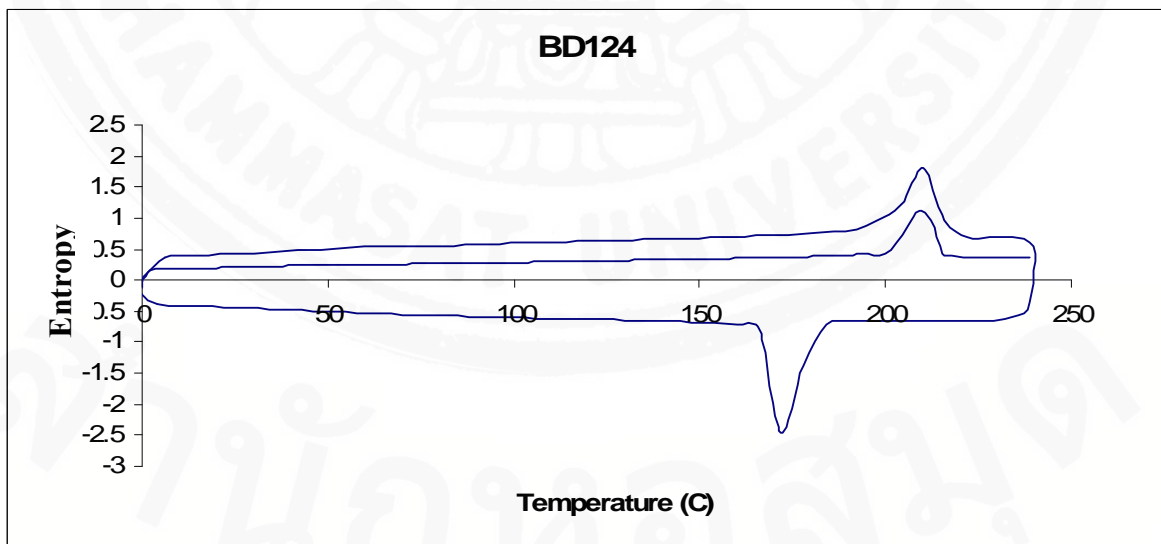
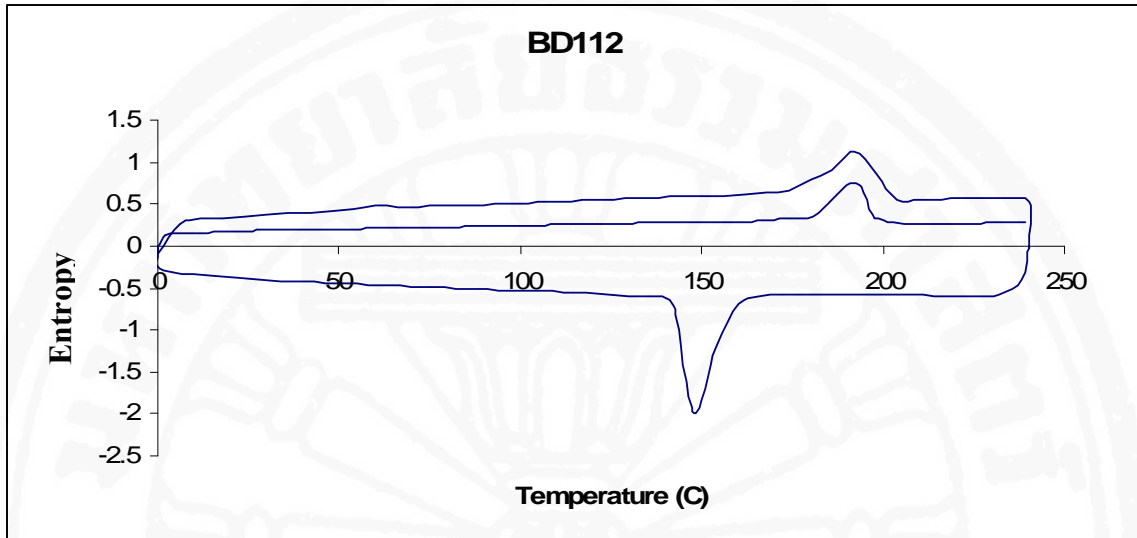






