APPENDIX A: ^{1}H-NMR for macromers and related copolymers (MMC)

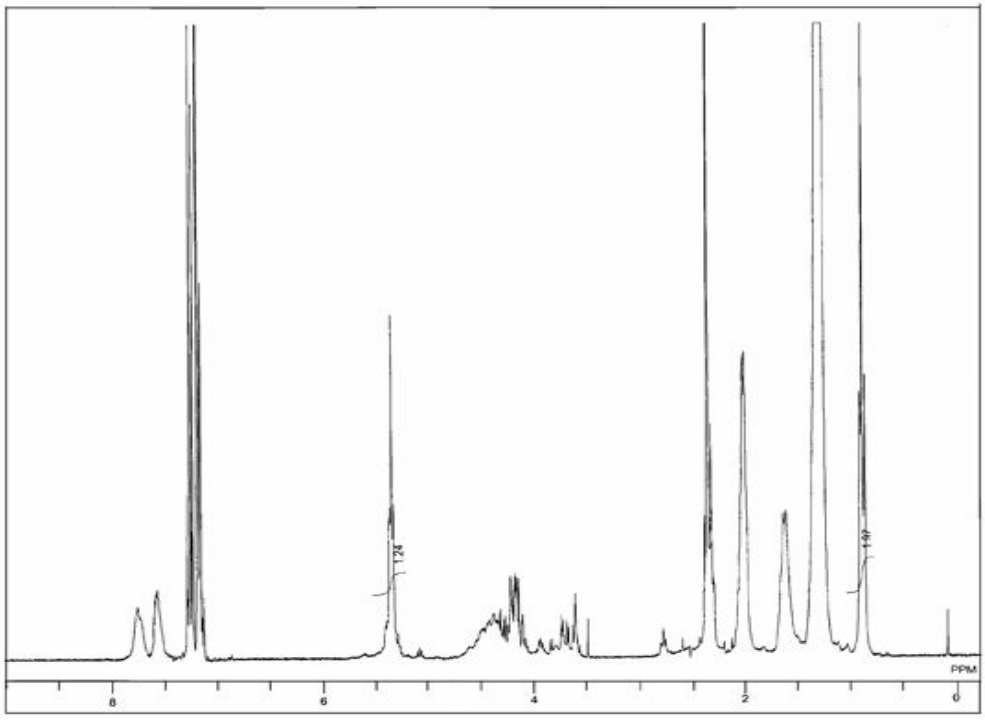


Figure 1 : ^{1}H-NMR for AlkOA65

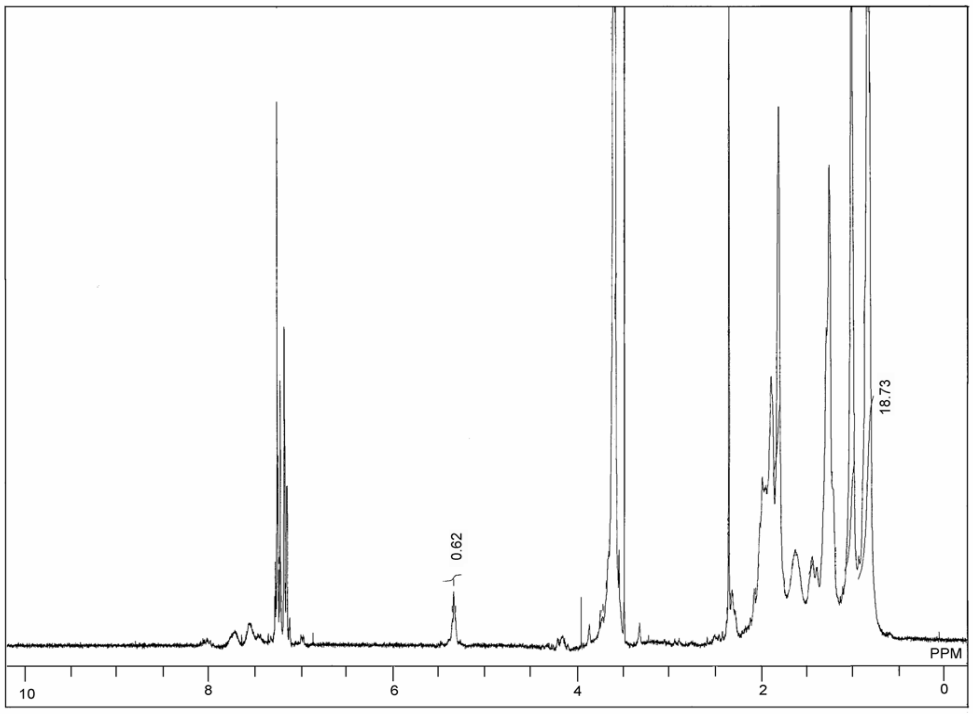


Figure 2 : ^{1}H-NMR for AL1 containing 50% macromer

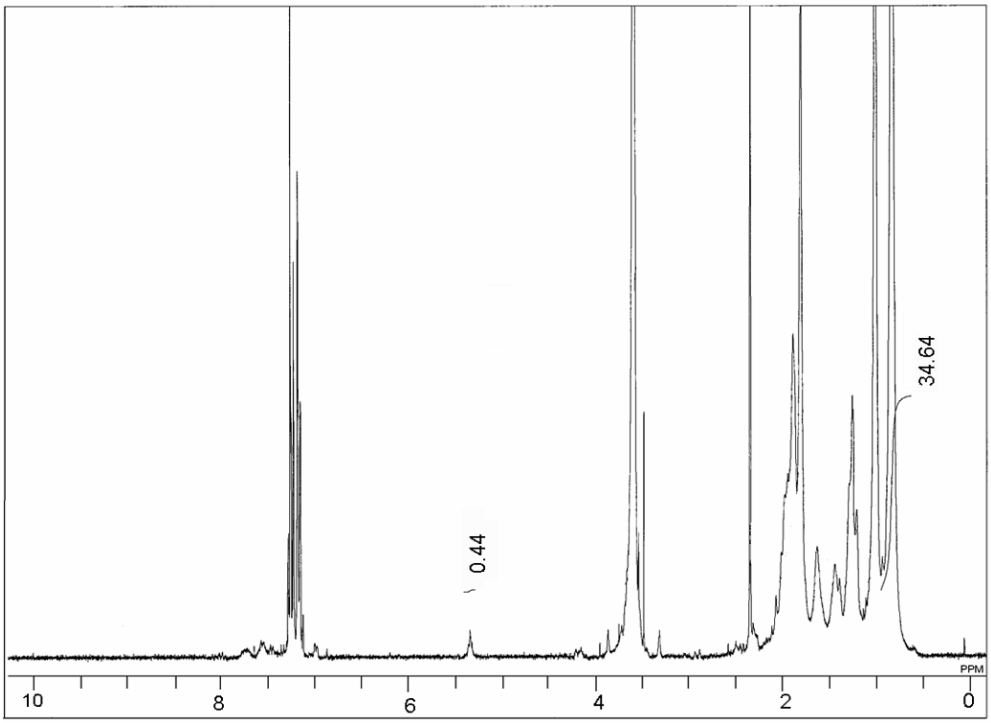


Figure 3 : ^{1}H-NMR for AL2 containing 35% macromer

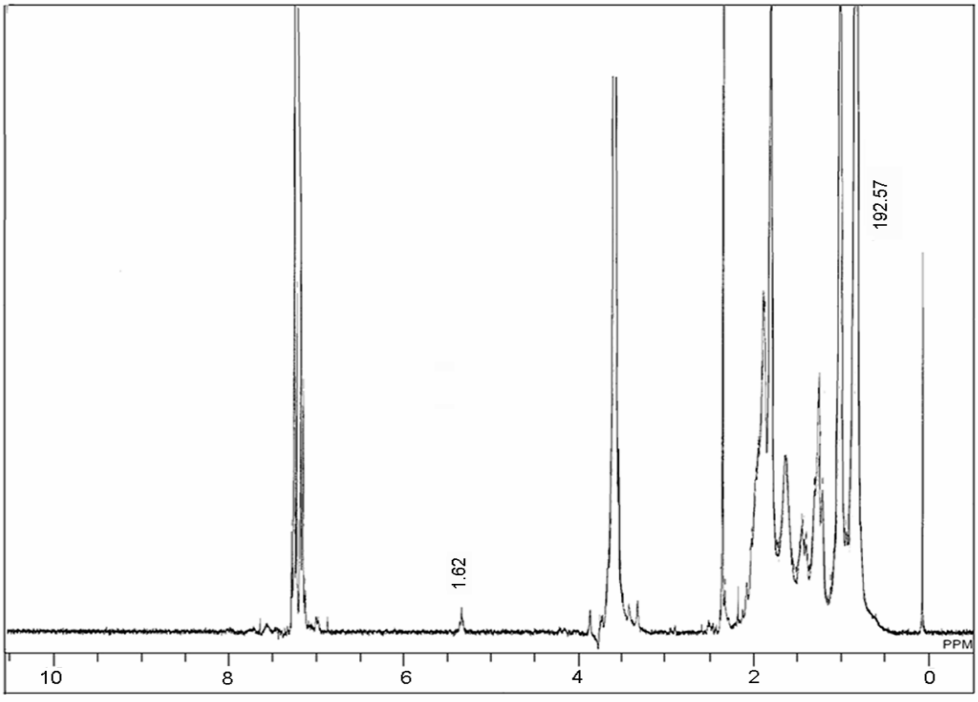


Figure 4 : ^{1}H-NMR for AL3 containing 20% macromer

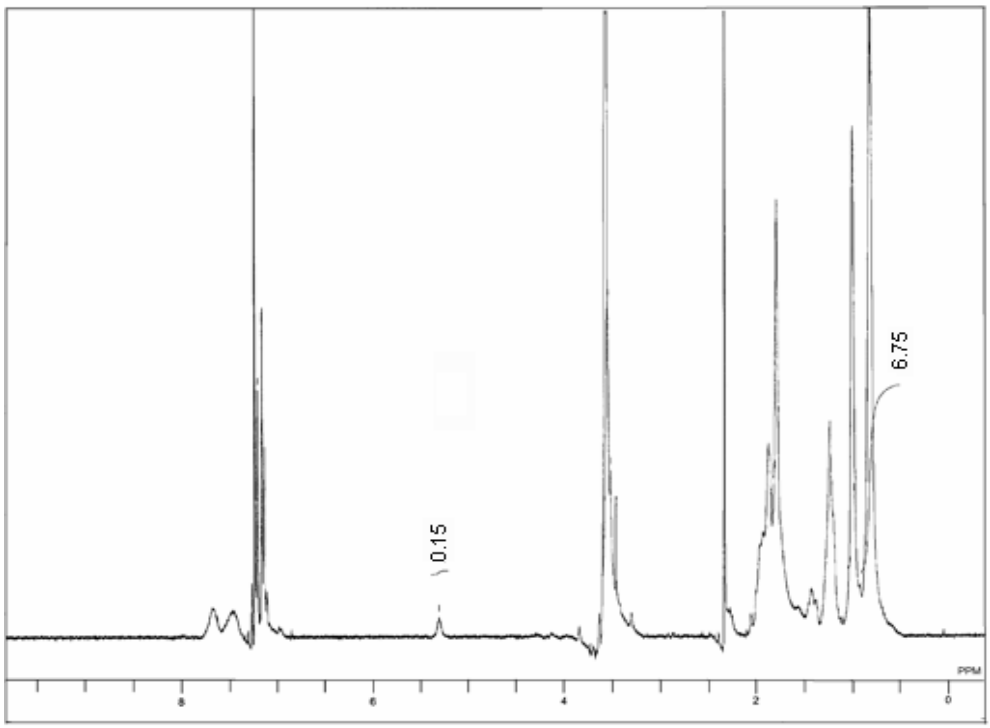


Figure 5 : ^{1}H-NMR for AM1 containing 50% macromer

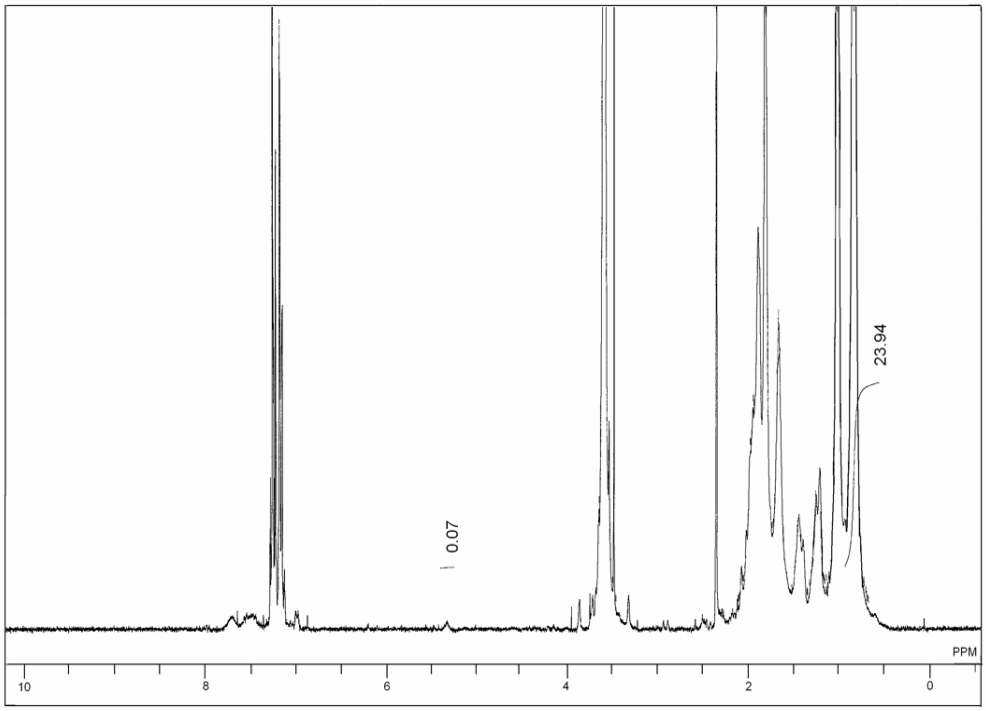


Figure 6 : ^{1}H-NMR for AM3 containing 20% macromer

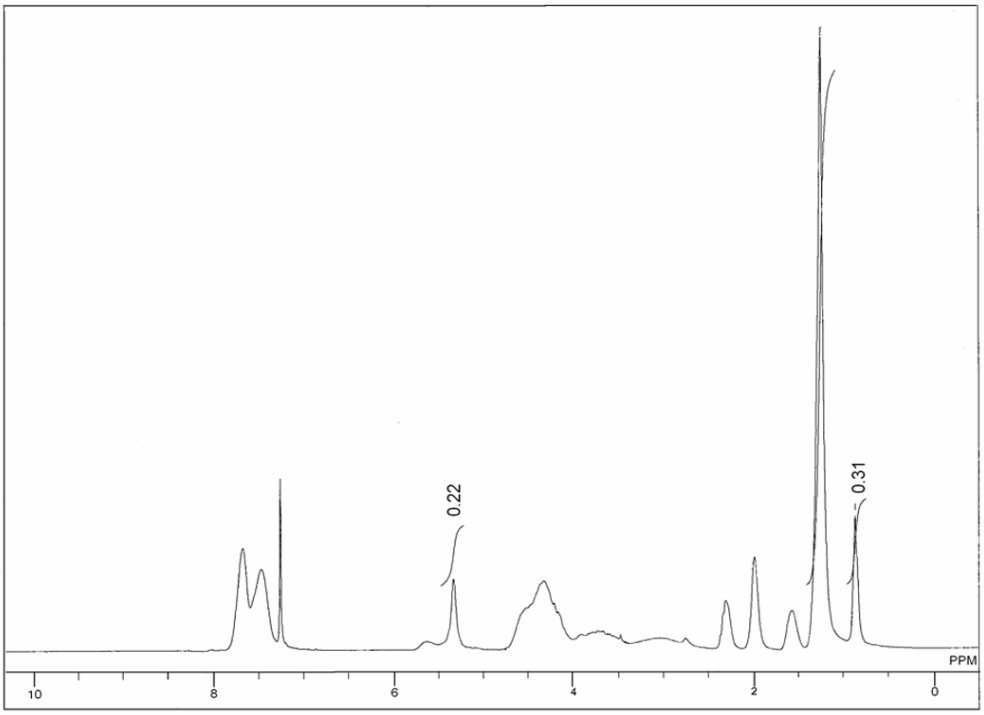


Figure 7 : ^{1}H-NMR for AlkOA28

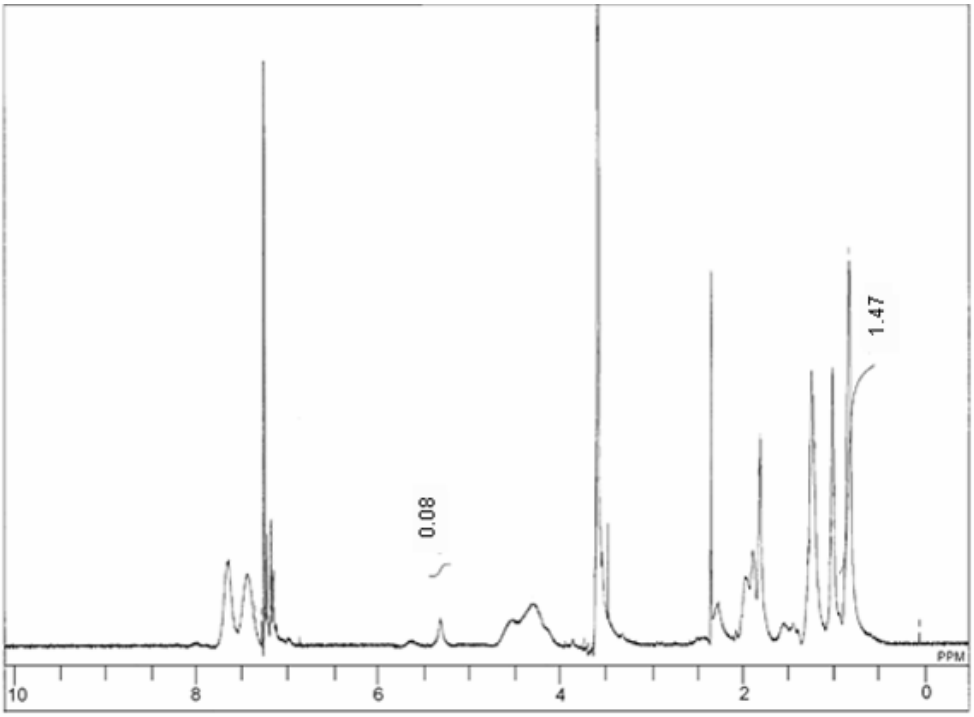


Figure 8 : ^{1}H-NMR for AS1 containing 50% macromer

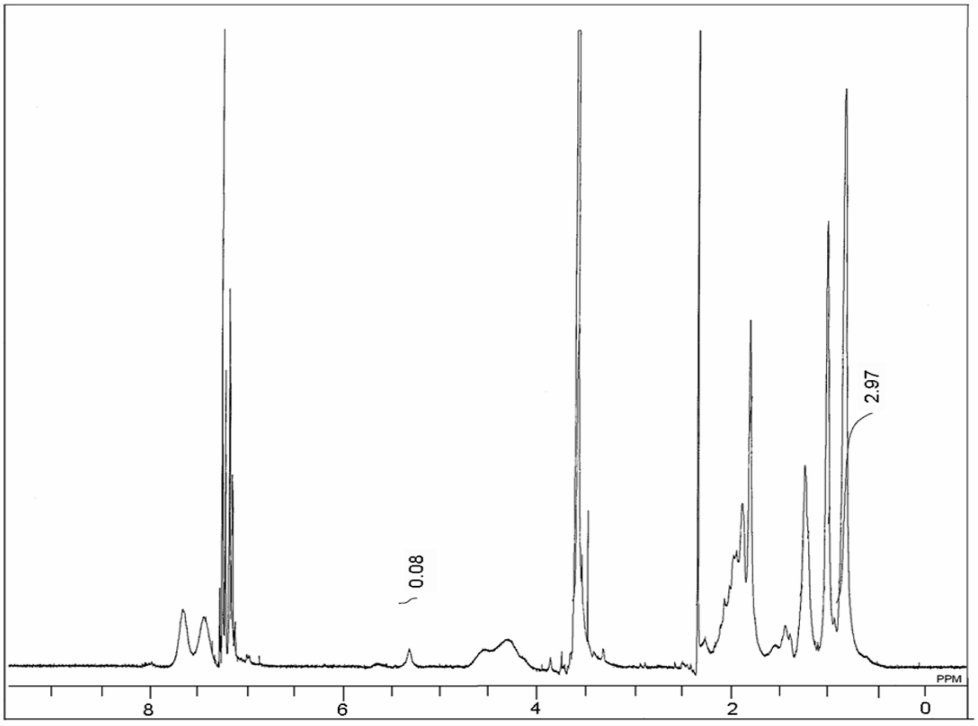


Figure 9 : ^{1}H-NMR for AS2 containing 35% macromer

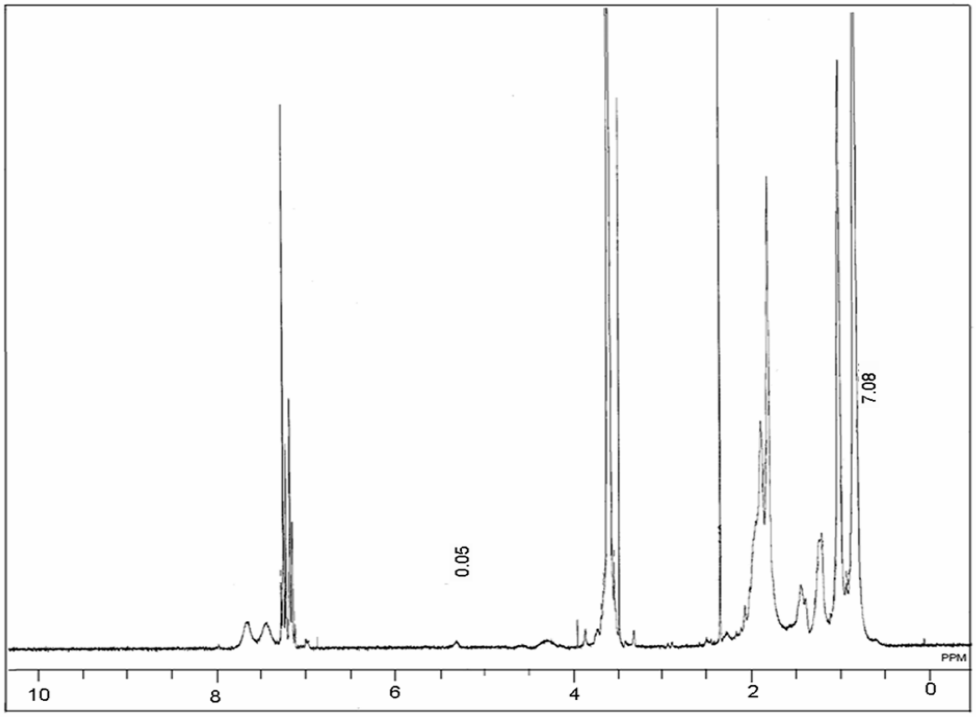


Figure 10 : ^{1}H-NMR for AS3 containing 20% macromer