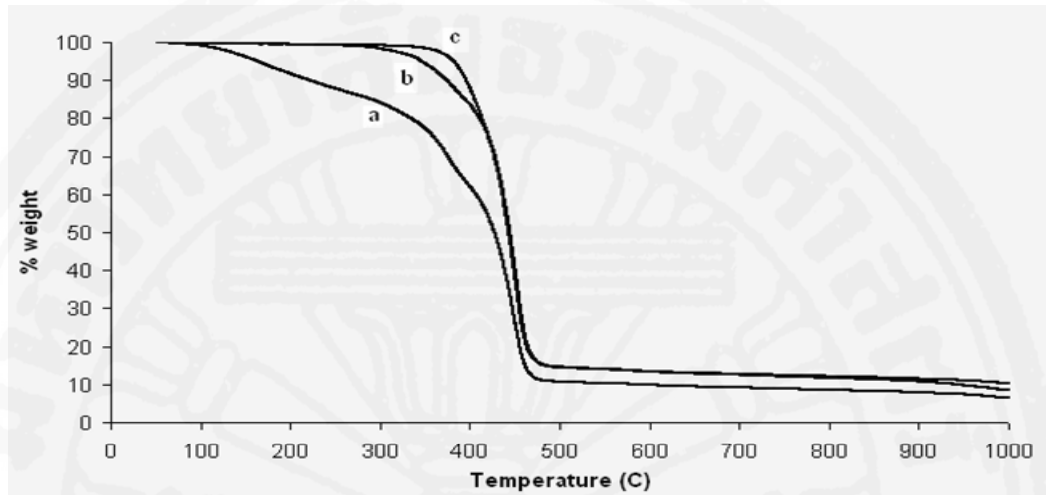




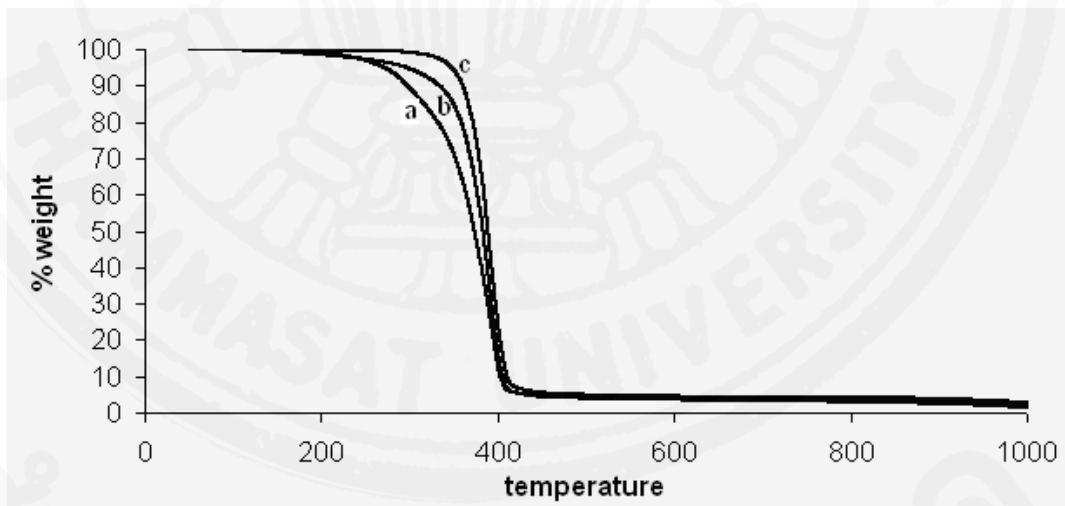


Appendix A3

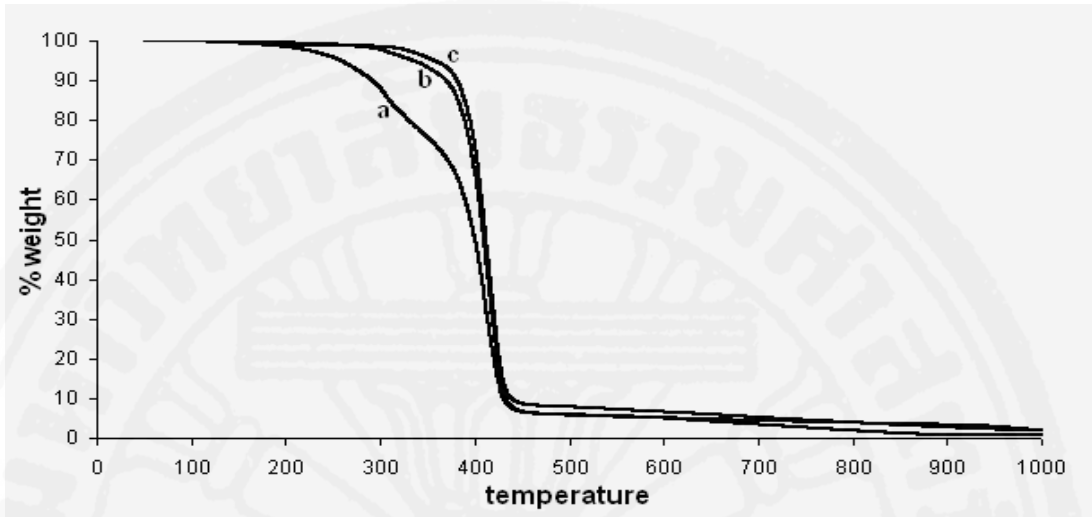
Thermo Gravimetric Analysis (TGA) of PLA-based Aliphatic-Aromatic Copolyesters



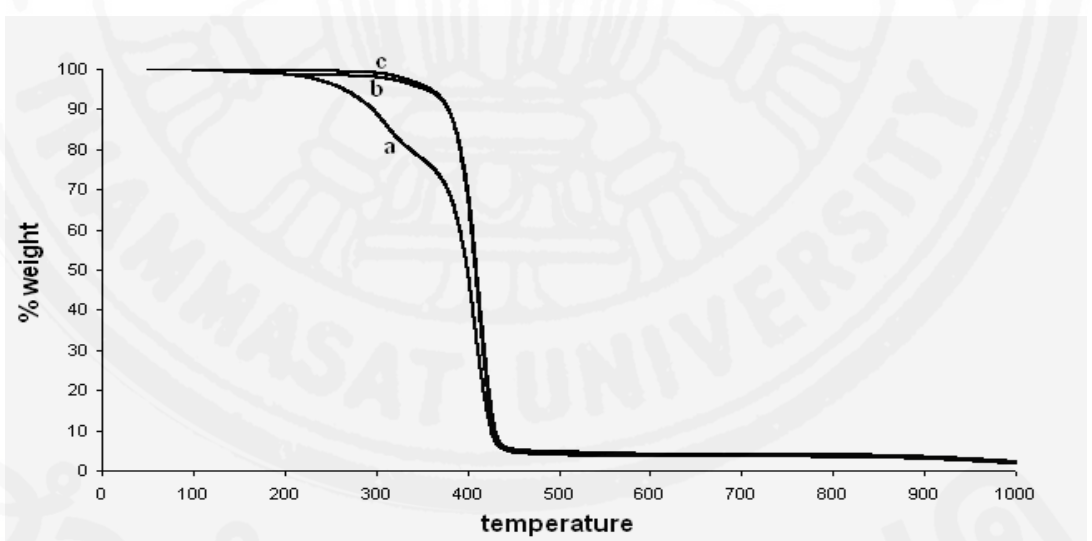
(a) EG212, (b) EG112, and (c) EG124



(a) PG212, (b) PG112, and (c) PG124



(a) PD212, (b) PD112, and (c) PD124



(a) BD212, (b) BD112, and (c) BD124

The image features a large, faint watermark of the Thammasat University logo in the background. The logo is circular and contains the university's name in Thai script at the top and 'THAMMASAT UNIVERSITY' in English at the bottom. In the center of the logo is a stylized emblem consisting of a lotus flower atop a tiered pedestal, with a crown-like structure above it. The text 'Appendix B: Degradation of copolymer' is centered over the logo.

Appendix B: Degradation of copolymer

สำนักหอสมุด

Table B1 Percentage weight loss of copolymers as a function of submersing time

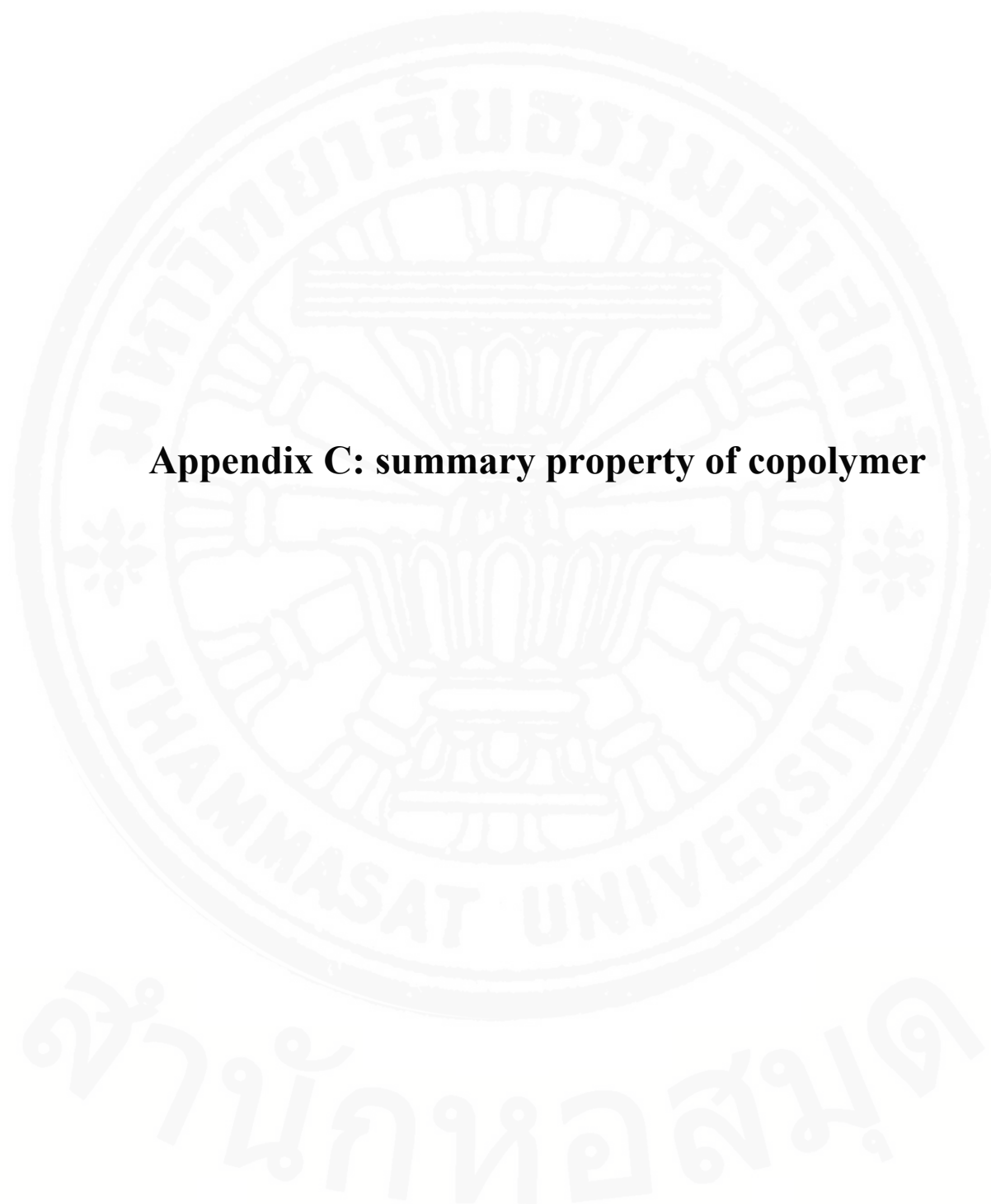
copolymers	% weight loss of copolymer as a function of time (week)					
	2	4	6	8	10	12
EG212	8.1	10.3	13.8	16.7	22.4	21.7
EG112	0.4	0.7	1.7	3.5	6.3	6.2
EG124	0.0	0.0	0.0	0.0	0.0	0.0
PG212	3.2	13.4	23.1	27.9	32.3	28.9
PG112	0.0	2.2	2.2	2.4	6.1	7.3
PG124	0.0	0.0	0.0	0.0	0.5	0.6
BD212	5.9	8.1	11.2	16.2	18.9	18.9
BD112	0.2	1.1	1.9	2.5	3.1	3.2
BD124	0.0	0.6	0.4	0.9	0.9	0.9
PD212	7.2	11.2	16.8	20.4	25.3	26.6
PD112	1.0	1.7	2.2	4.2	4.1	4.9
PD124	0.5	0.5	0.8	1.0	2.1	1.0