APPENDIX B: DSC thermograms for macromers

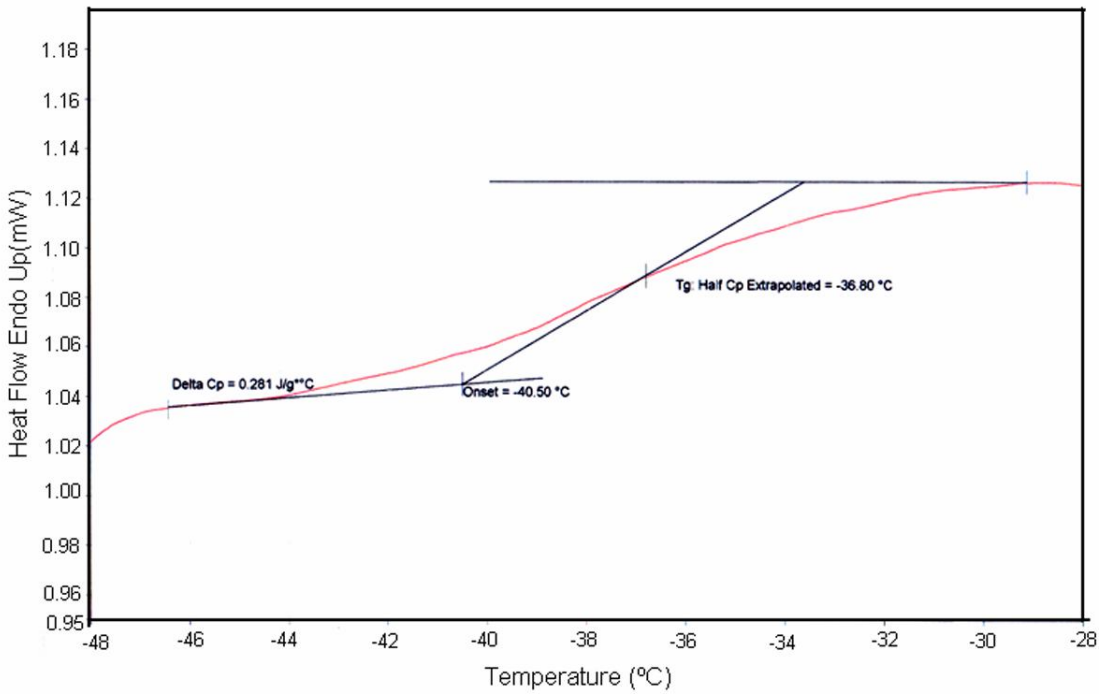


Figure 1 : DSC trace of AlkOA65

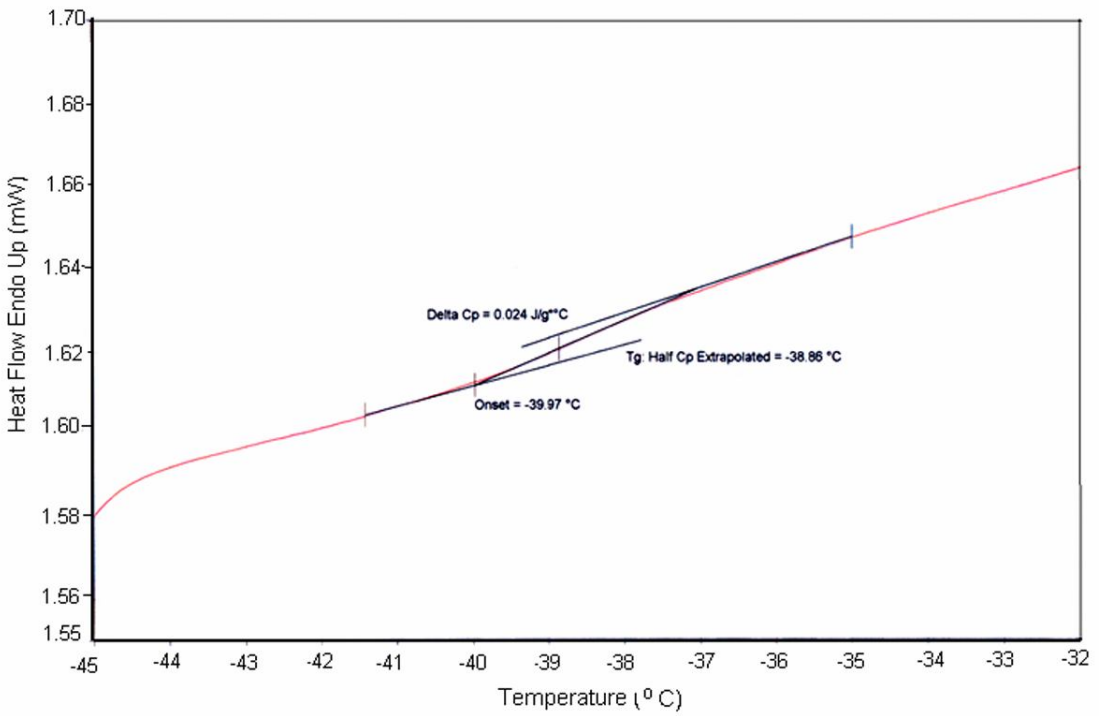


Figure 2 : DSC trace of AlkOA40

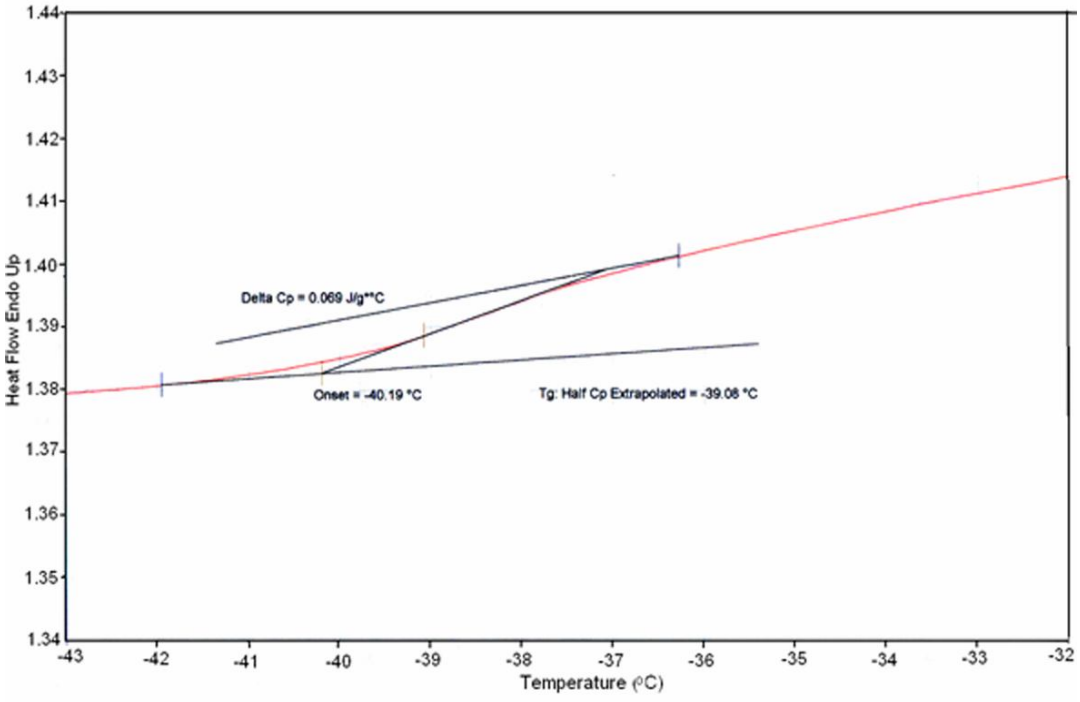


Figure 3 : DSC trace of AlkOA28

APPENDIX C: Overlaid FTIR spectra of macromers, related copolymers (MMC), oleic acid and PMMA

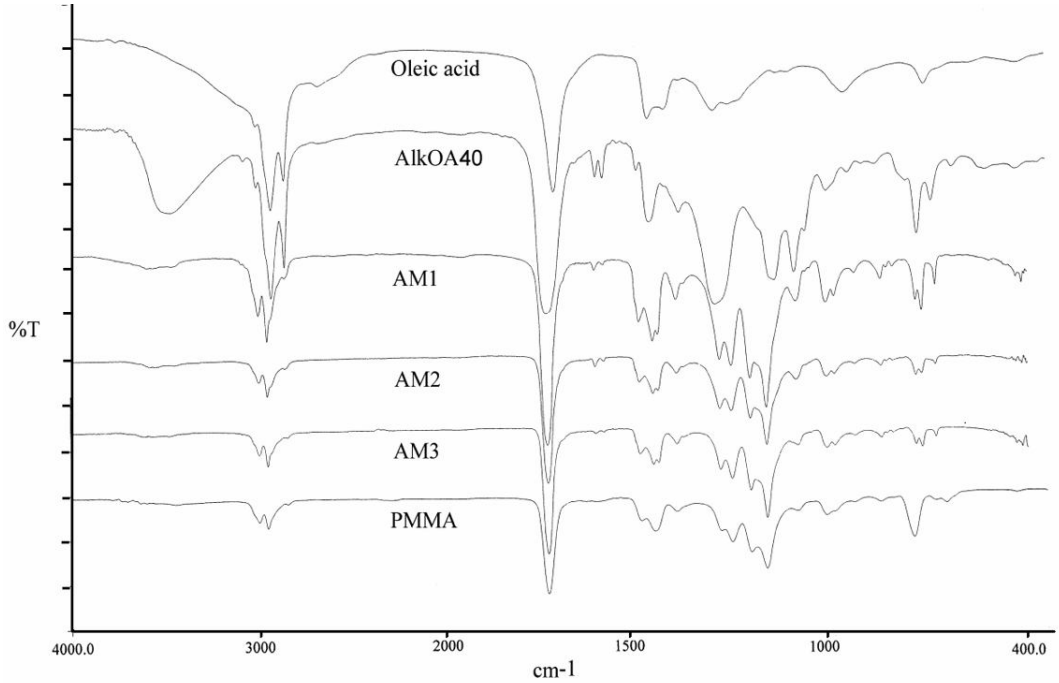


Figure 1 : FTIR spectra of AlkOA40, related copolymers, oleic acid and PMMA

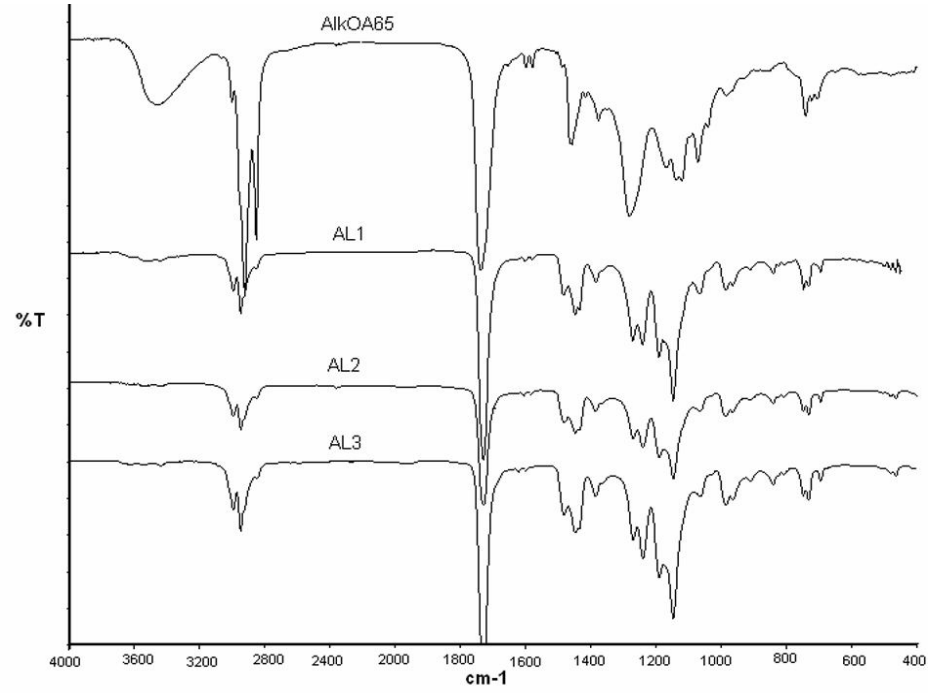


Figure 2 : FTIR spectra of AlkOA65 and related copolymers

APPENDIX D: Overlay of GPC chromatograms of AlkOA65, AlkOA28, related copolymers and PMMA

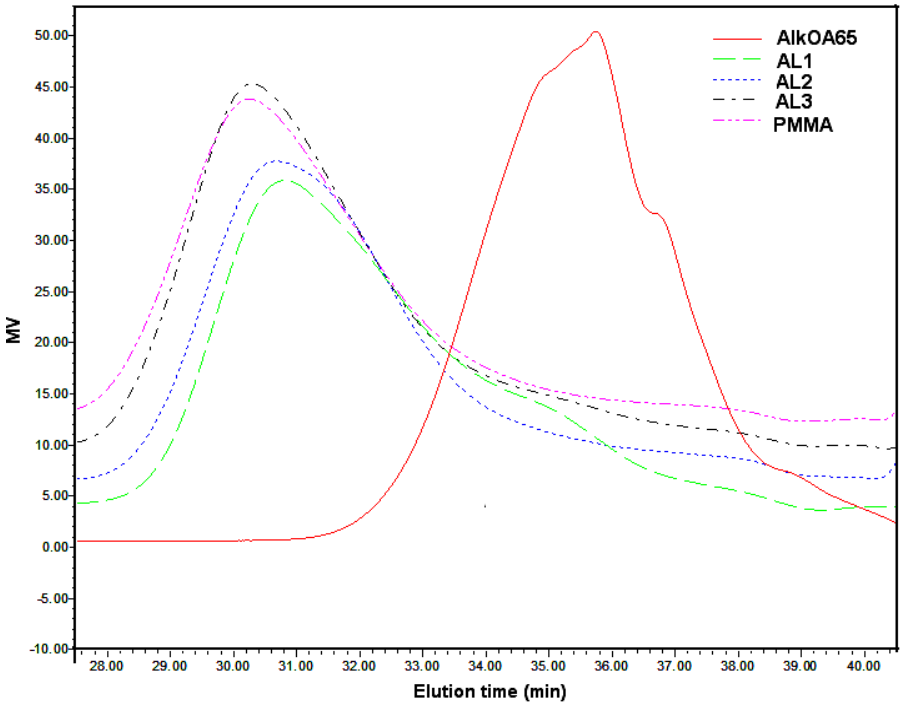


Figure 1 : Overlay of GPC chromatograms of AlkOA65, related copolymers and PMMA

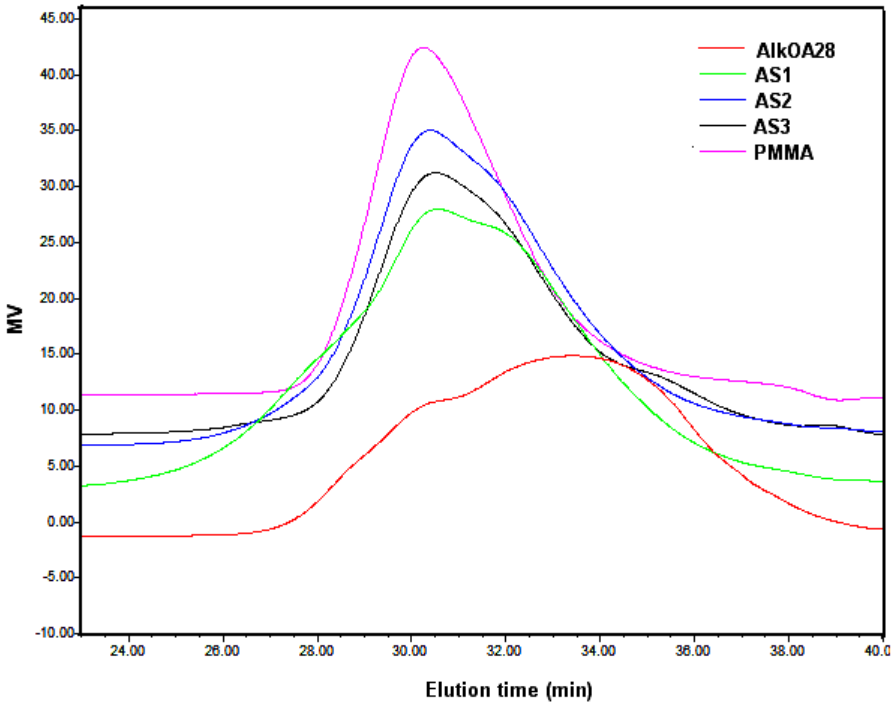


Figure 2 : Overlay of GPC chromatograms of AlkOA28, related copolymers and PMMA

APPENDIX E: DSC thermograms for copolymers (MMC)