Table B2 Result on UV absorbance of the 243 nm band of supernatant obtained from hydrolysis of copolymers

copolymer	Absorbance of the 243 nm band as a function of time (week)					
	2	4	6	8	10	12
EG212	0.35	1.04	1.37	1.37	1.9	1.31
EG112	0.04	0.09	0.17	0.38	0.61	0.73
EG124	0.01	0.01	0.01	0.01	0.01	0.01
PG212	0.21	0.60	1.10	1.26	1.27	1.30
PG112	0.07	0.09	0.14	0.25	0.28	0.45
PG124	0.02	0.02	0.01	0.03	0.02	0.03
BD212	0.11	0.13	0.22	0.39	0.44	0.46
BD112	0.05	0.08	0.14	0.21	0.30	0.34
BD124	0.03	0.04	0.05	0.06	0.06	0.06
PD212	0.20	0.35	0.63	1.24	1.08	1.03
PD112	0.08	0.12	0.17	0.27	0.29	0.36
PD124	0.03	0.06	0.06	0.09	0.08	0.08

Table B3 Results on the content of degraded aromatic ester fragments in a phosphate buffer solution (pH 7.2) as a function of time.

copolymer	Content of degraded aromatic ester fragments ($\text{mol} \times 10^{-5}$) as a function of time (week)					
	2	4	6	8	10	12
EG212	7.77	22.90	30.00	30.10	41.60	28.80
EG112	1.00	2.12	3.83	8.36	13.30	16.00
EG124	0.21	0.26	0.37	0.37	0.40	0.40
PG212	4.57	13.2	24.10	27.50	27.70	28.40
PG112	1.59	2.06	3.04	5.47	6.19	9.96
PG124	0.45	0.41	0.24	0.72	0.37	0.74
BD212	2.36	2.91	4.84	8.51	9.74	10.20
BD112	1.00	1.77	3.11	4.71	6.70	7.55
BD124	0.65	0.78	1.16	1.47	1.23	1.40
PD212	4.46	7.68	13.9	27.10	23.70	22.50
PD112	1.68	2.60	3.74	5.91	6.39	7.94
PD124	0.76	1.33	1.40	2.06	1.66	1.84



Appendix C: summary property of copolymer

Table C1 Summary on effect of diols and molar ratio on the property of copolymer

Copolymer	Mn	Sequential length ^a		Number-average sequential length ^a		T/L ratio ^a	B ^a	T _g (°C)	T _m (°C) [ΔH(J/g)]	TGA(°C)			% solute	
		Y _(L)	X _(ET)	L _{n(L)}	L _{n(ET)}					On set	T ₅₀	T ₉₀	CH ₂ Cl ₂	THF
EG212	5200	2.43	0.47	0.47	1.6	1.7	2.75	44	-	60	427	580	44.1	15.3
EG112	7200	1.21	3.49	0.26	1.73	3.3	4.39	58	199 [28]	75	444	940	95.6	97.6
EG124	21000	1.03	7.98	0.16	1.81	5.6	6.74	76	218 [30]	85	442	990	11.2	0.4
PG212	1500	1.38	2.02	0.76	1.36	0.9	2.05	25	-	77	373	402	98.8	99.2
PG112	3400	1.83	3.24	0.53	1.49	1.4	2.56	53	-	83	383	406	80.8	94.4
PG124	28000	1.98	5.22	0.27	1.73	2.7	4.37	78	-	94	389	410	98.8	98.5
PD212	3000	1.72	2.86	0.58	1.63	1.4	2.34	20	136 [18]	92	400	430	10	1.4
PD112	10200	1.18	4.24	0.15	1.82	6.1	7.26	29	198 [43]	100	409	433	86.3	72.8
PD124	11700	1.05	8.96	0.07	1.9	13.2	14.41	31	214 [53]	112	412	438	1.3	1
BD212	8100	1.63	2.74	0.51	1.62	1.6	2.59	32	134 [18]	82	400	426	14.2	5.6
BD112	25200	1.25	9.08	0.19	1.94	5.2	5.87	26	191 [37]	105	410	428	88.7	83.7
BD124	35000	1.11	18.08	0.07	1.99	15.6	15.8	31	210 [42]	110	409	429	4.3	0.2