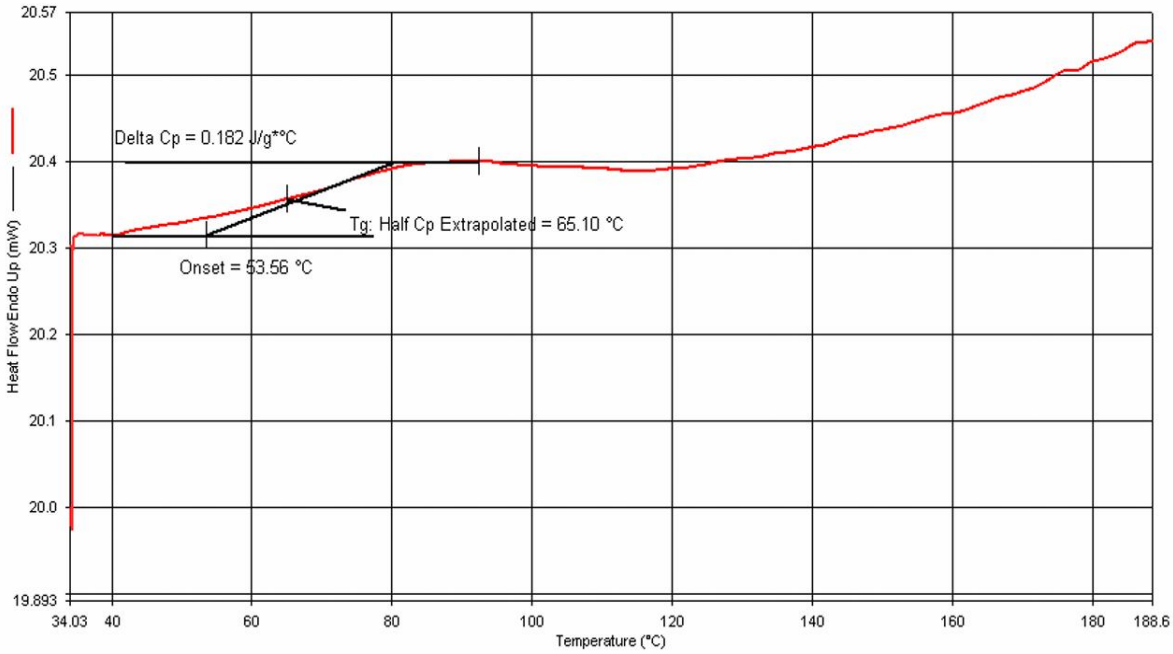


Figure 1 : DSC thermogram of AL1 containing 50% macromer

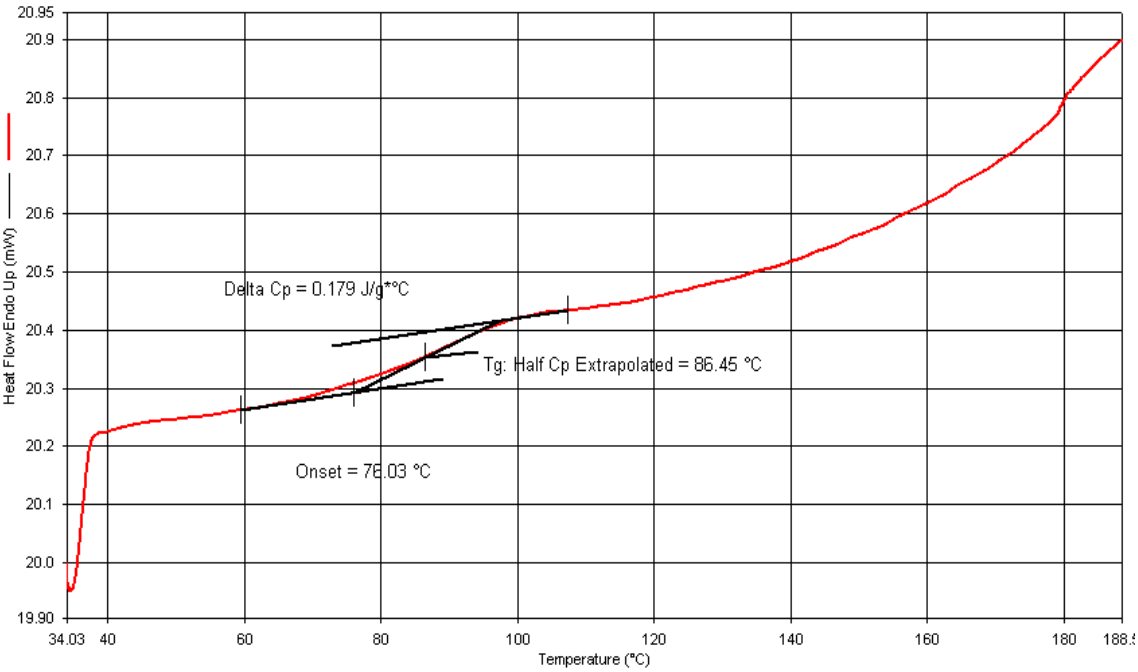


Figure 2 : DSC thermogram of AL2 containing 35% macromer

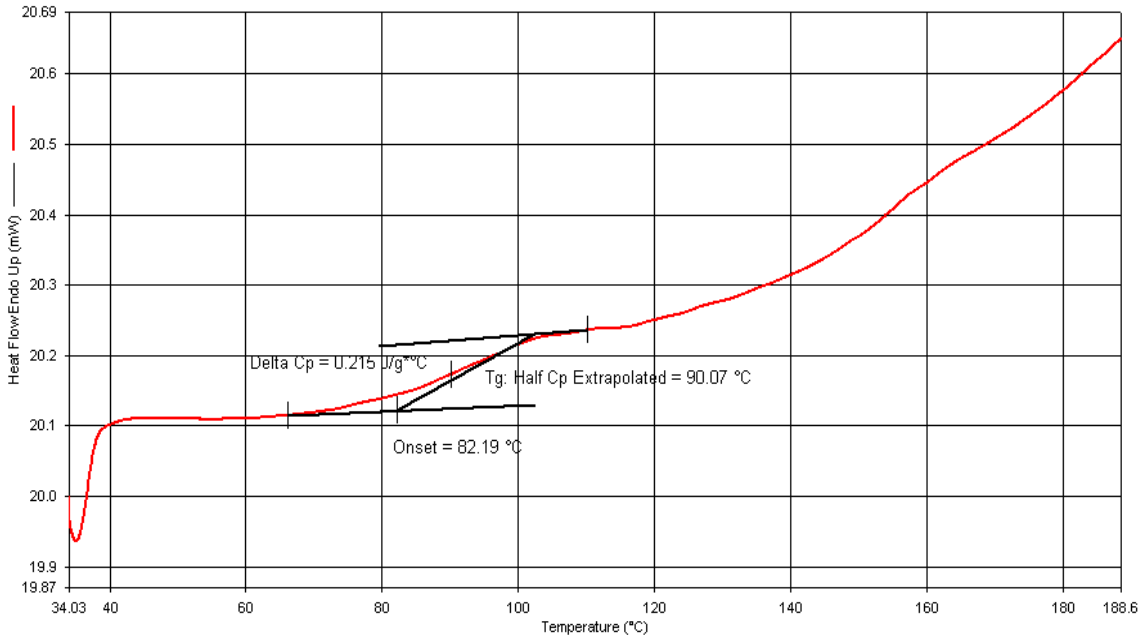


Figure 3 : DSC thermogram of AL3 containing 20% macromer

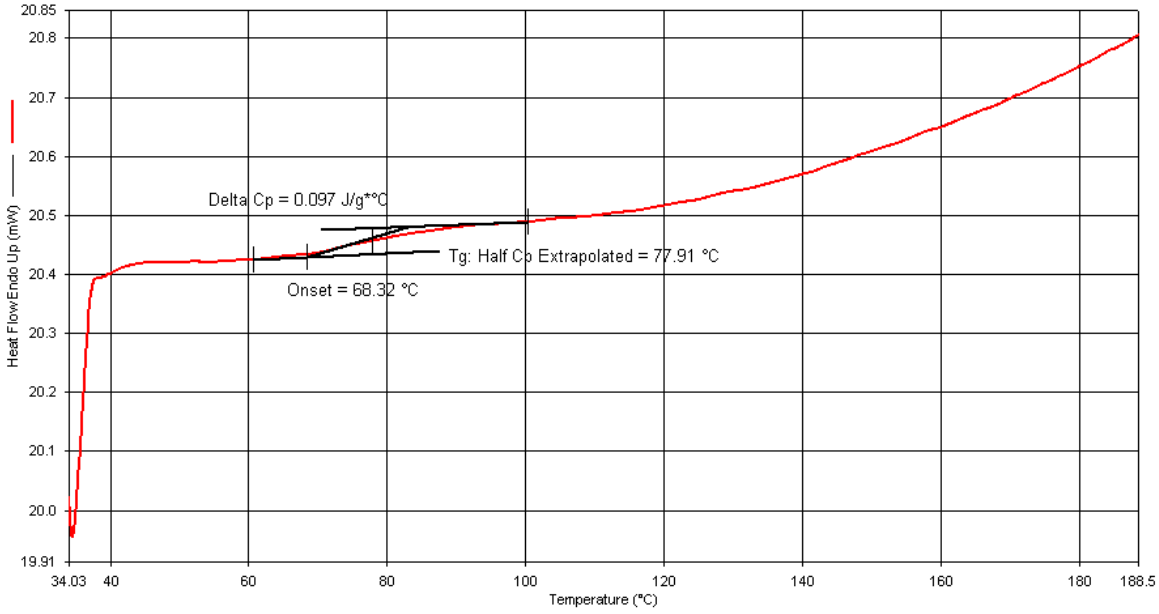


Figure 4 : DSC thermogram of AM1 containing 50% macromer

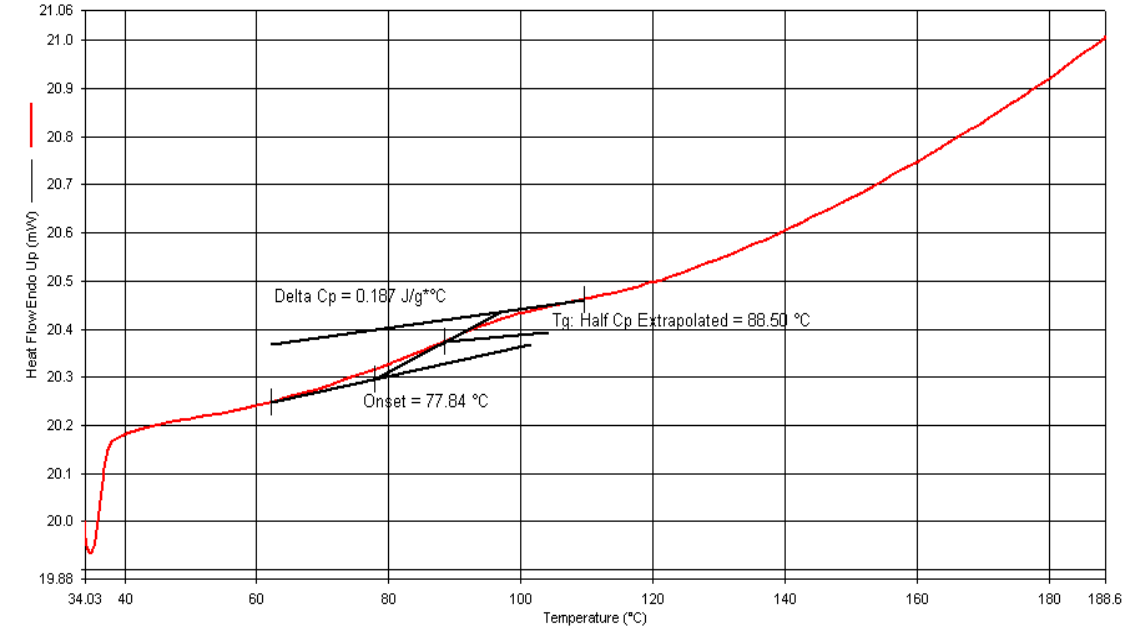


Figure 5 : DSC thermogram of AM2 containing 35% macromer

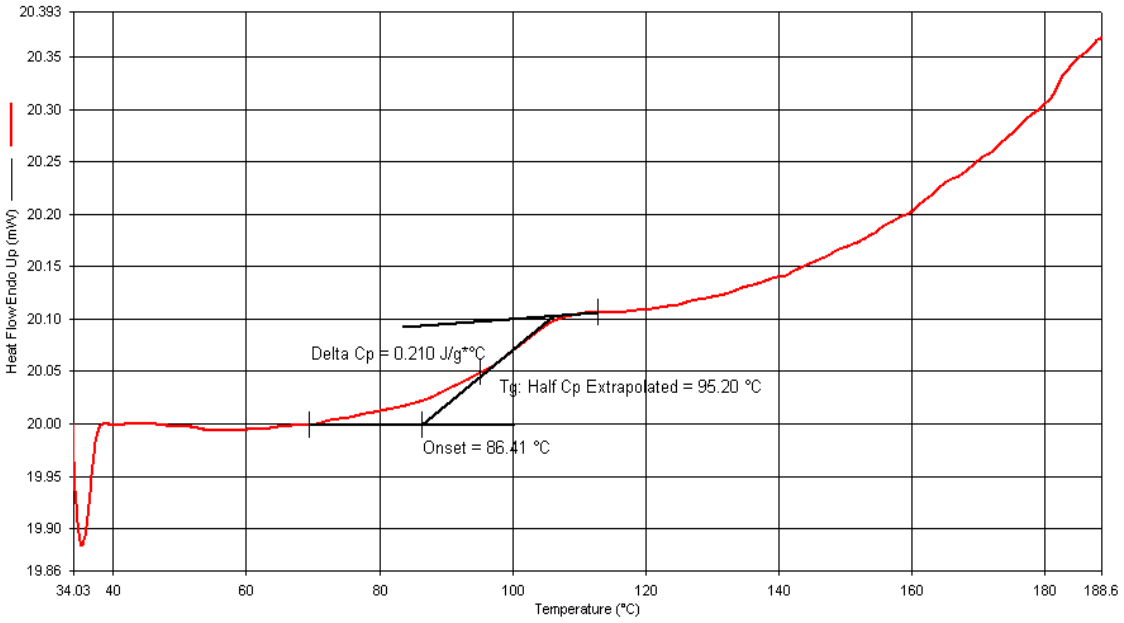


Figure 6 : DSC thermogram of AM3 containing 20% macromer

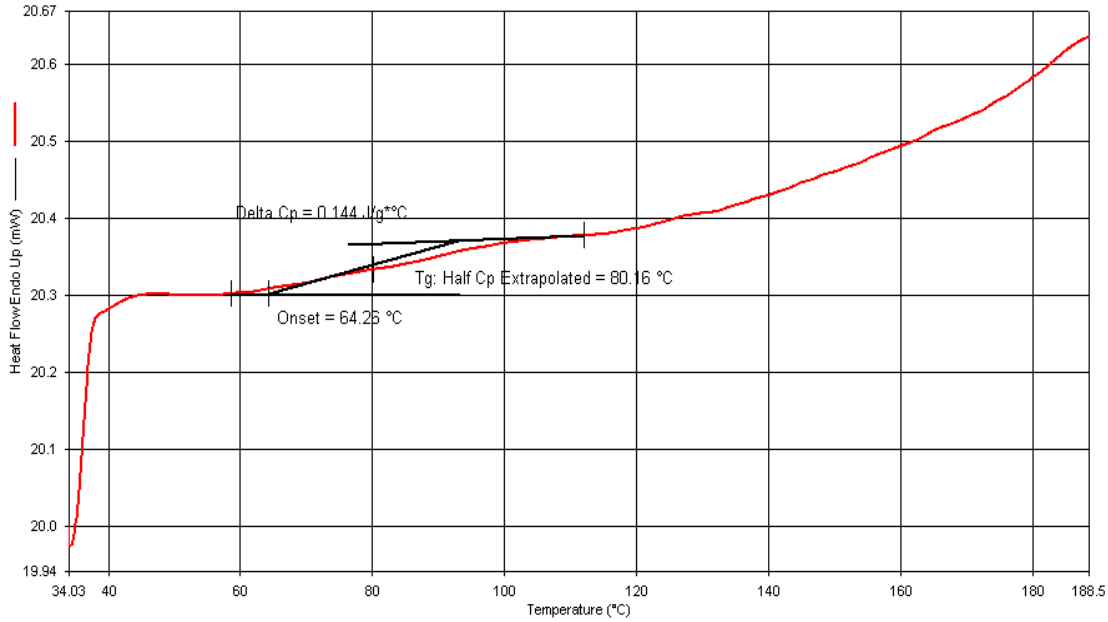


Figure 7 : DSC thermogram of AS1 containing 50% macromer

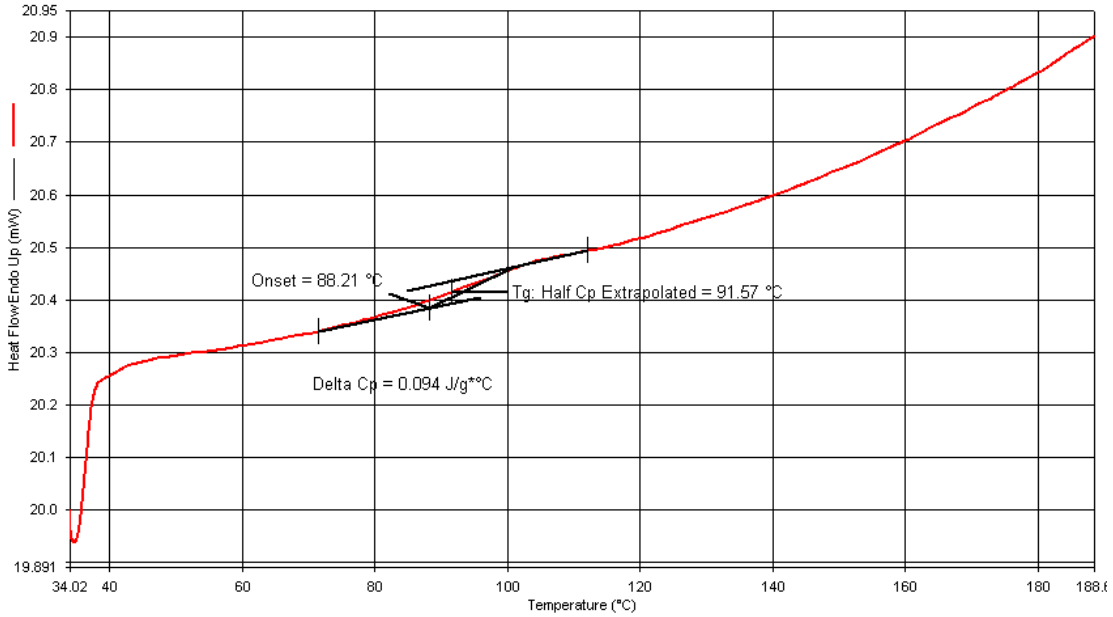


Figure 8 : DSC thermogram of AS2 containing 35% macromer

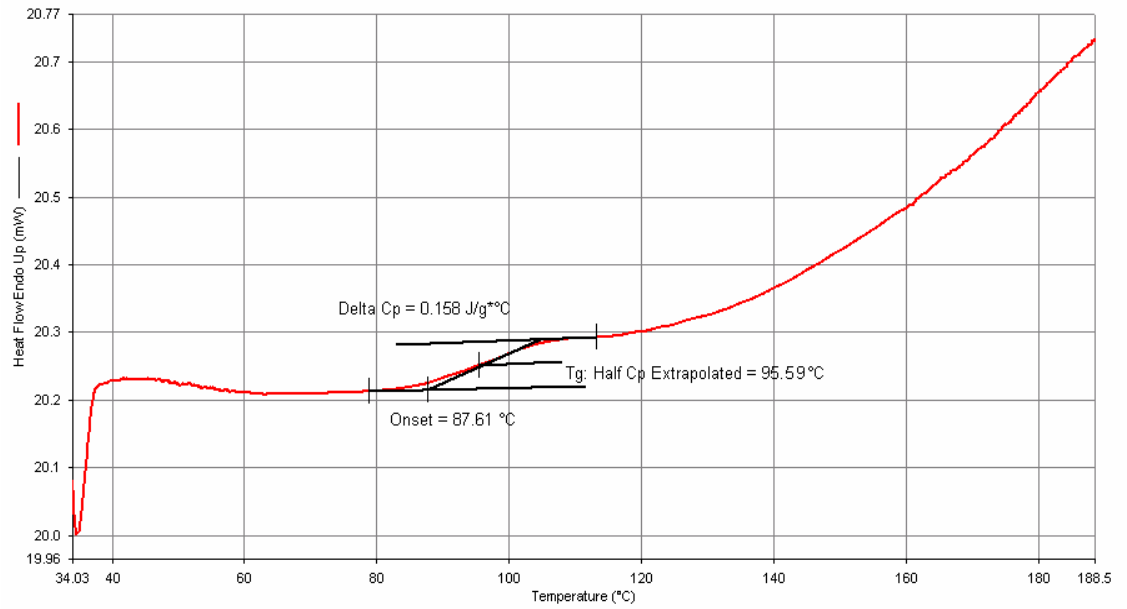


Figure 9 : DSC thermogram of AS3 containing 20% macromer

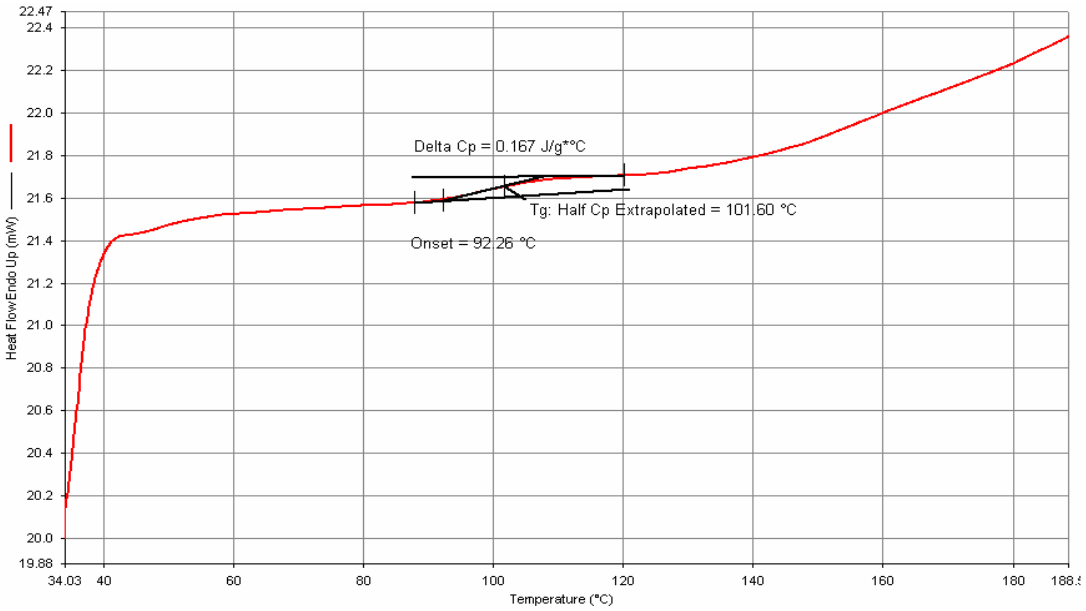


Figure 10 : DSC thermogram of PMMA

APPENDIX F: TGA thermograms for copolymers (MMC)

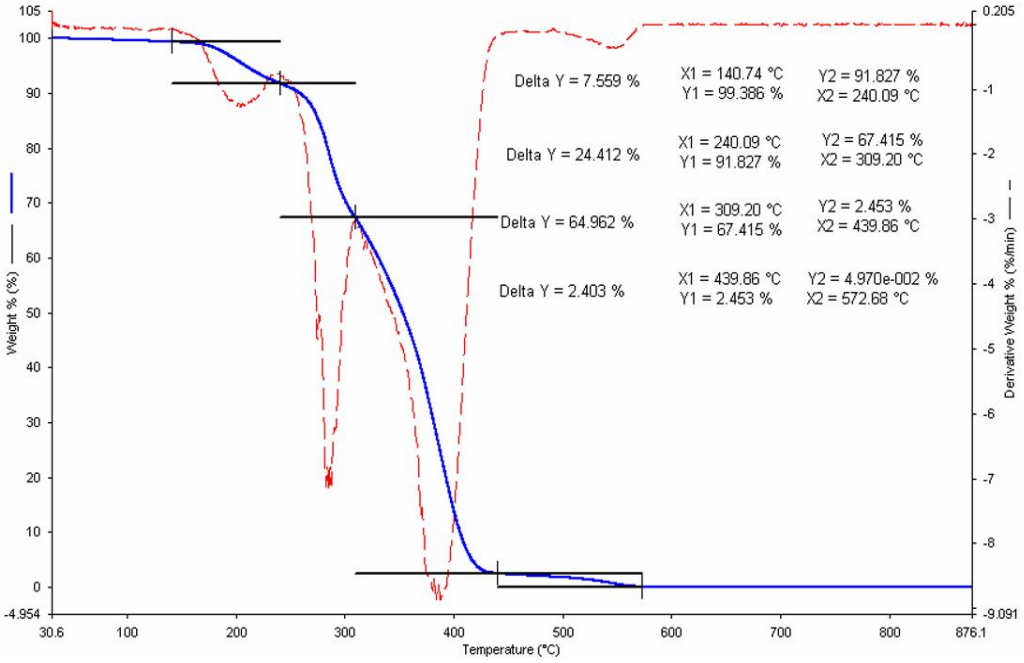


Figure 1 : TGA thermogram for AL1 containing 50% macromer

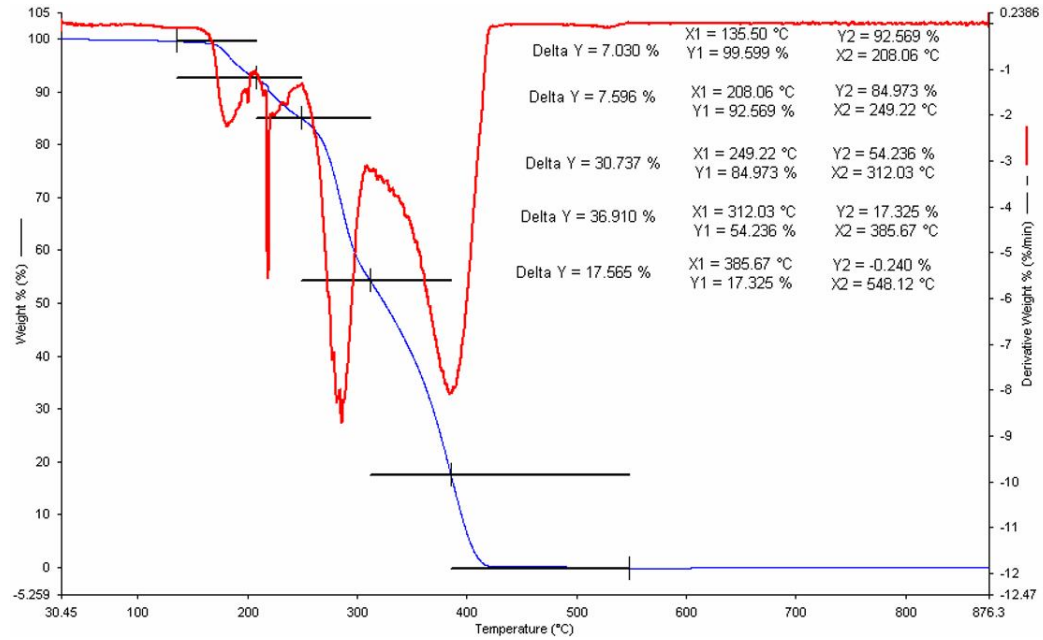


Figure 2 : TGA thermogram for AL2 containing 35% macromer

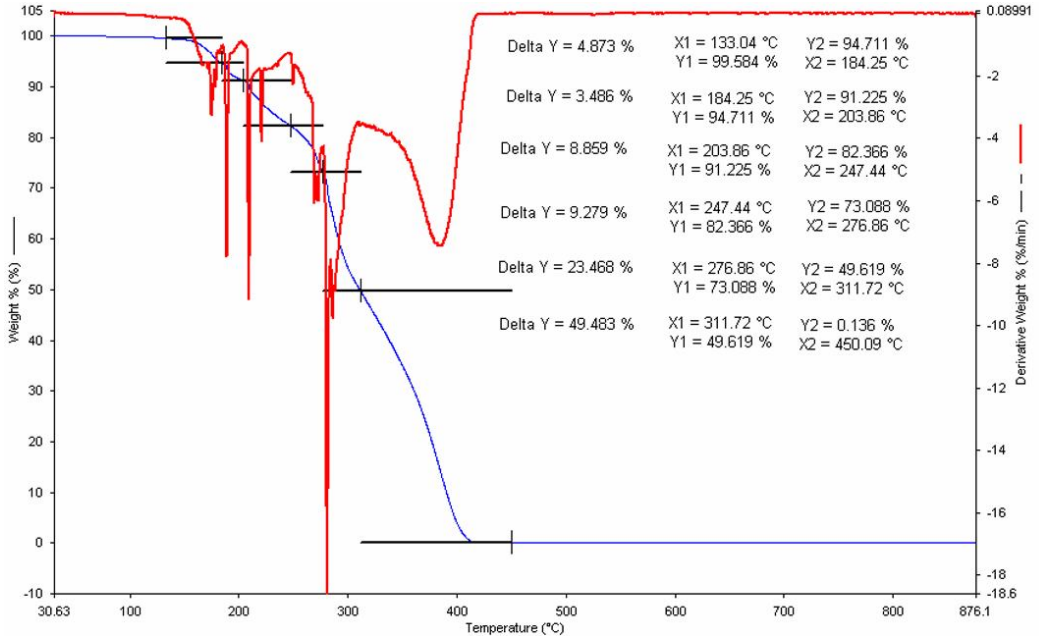


Figure 3 : TGA thermogram for AL3 containing 20% macromer

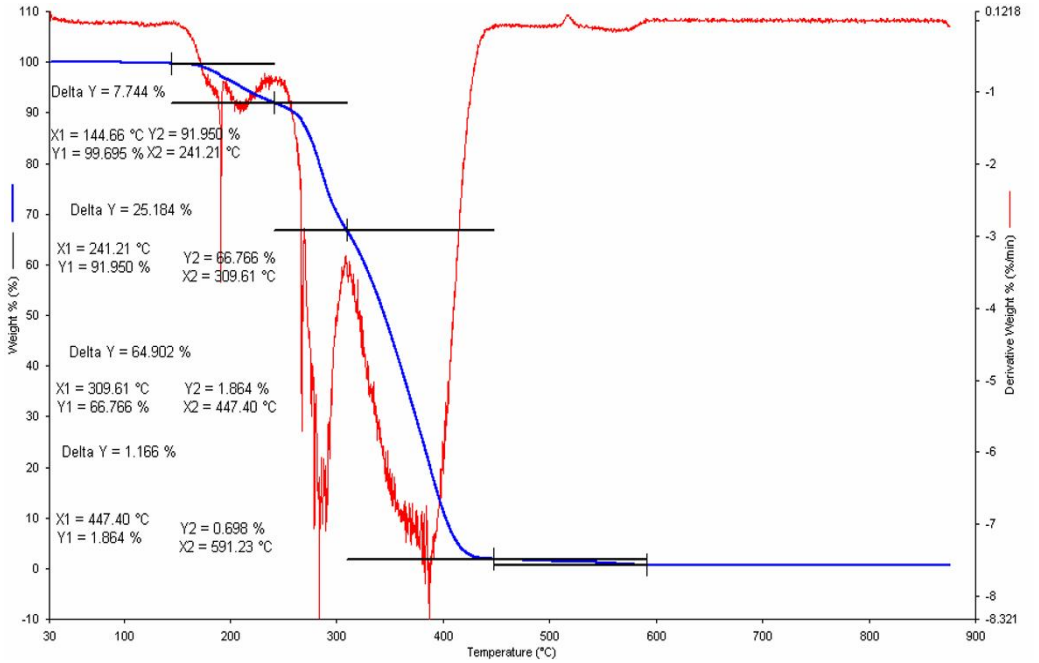


Figure 4 : TGA thermogram for AM1 containing 50% macromer

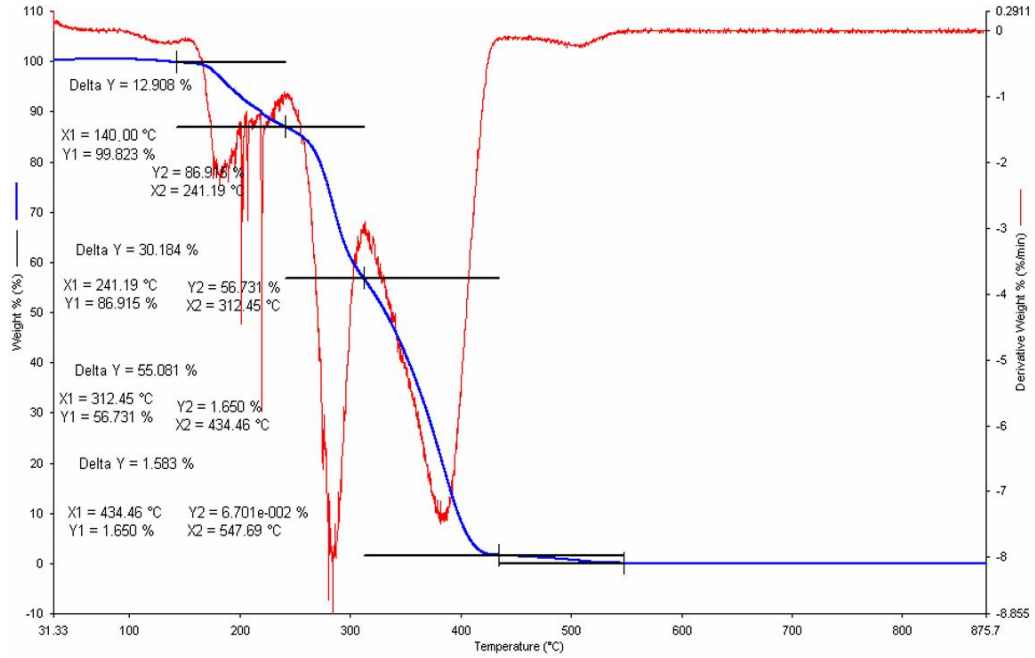


Figure 5 : TGA thermogram for AM2 containing 35% macromer

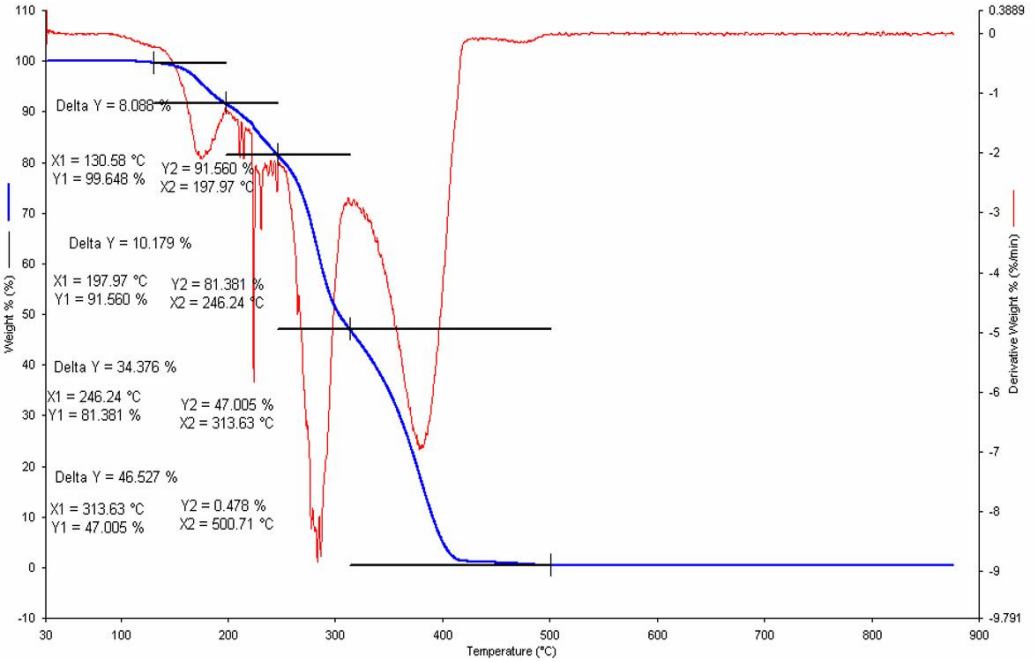


Figure 6 : TGA thermogram for AM3 containing 20% macromer

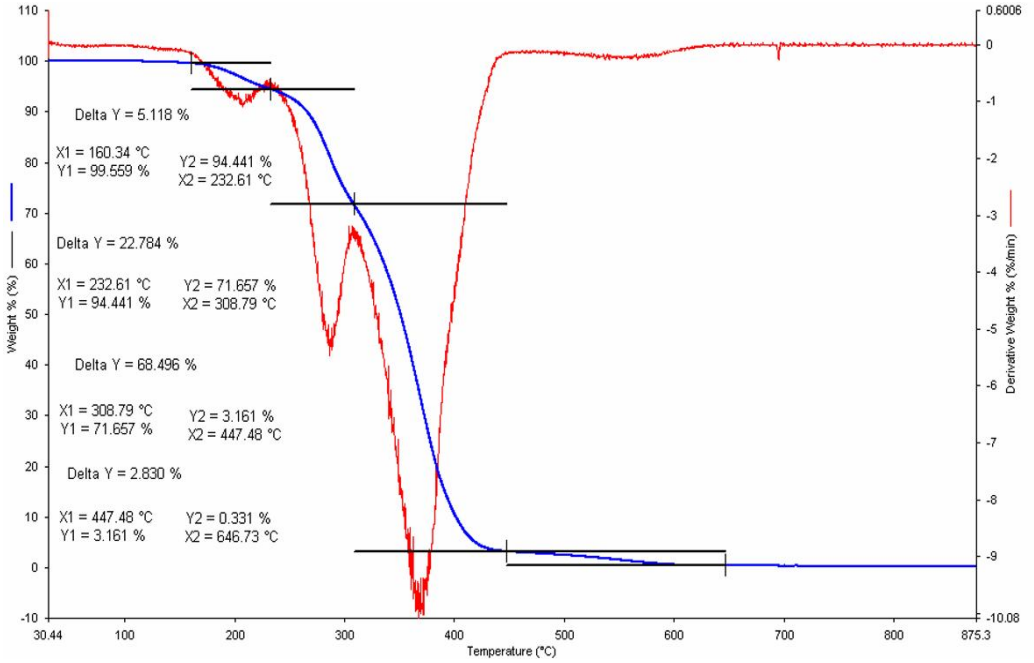


Figure 7 : TGA thermogram for AS1 containing 50% macromer

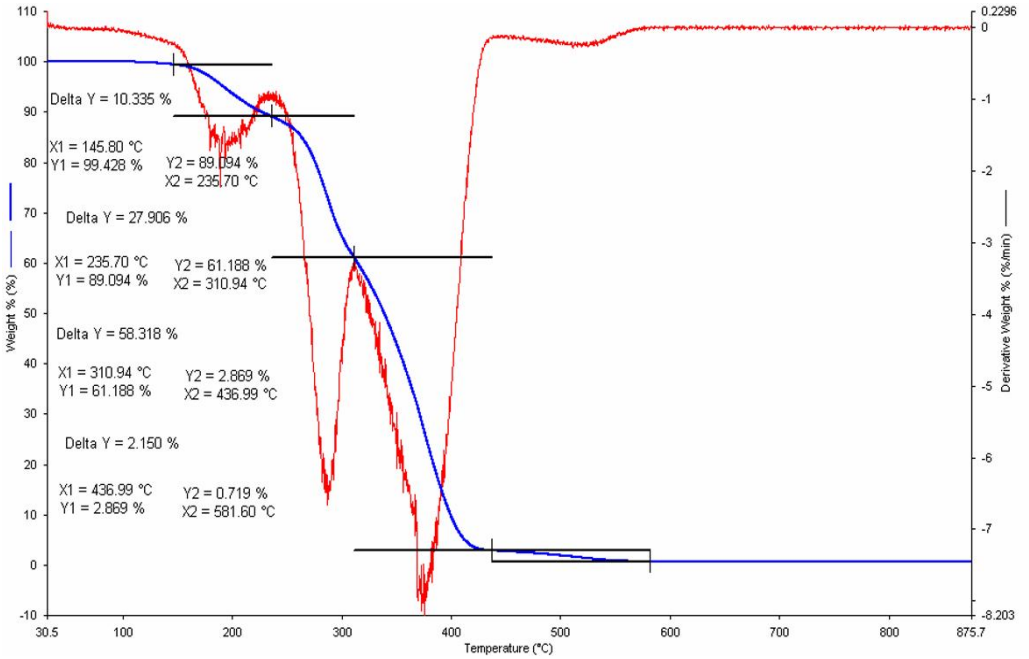


Figure 8 : TGA thermogram for AS2 containing 35% macromer

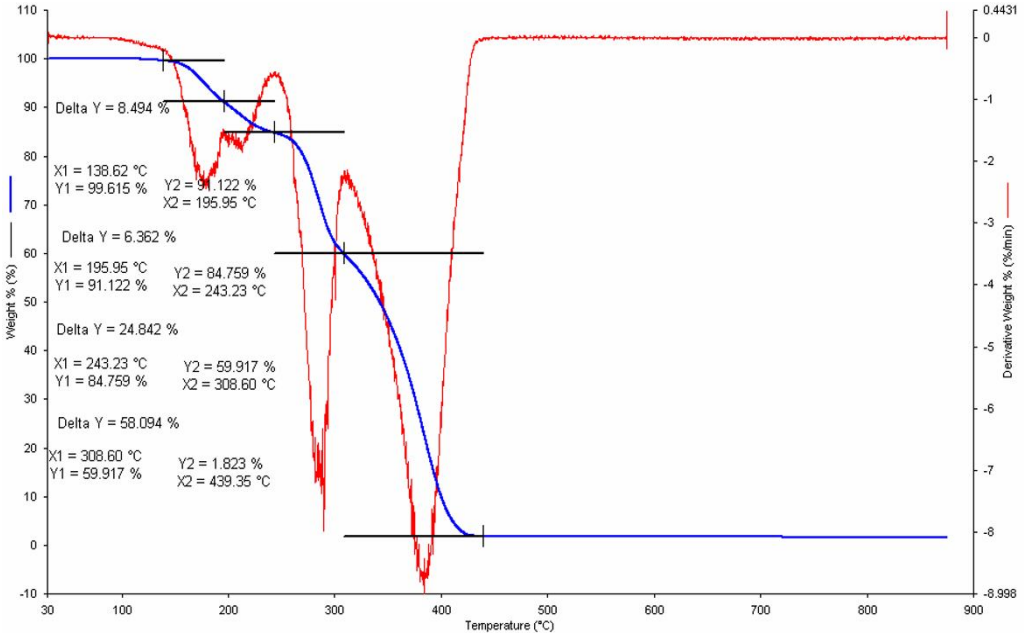


Figure 9 : TGA thermogram for AS3 containing 20% macromer

APPENDIX G: DMA graphs for copolymers (MMC)

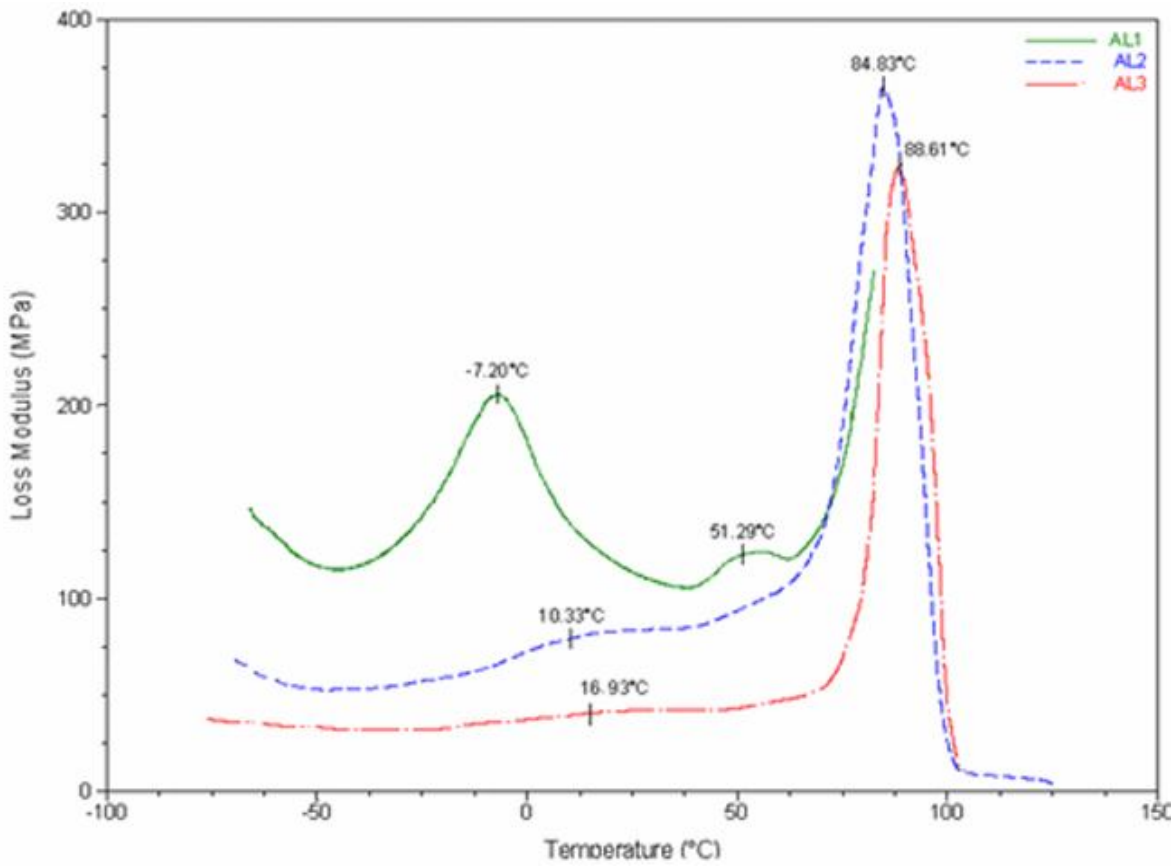


Figure 1 : Plots of loss modulus versus temperature for samples AL1, AL2 and AL3 containing 50%, 35% and 20% macromer respectively

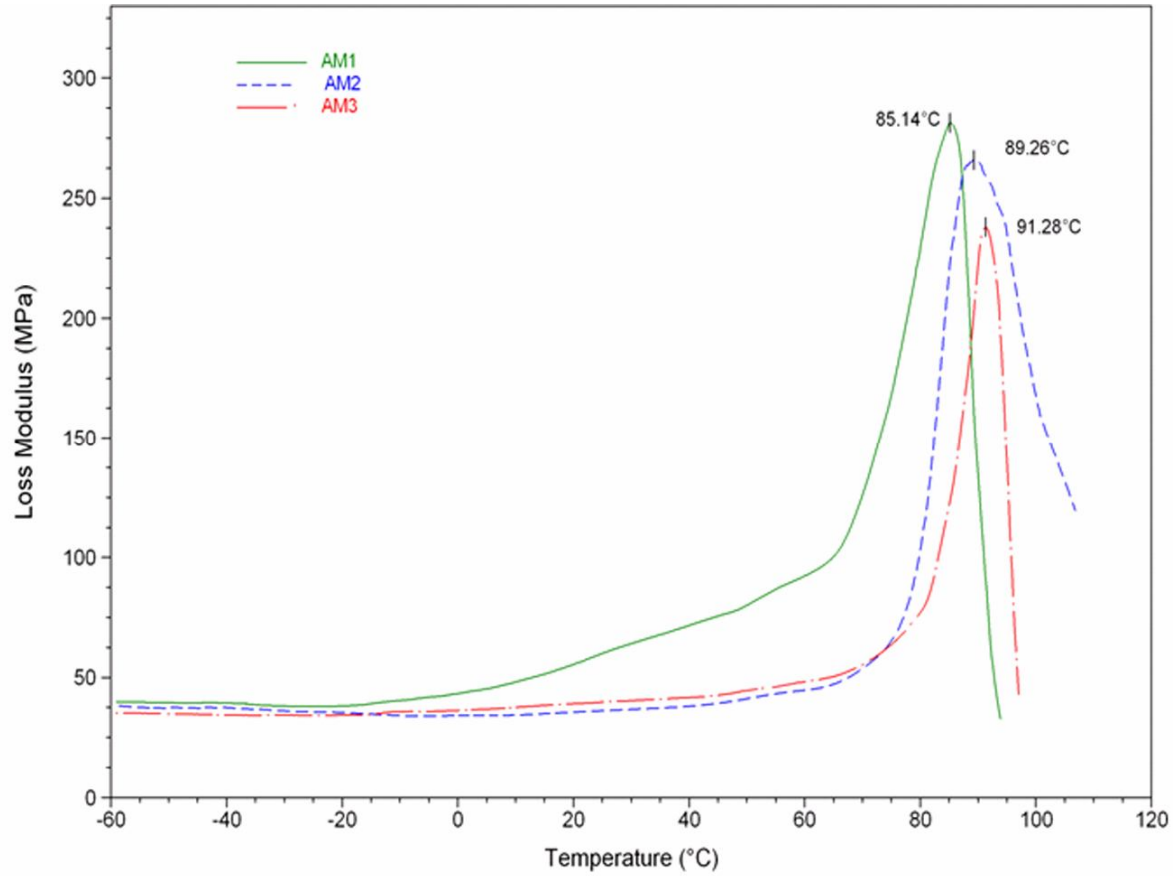


Figure 2 : Plots of loss modulus versus temperature for samples AM1, AM2 and AM3 containing 50%, 35% and 20% macromer respectively

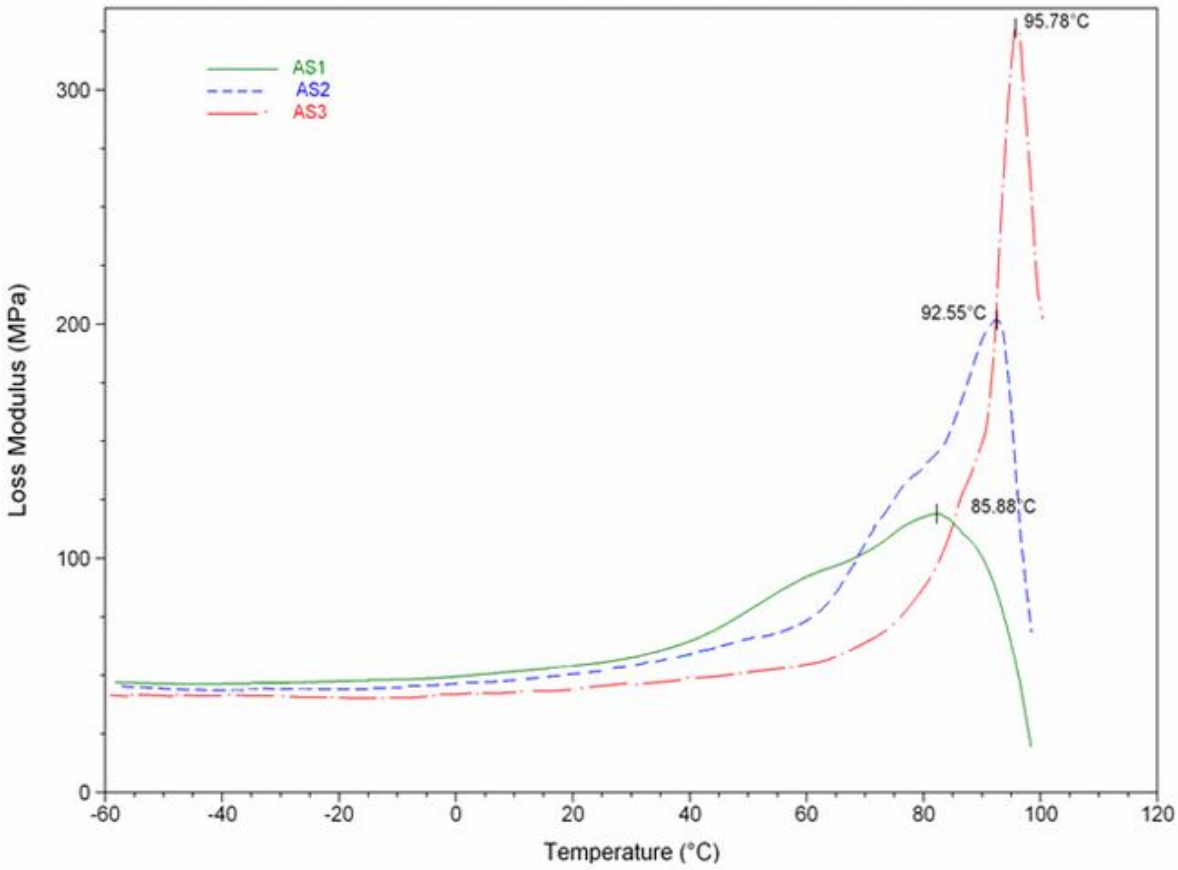


Figure 3 : Plots of loss modulus versus temperature for samples AS1, AS2 and AS3 containing 50%, 35% and 20% macromer respectively

APPENDIX H: FTIR spectra for modified copolymers with BA (MMBC)

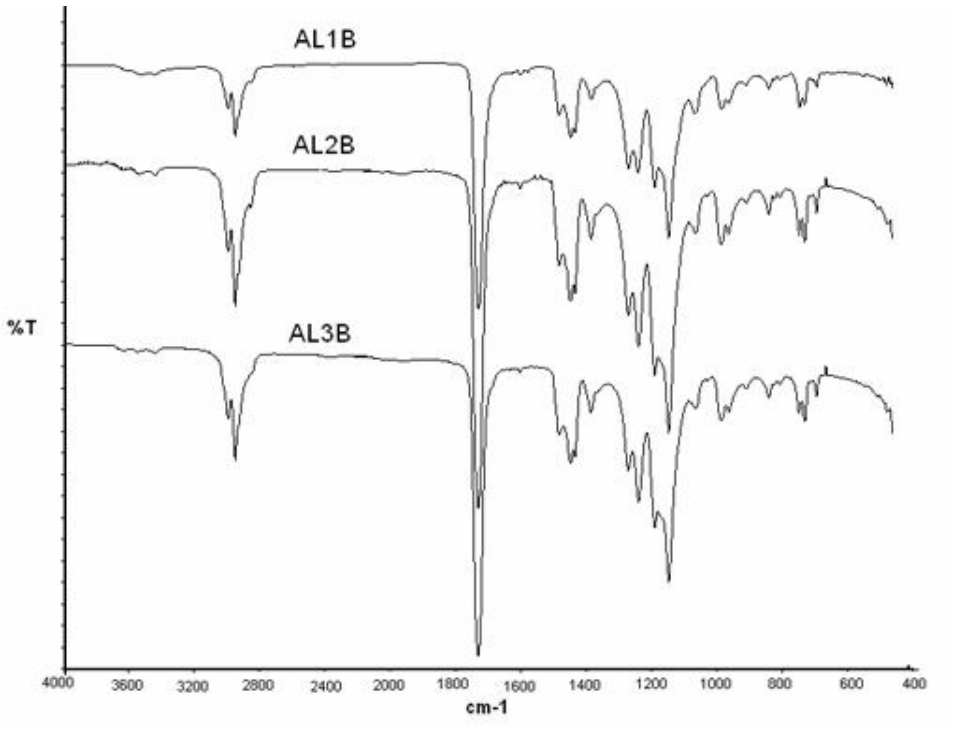


Figure 1 : Overlaid FTIR spectra for ALB series

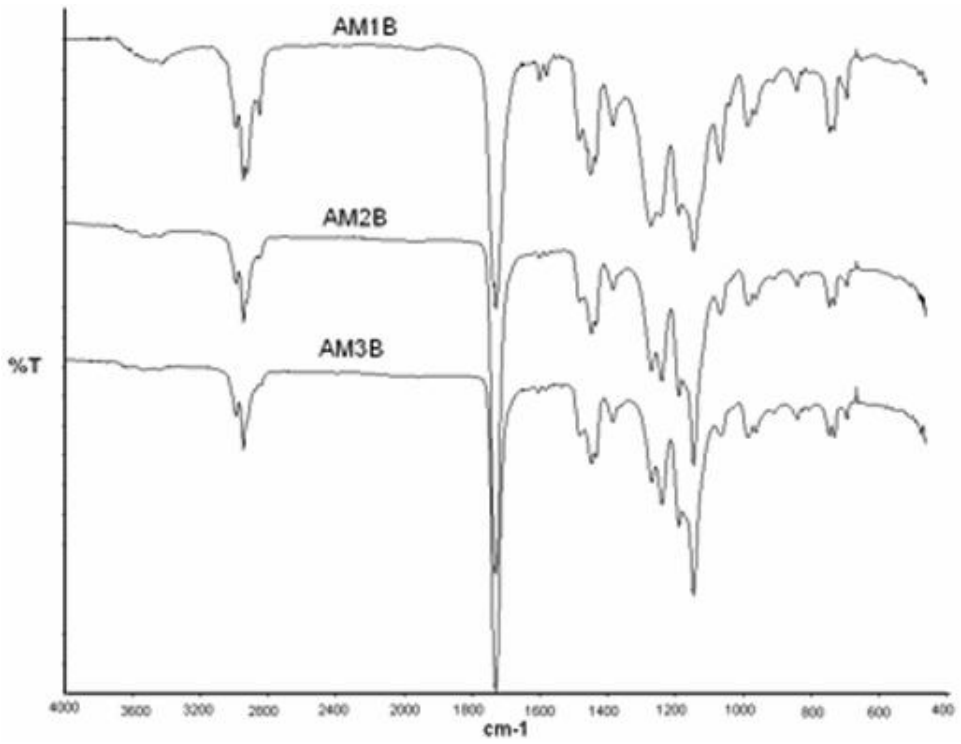


Figure 2 : Overlay FTIR spectra for AMB series

APPENDIX I: ^{1}H-NMR spectra for modified copolymers with BA (MMBC)

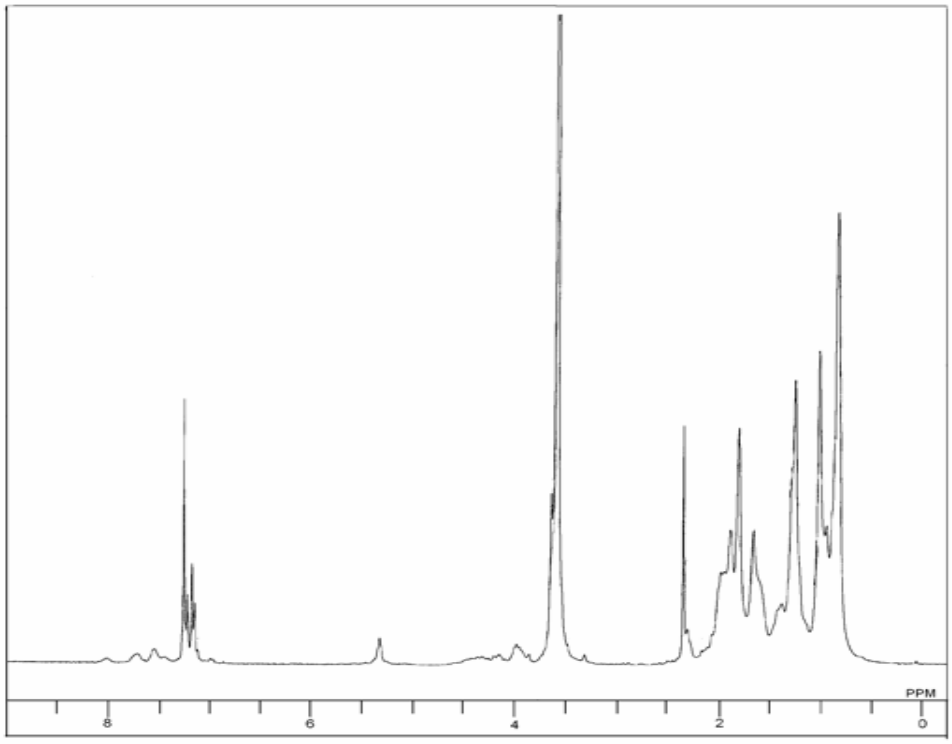


Figure 1 : ^{1}H-NMR for AL1B containing 50% macromer

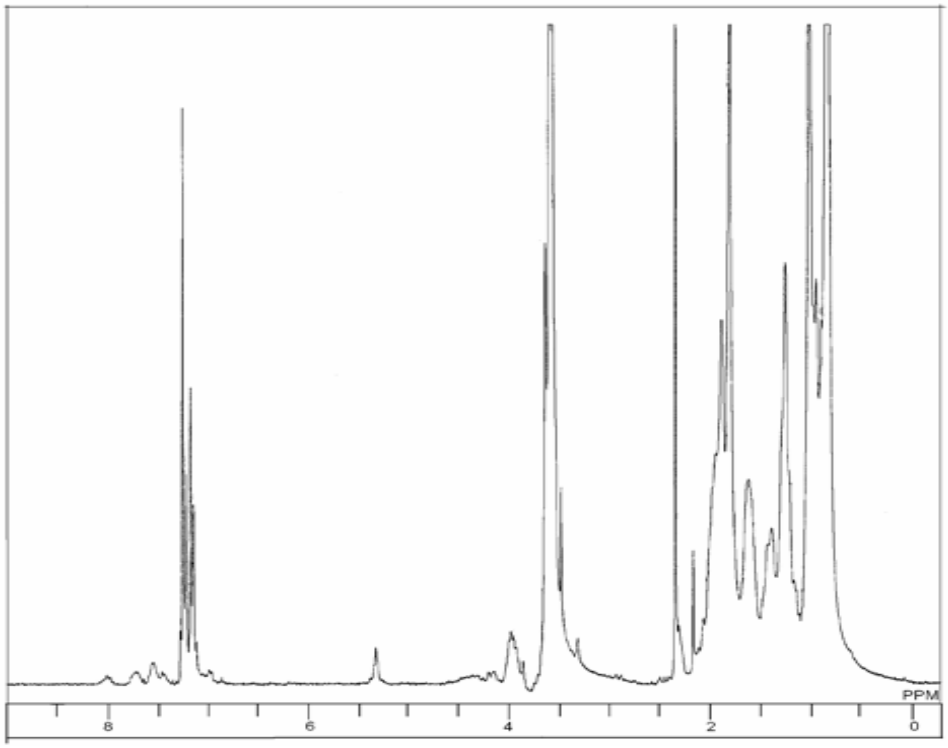


Figure 2 : ^{1}H-NMR for AL2B containing 35% macromer

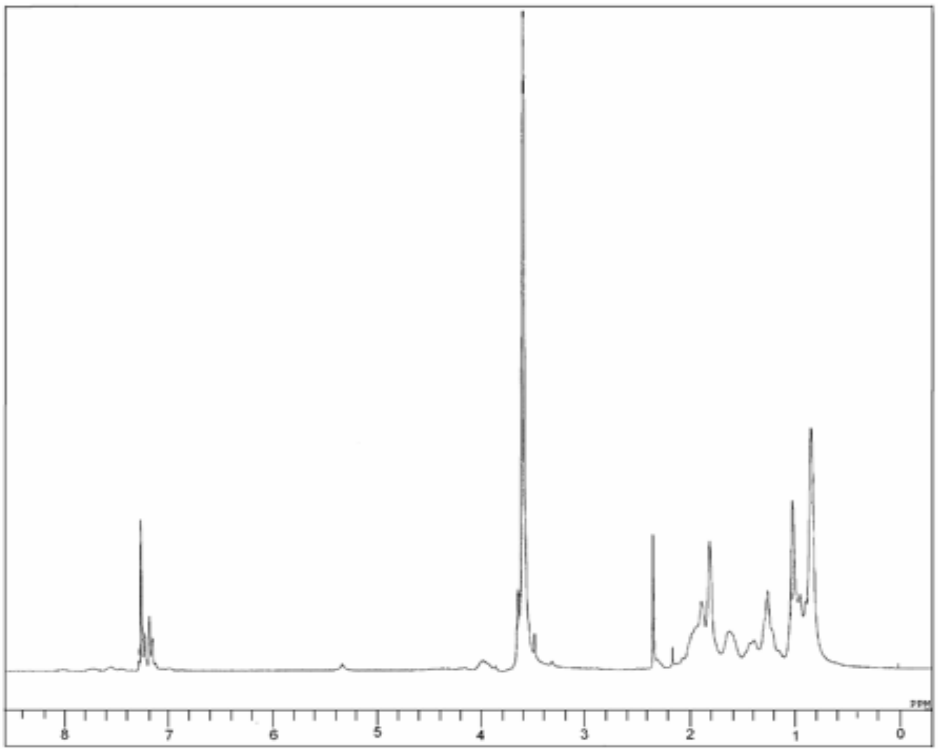


Figure 3 : ^{1}H-NMR for AL3B containing 20% macromer

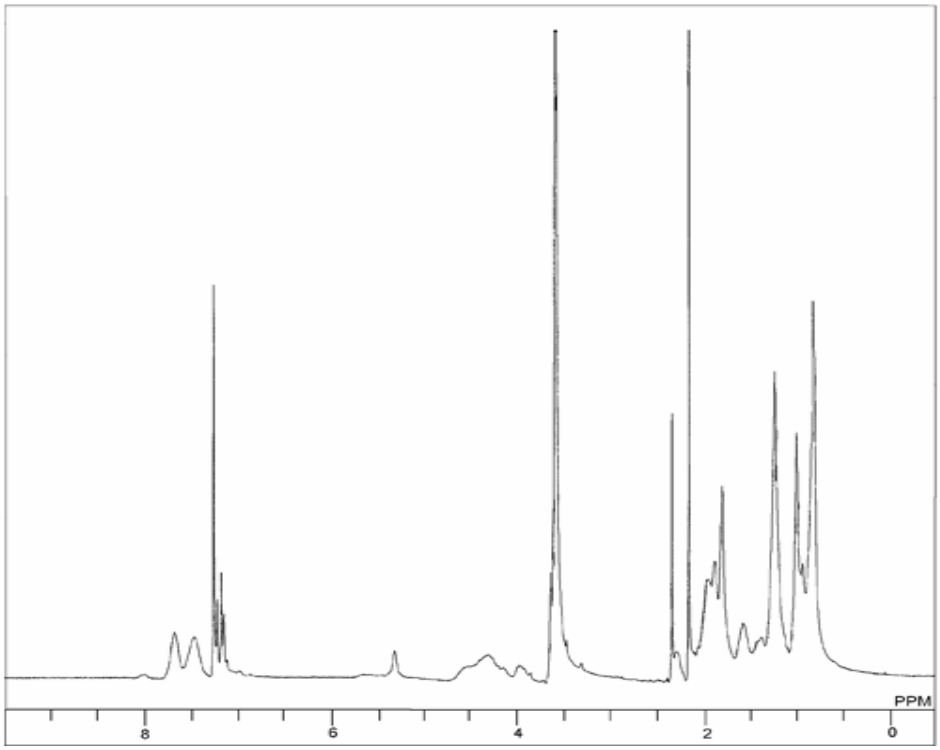


Figure 4 : ^{1}H-NMR for AM1B containing 50% macromer

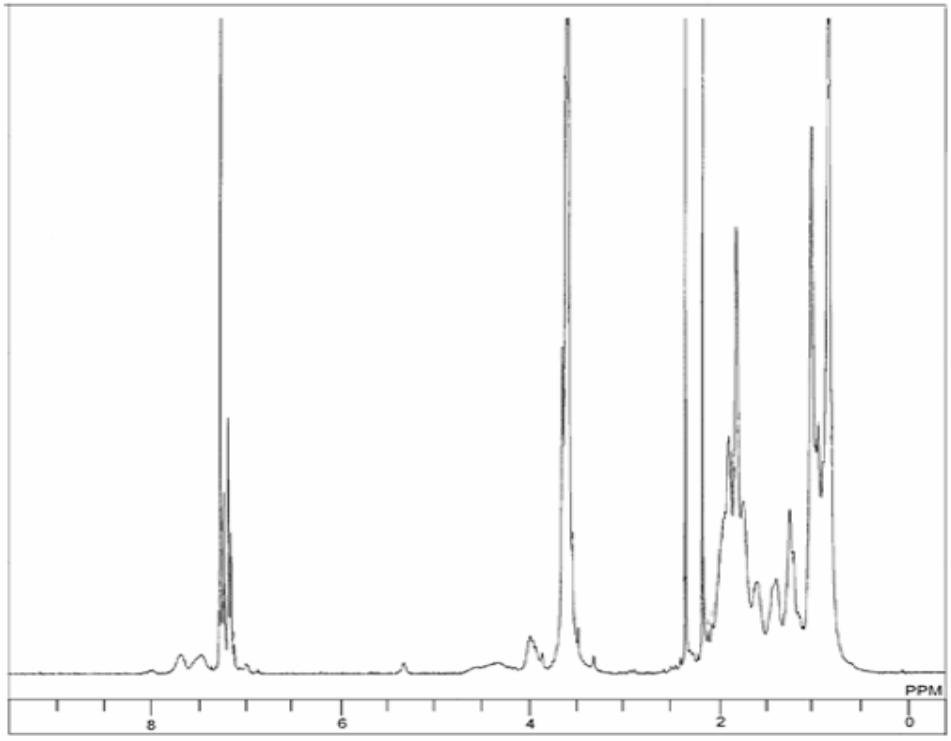


Figure 5 : ^{1}H-NMR for AM3B containing 20% macromer

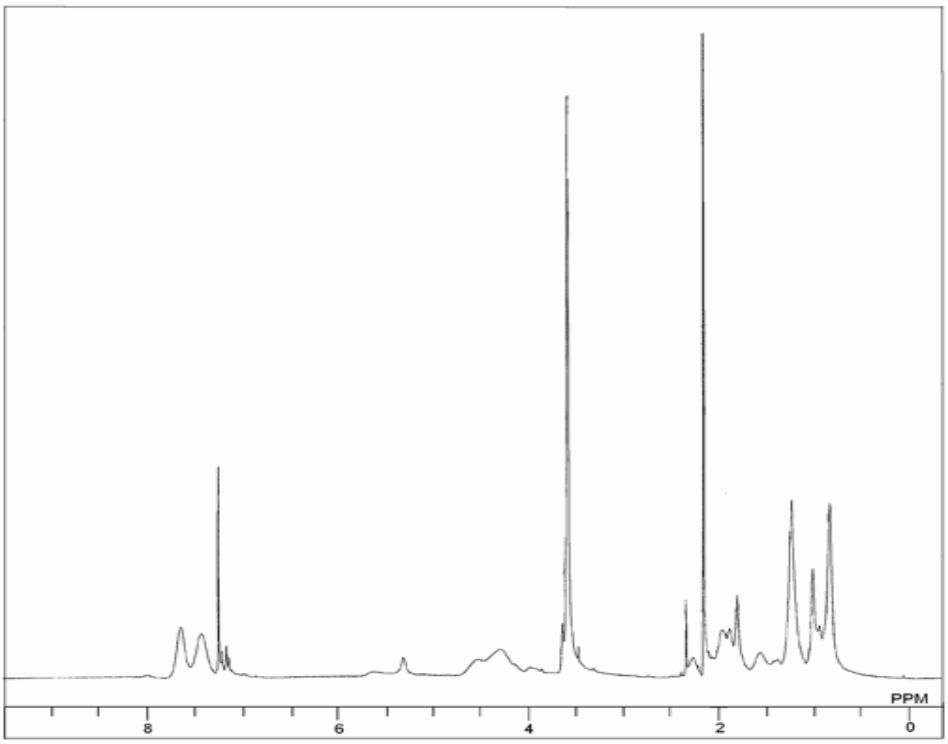


Figure 6 : ^{1}H-NMR for AS1B (10%) containing 50% macromer

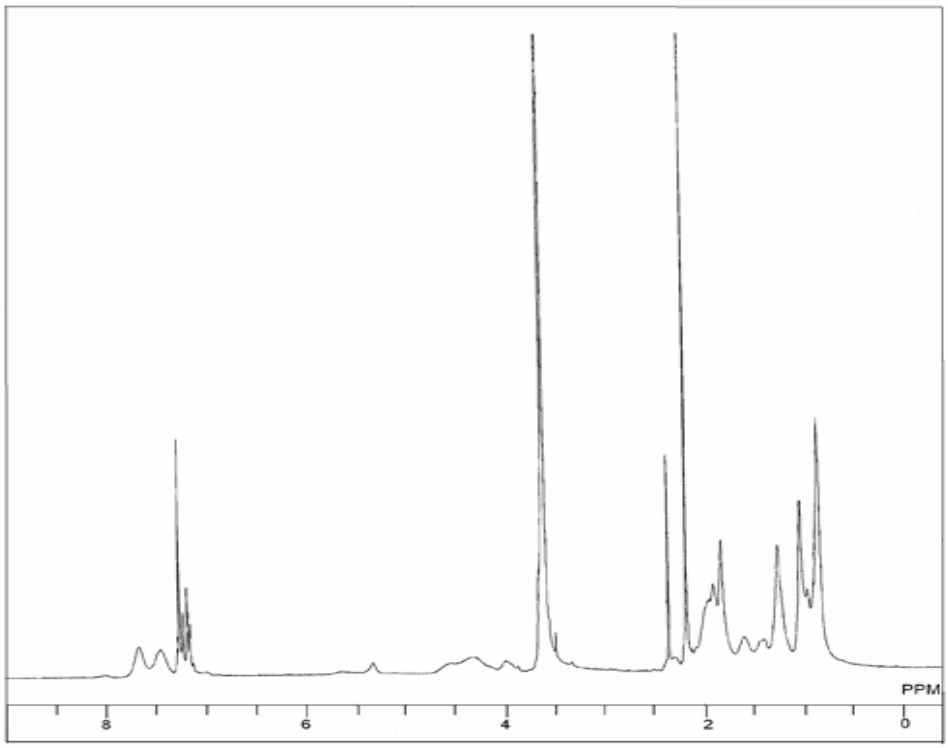


Figure 7 : ^{1}H-NMR for AS2B (10%) containing 35% macromer

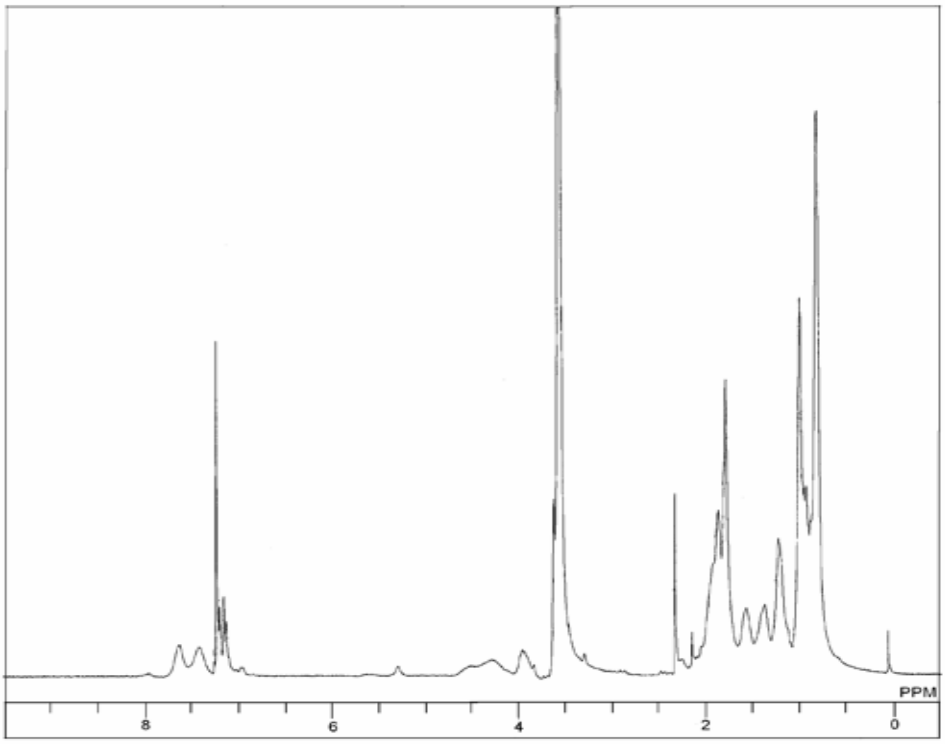


Figure 8 : ^{1}H-NMR for AS3B (10%) containing 20% macromer

APPENDIX J: DSC thermograms for copolymers modified with BA (MMBC)

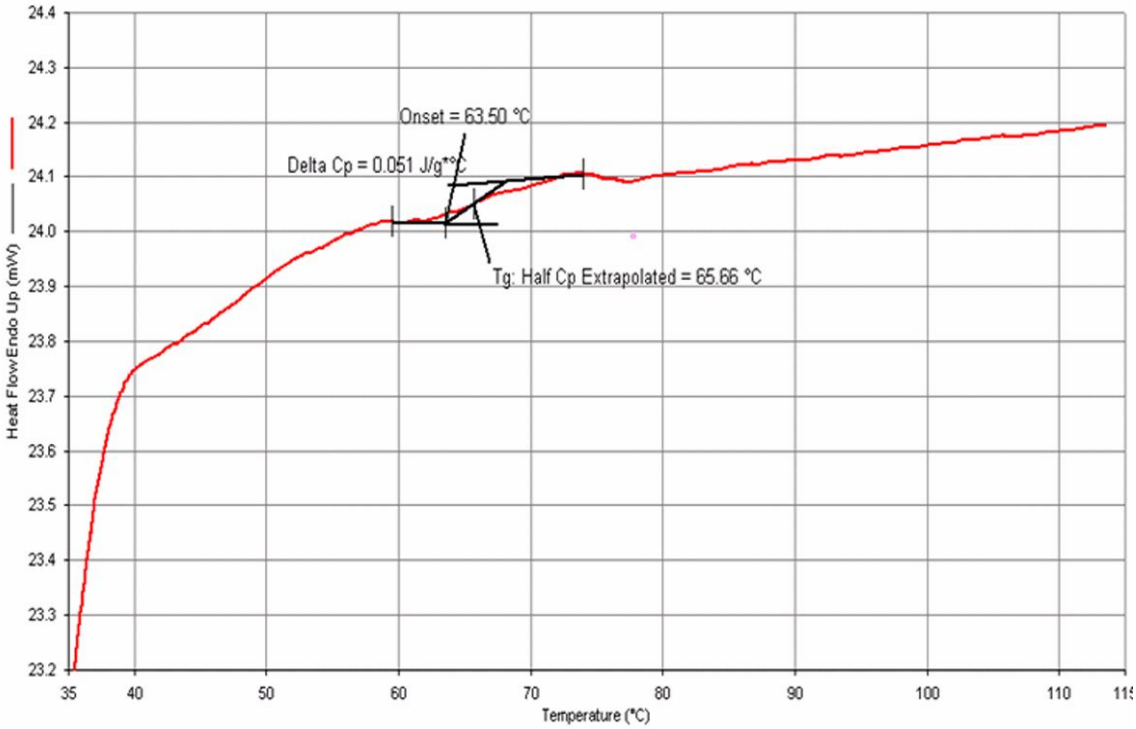


Figure 1 : DSC thermogram of AL1B containing 50% macromer

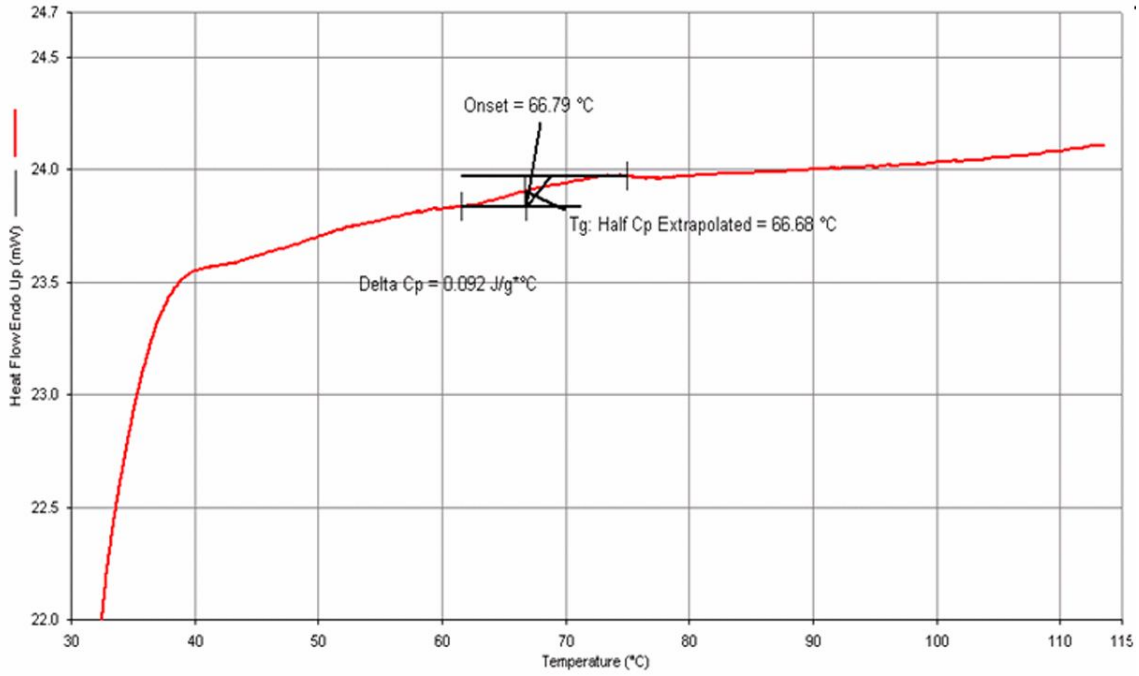


Figure 2 : DSC thermogram of AL2B containing 35% macromer

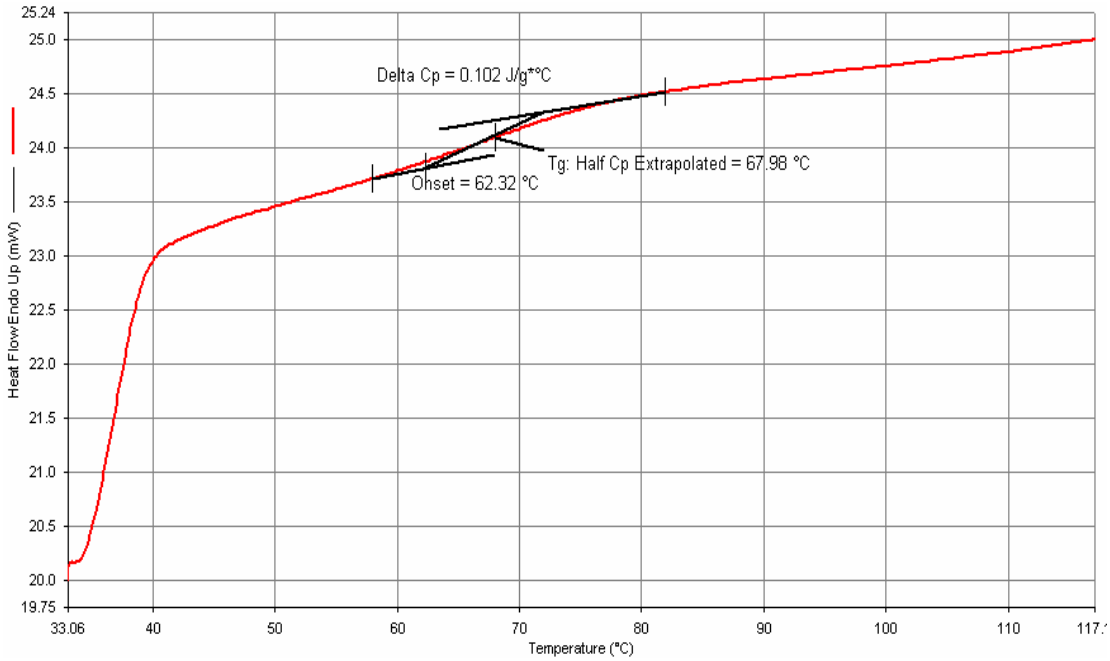


Figure 3 : DSC thermogram of AL3B containing 20% macromer

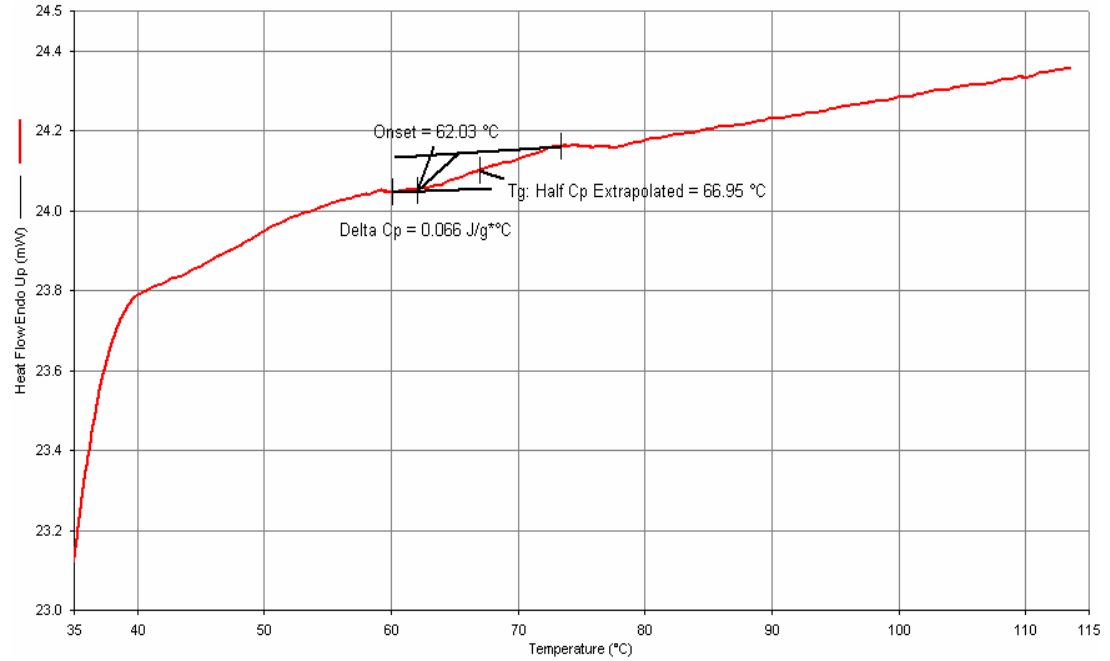


Figure 4 : DSC thermogram of AM1B containing 50% macromer

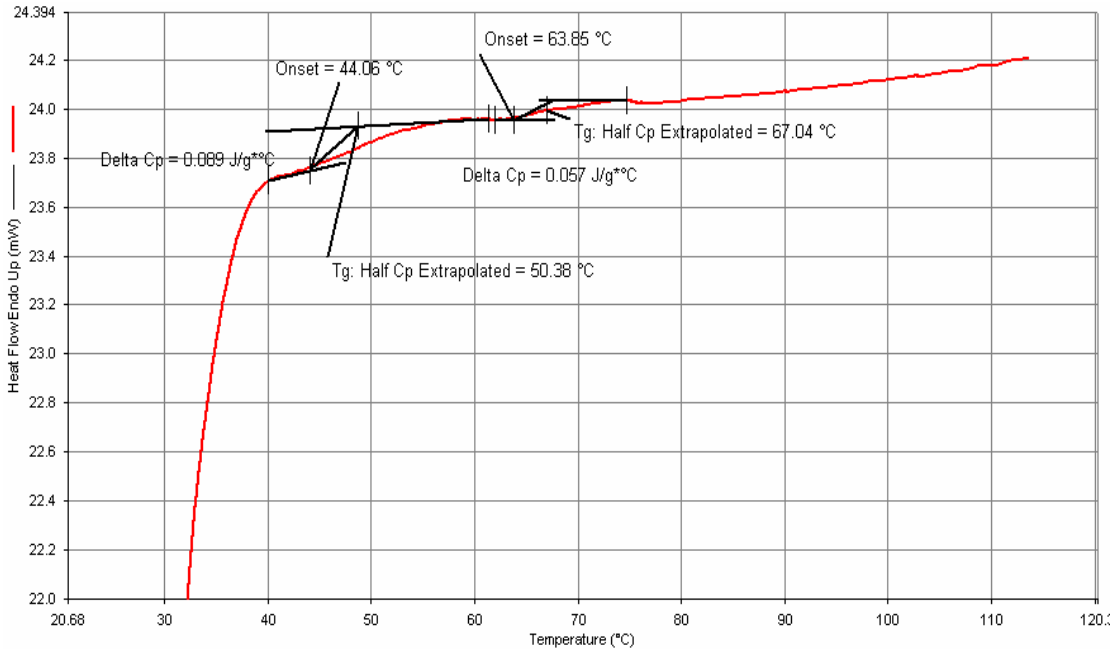


Figure 5 : DSC thermogram of AM2B containing 35% macromer

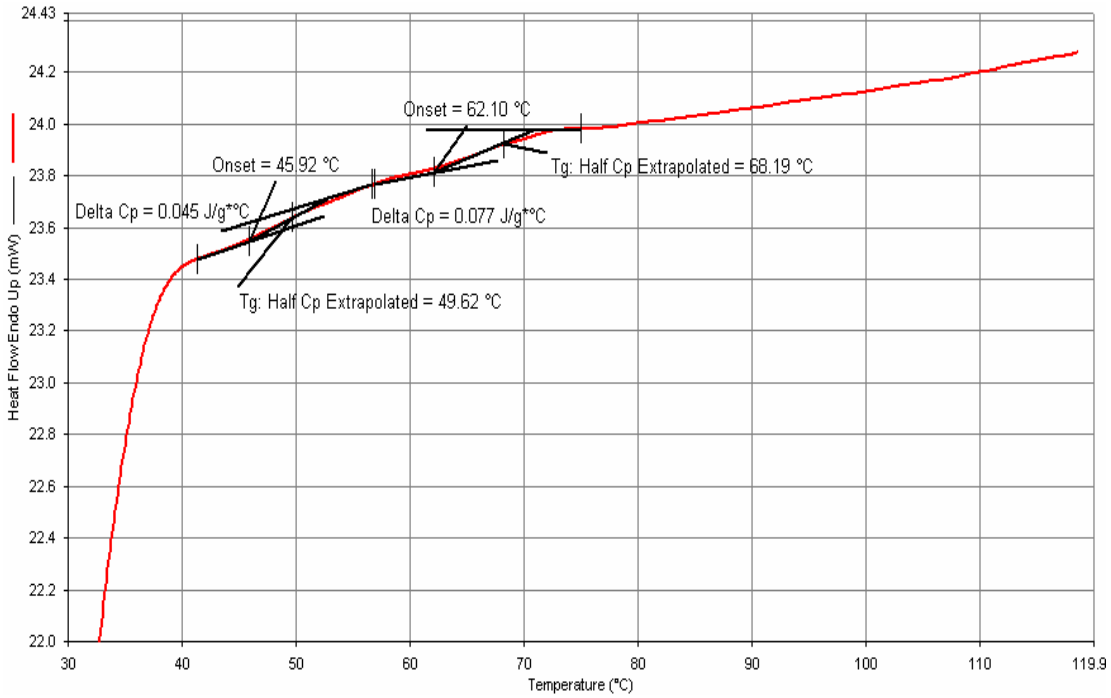


Figure 6 : DSC thermogram of AM3B containing 20% macromer

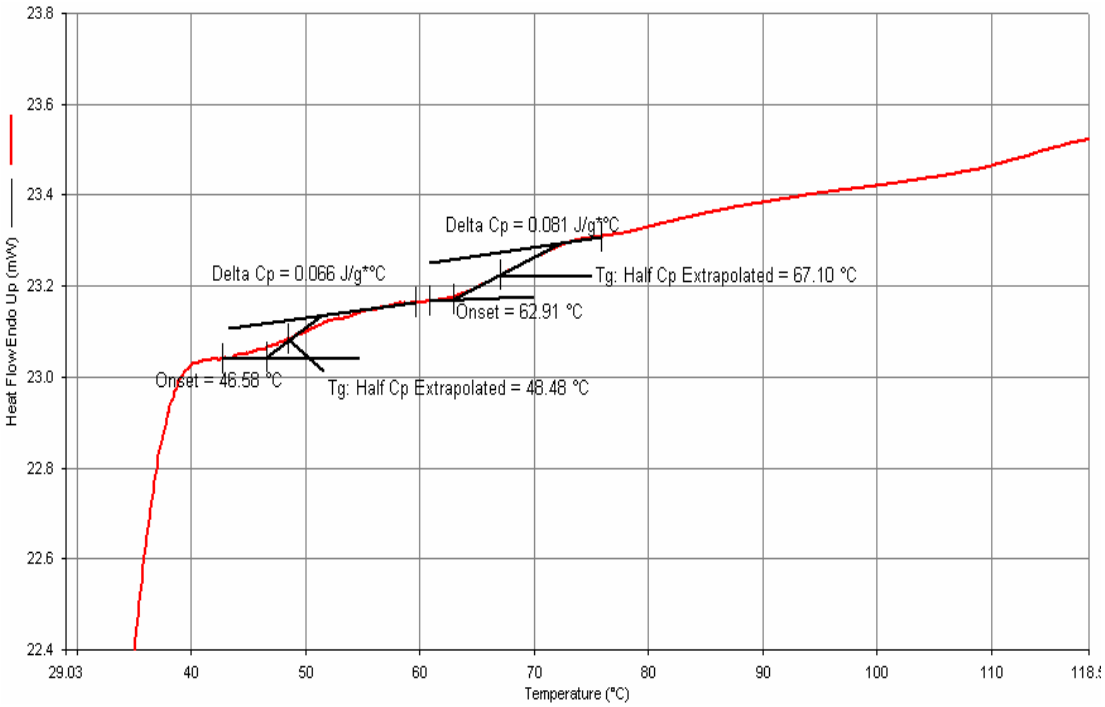


Figure 7 : DSC thermogram of AS1B(10%) containing 50% macromer

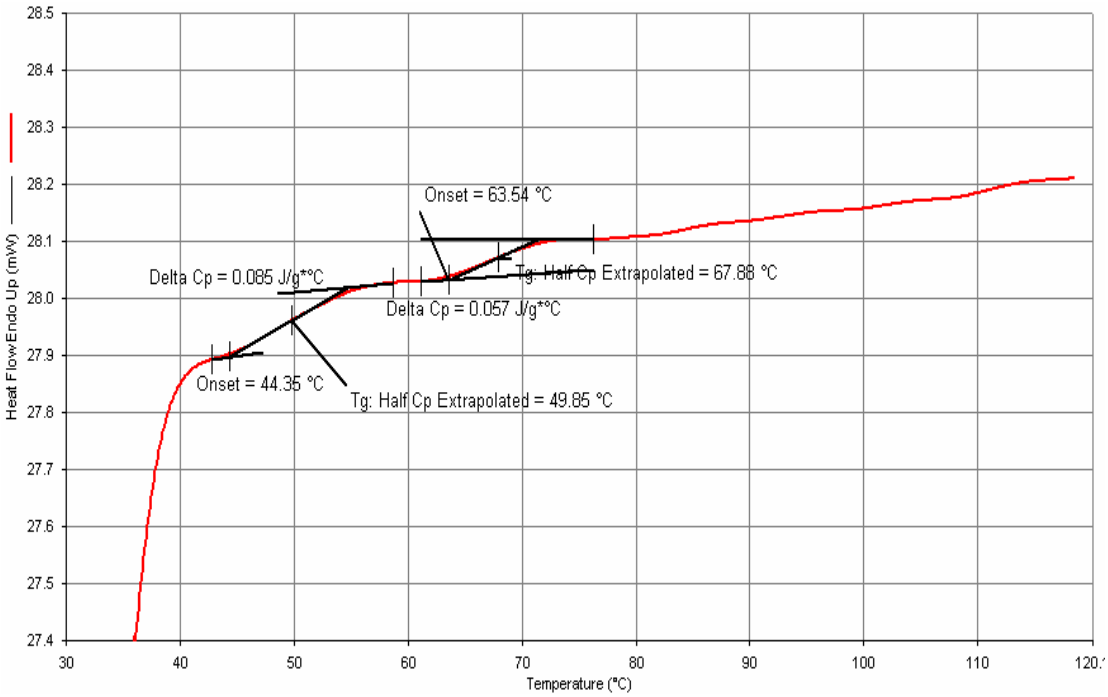


Figure 8 : DSC thermogram of AS2B (10%) containing 35% macromer

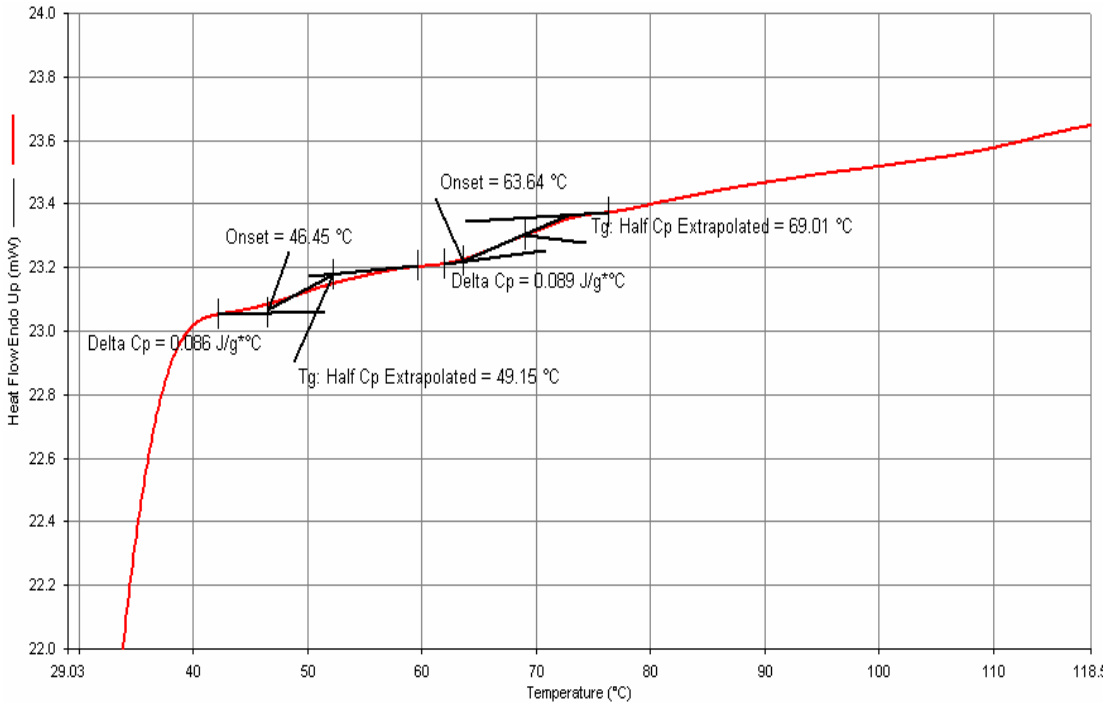


Figure 9 : DSC thermogram of AS3B(10%) containing 20% macromer

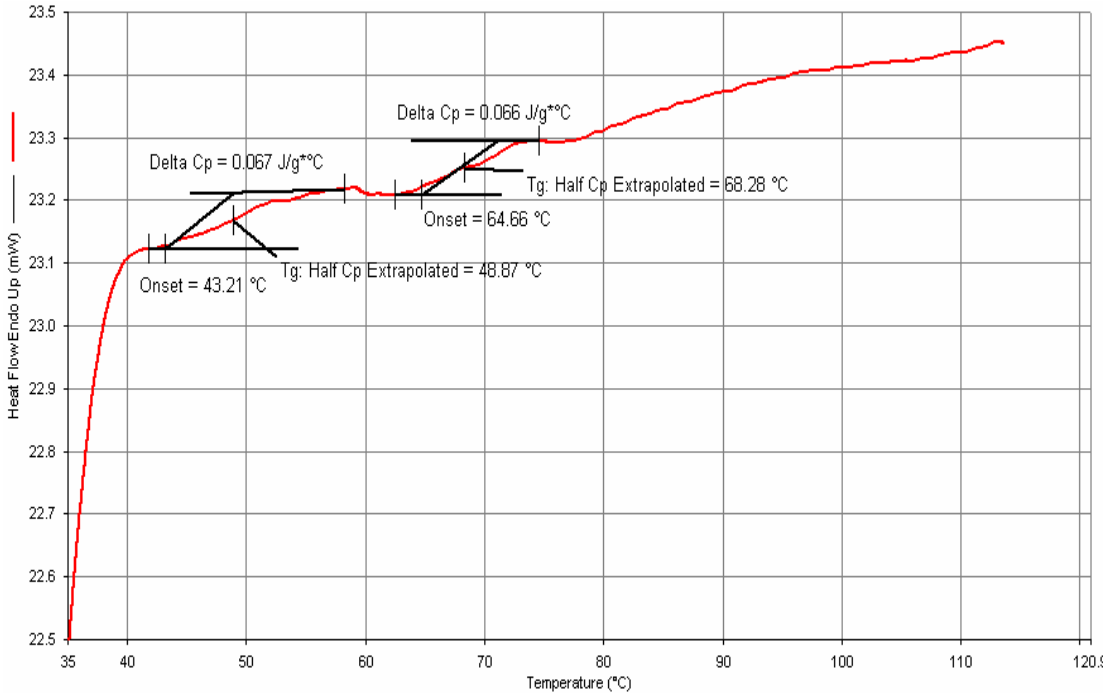


Figure 10 : DSC thermogram of AS1B (5%) containing 50% macromer

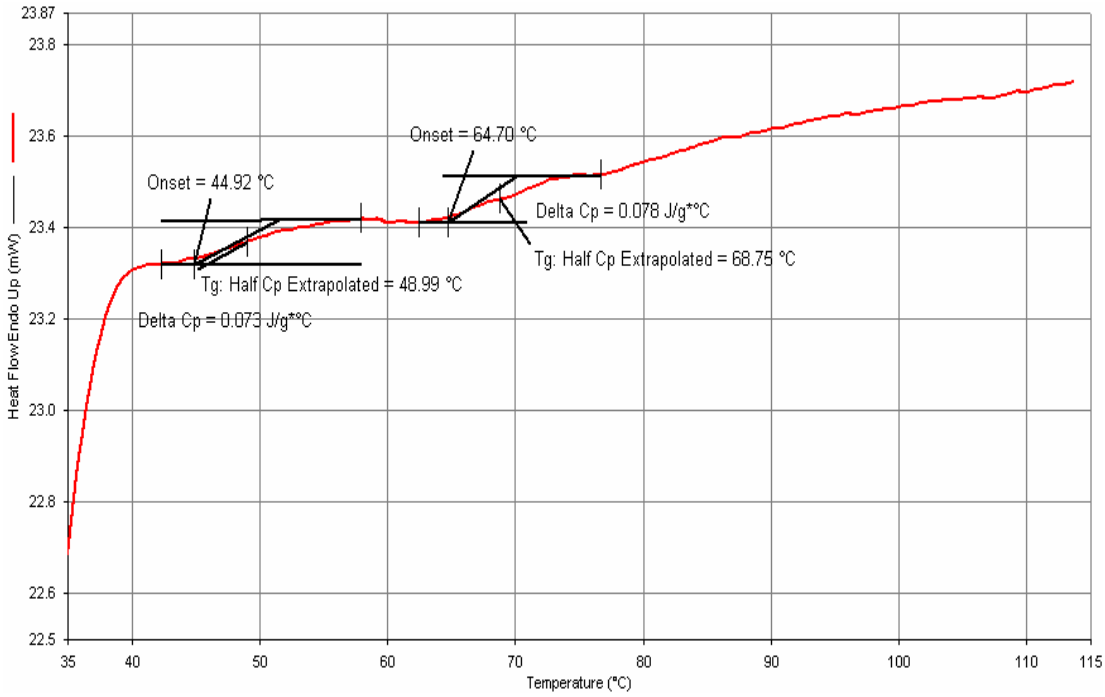


Figure 11 : DSC thermogram of AS2B (5%) containing 35% macromer

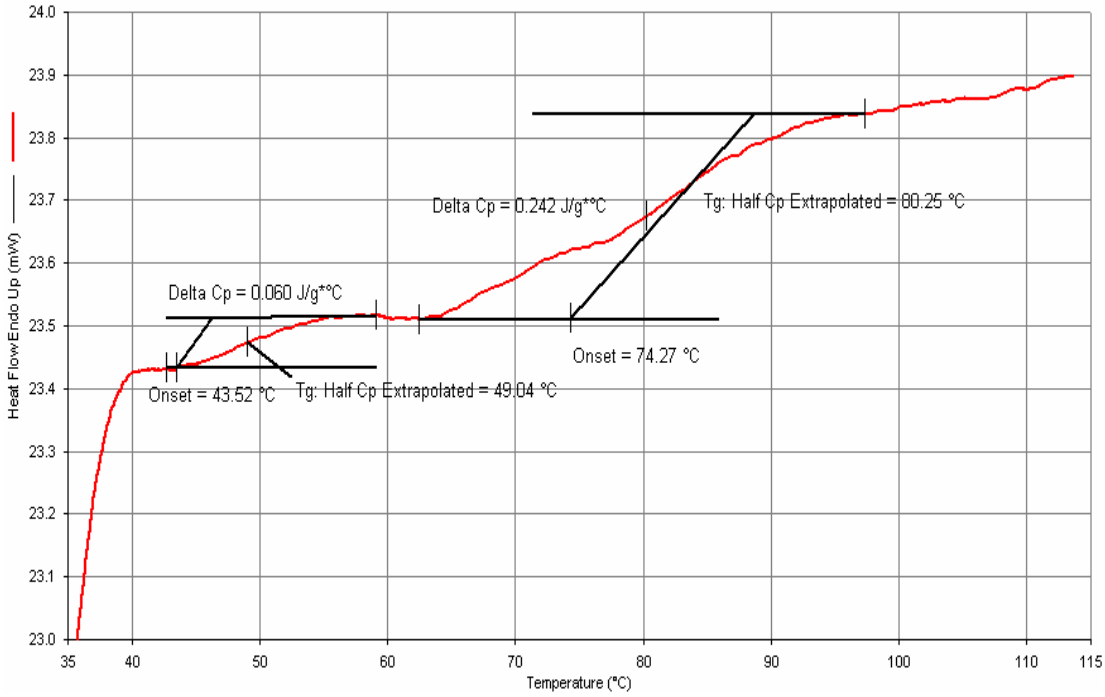


Figure 12 : DSC thermogram of AS3B (5%) containing 20% macromer

APPENDIX K: Overlay of GPC chromatograms MMBC samples

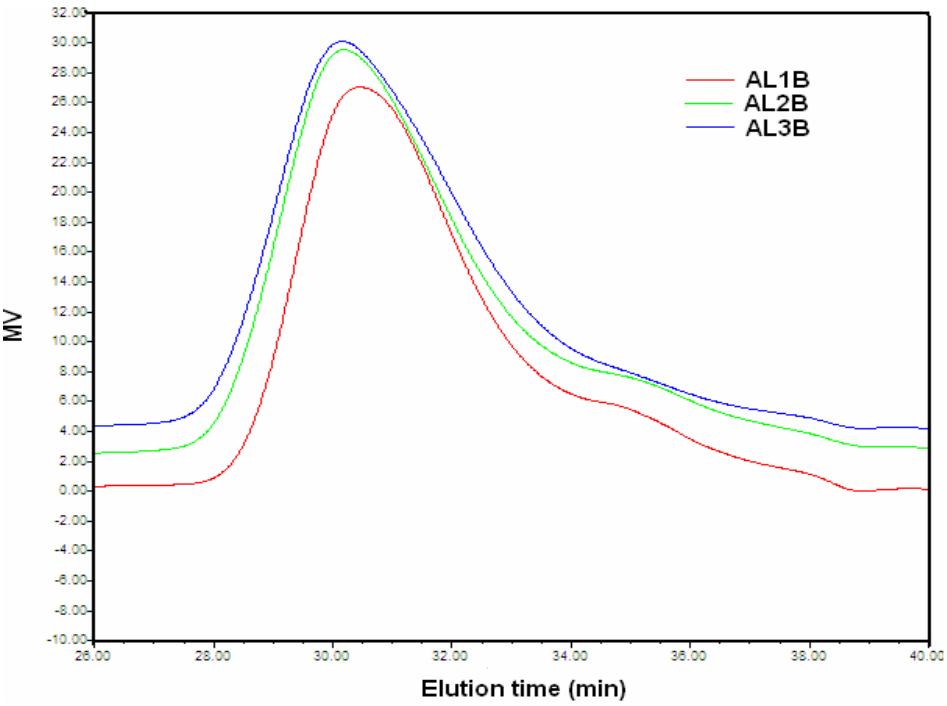


Figure 1 : Overlay of GPC chromatograms of ALB series

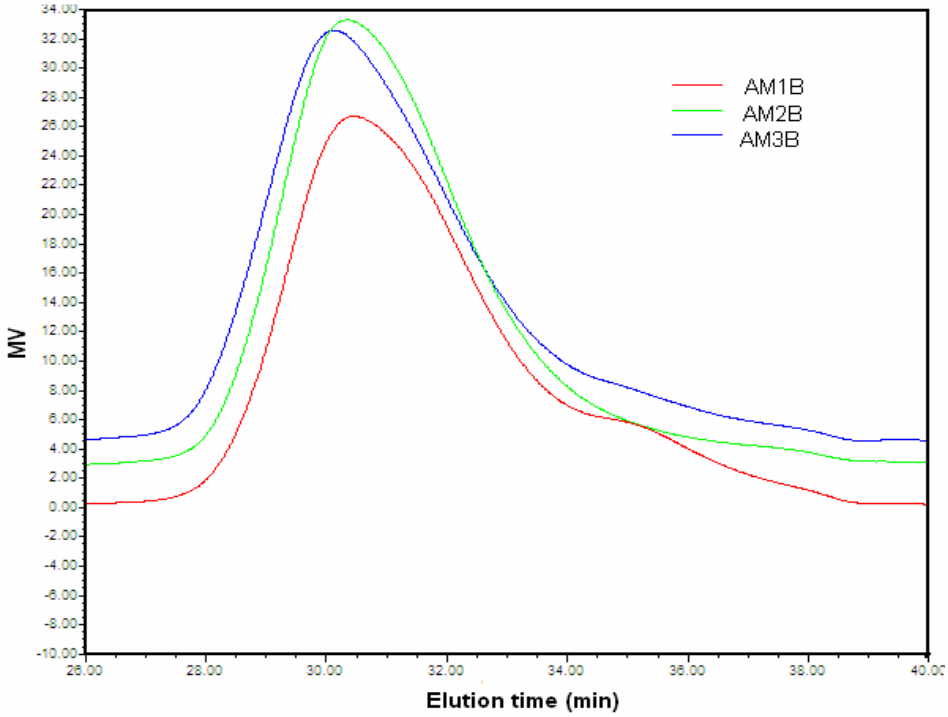


Figure 2 : Overlay of GPC chromatograms of AMB series

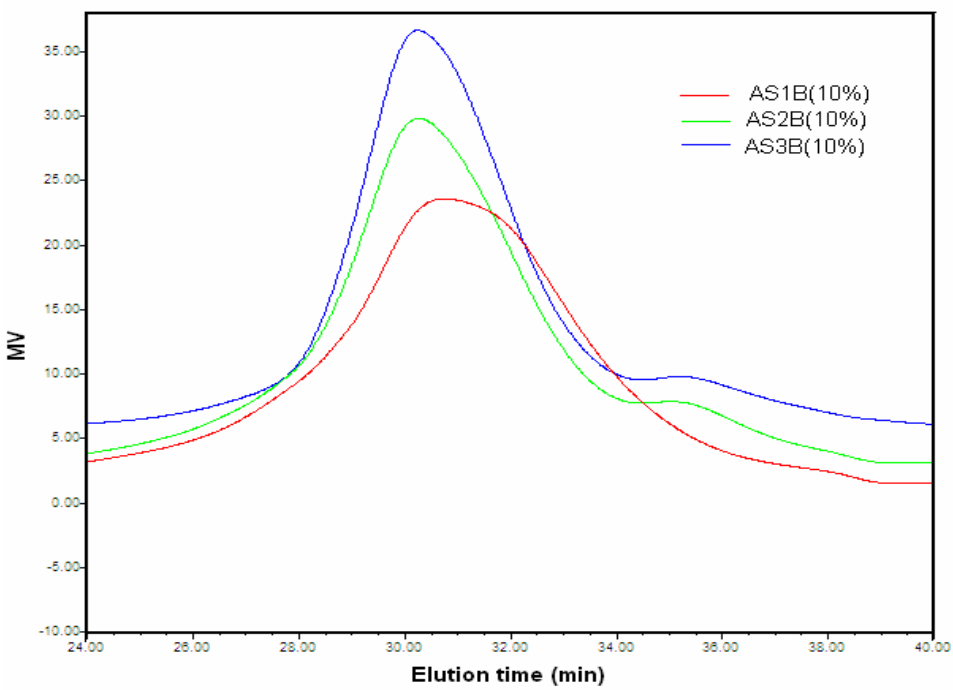


Figure 3 : Overlay of GPC chromatograms of ASB(10%) series

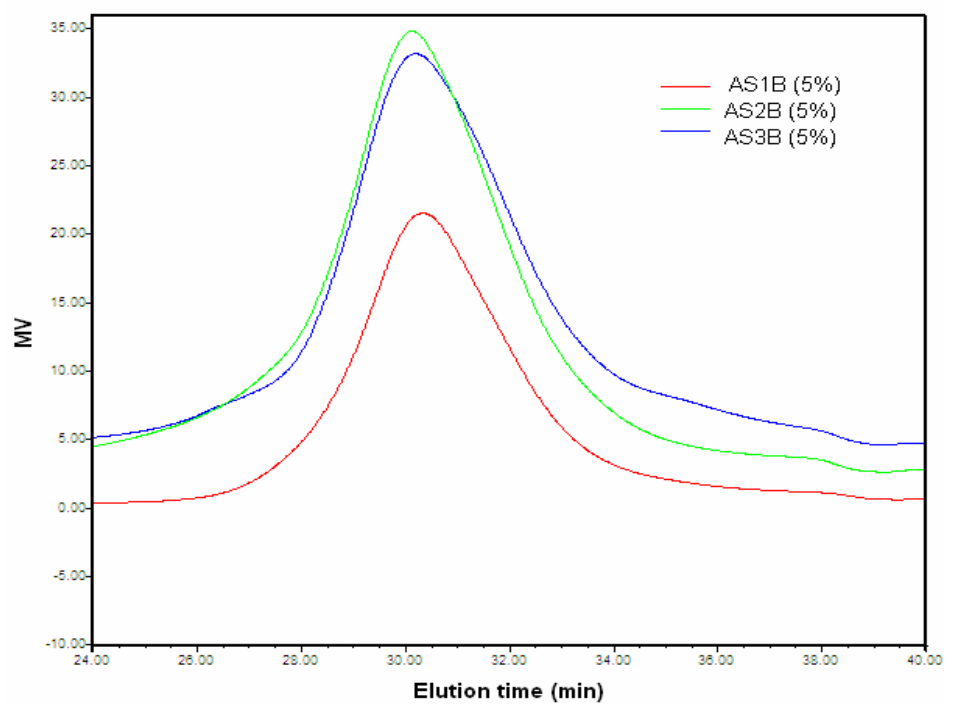


Figure 4 : Overlay of GPC chromatograms of ASB(5%) series

APPENDIX L: TGA thermograms for copolymers modified with BA (MMBC)

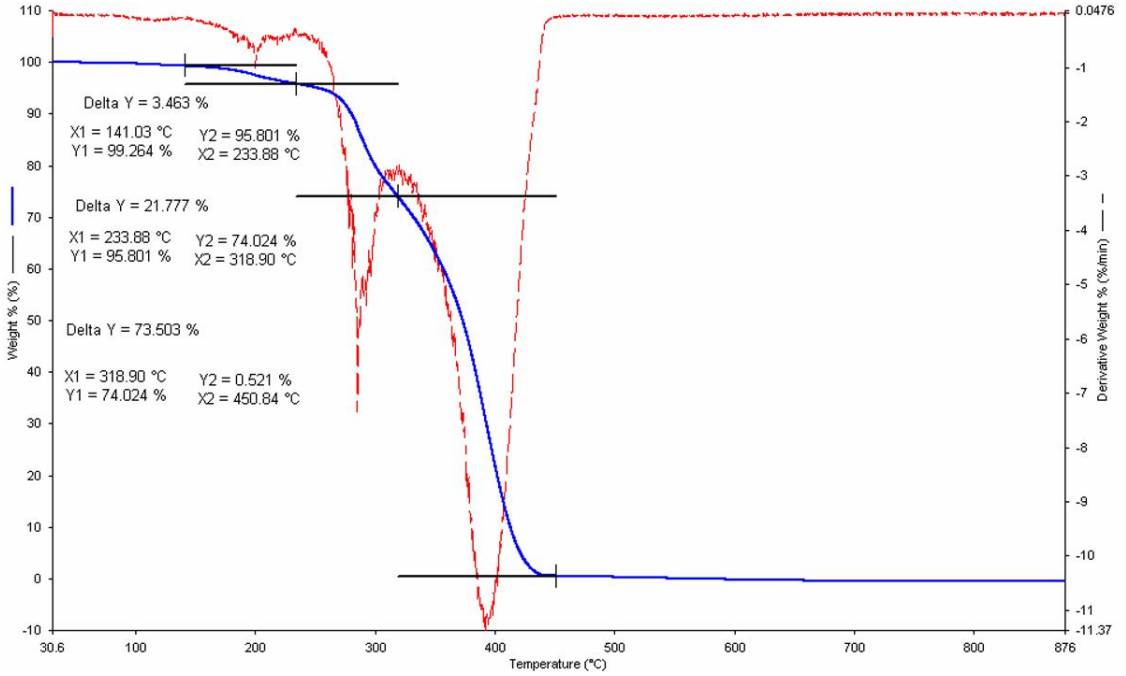


Figure 1 : TGA graph for AL1B containing 50% macromer

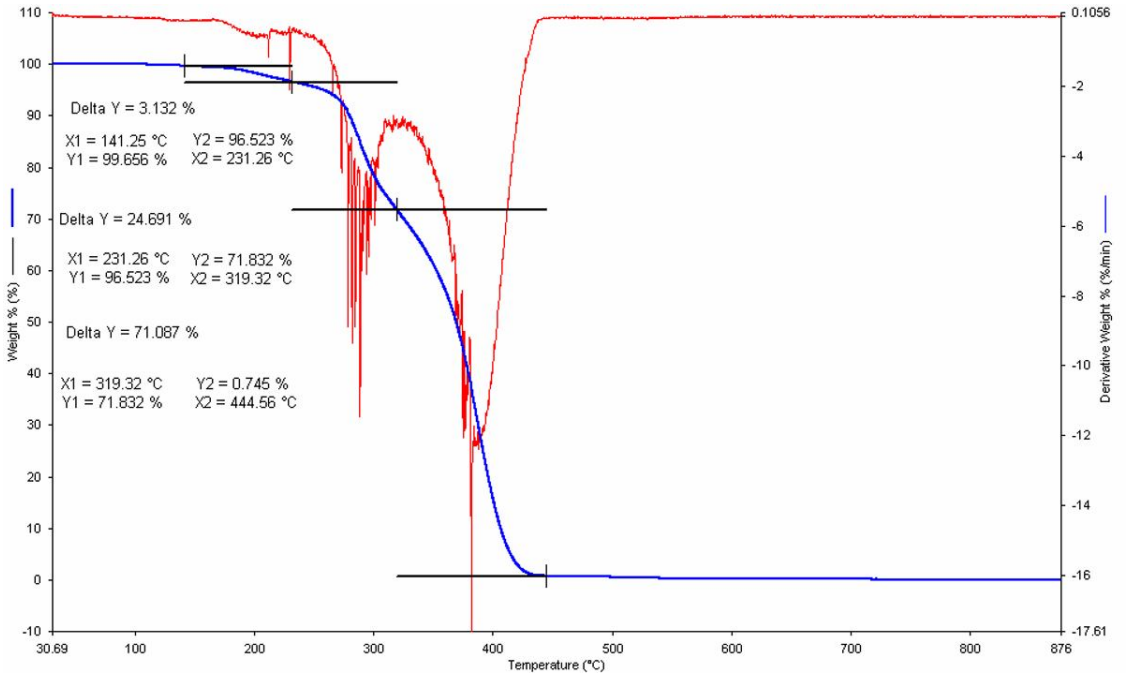


Figure 2 : TGA graph for AL2B containing 35% macromer

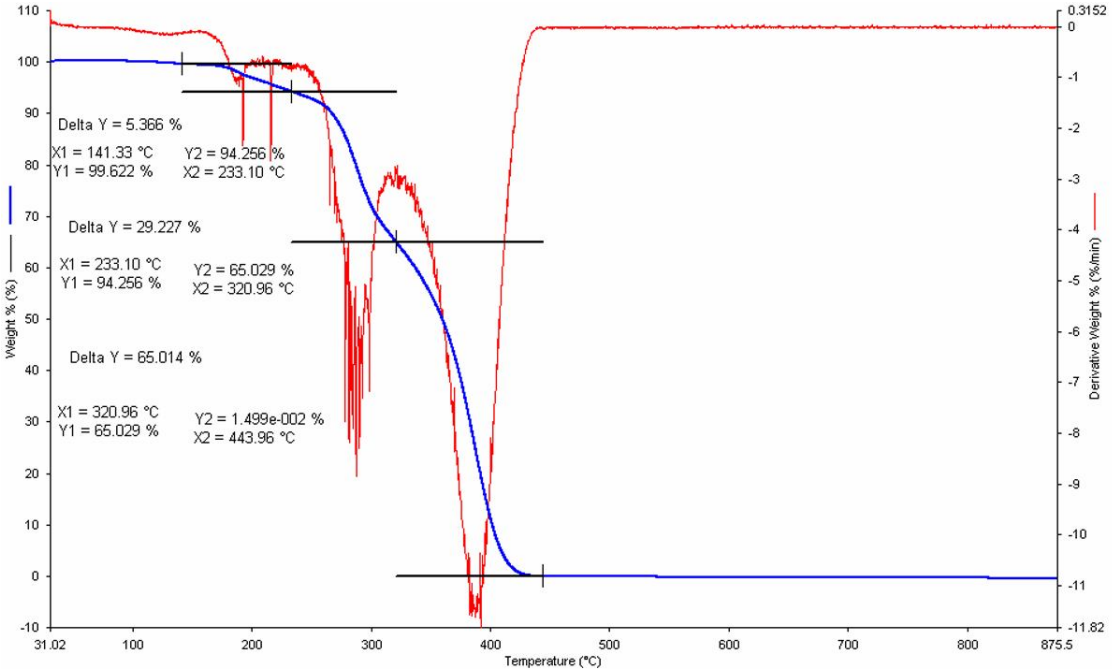


Figure 3 : TGA graph for AL3B containing 20% macromer

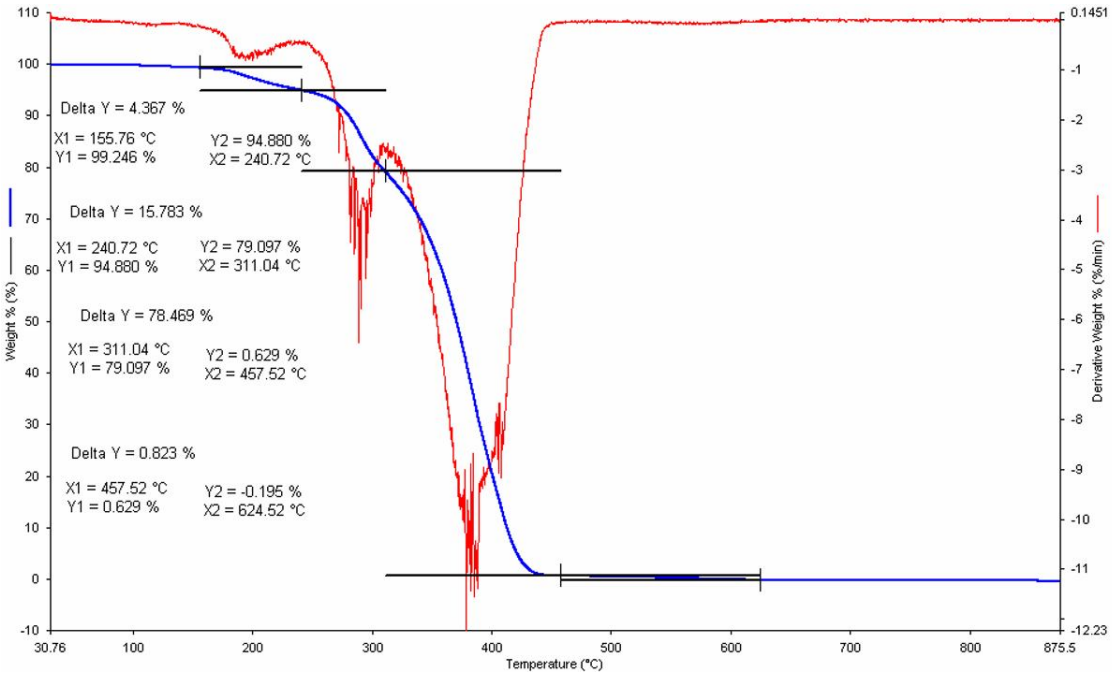


Figure 4 : TGA graph for AM1B containing 50% macromer

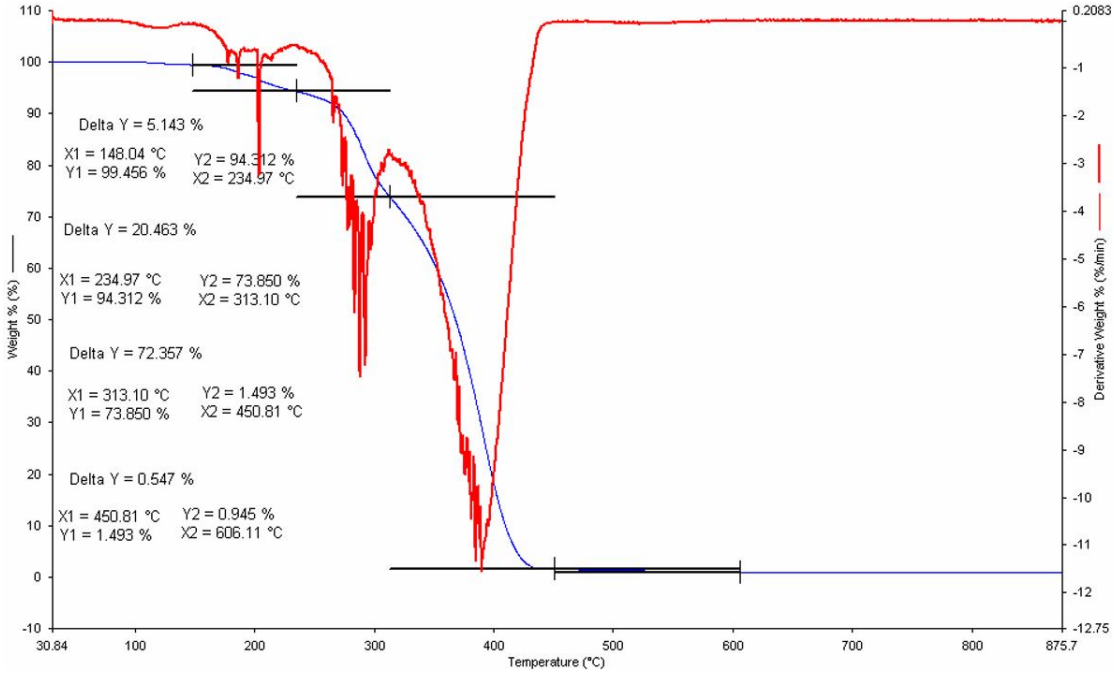


Figure 5 : TGA graph for AM2B containing 35% macromer

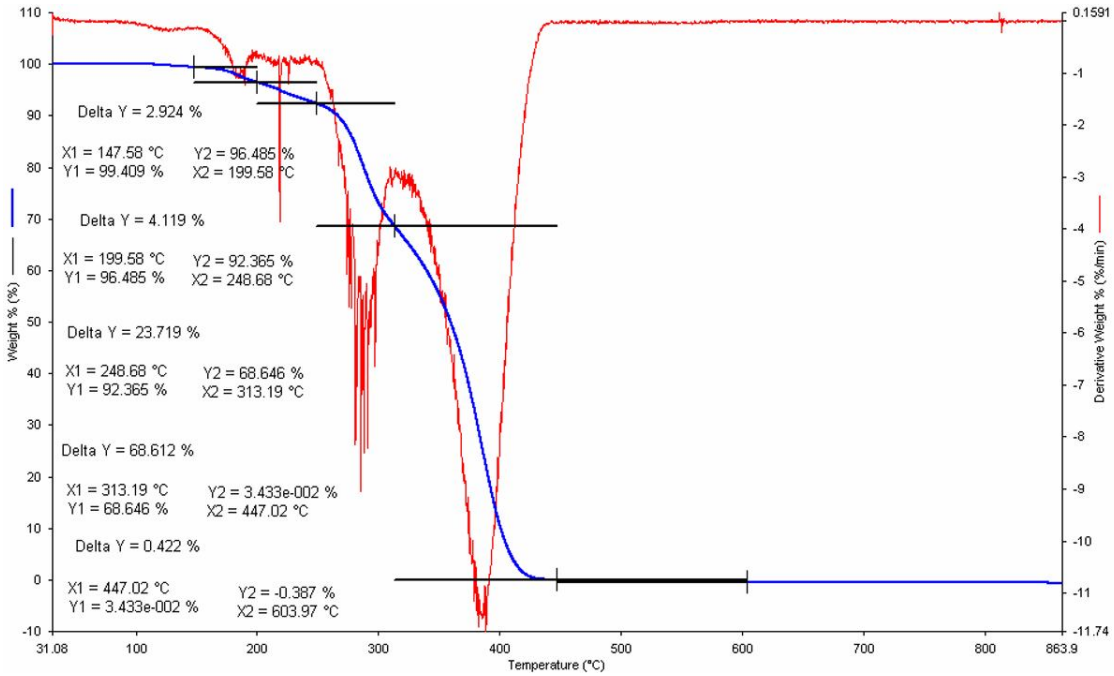


Figure 6 : TGA graph for AM3B containing 20% macromer

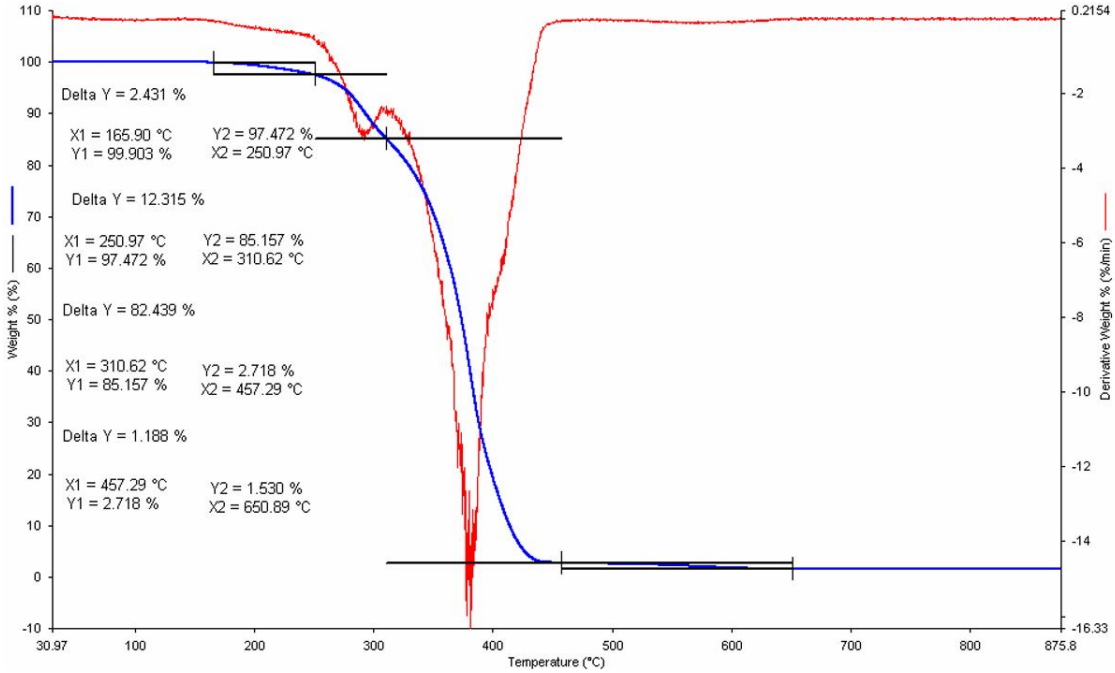


Figure 7 : TGA graph for AS1B(10%) containing 50% macromer

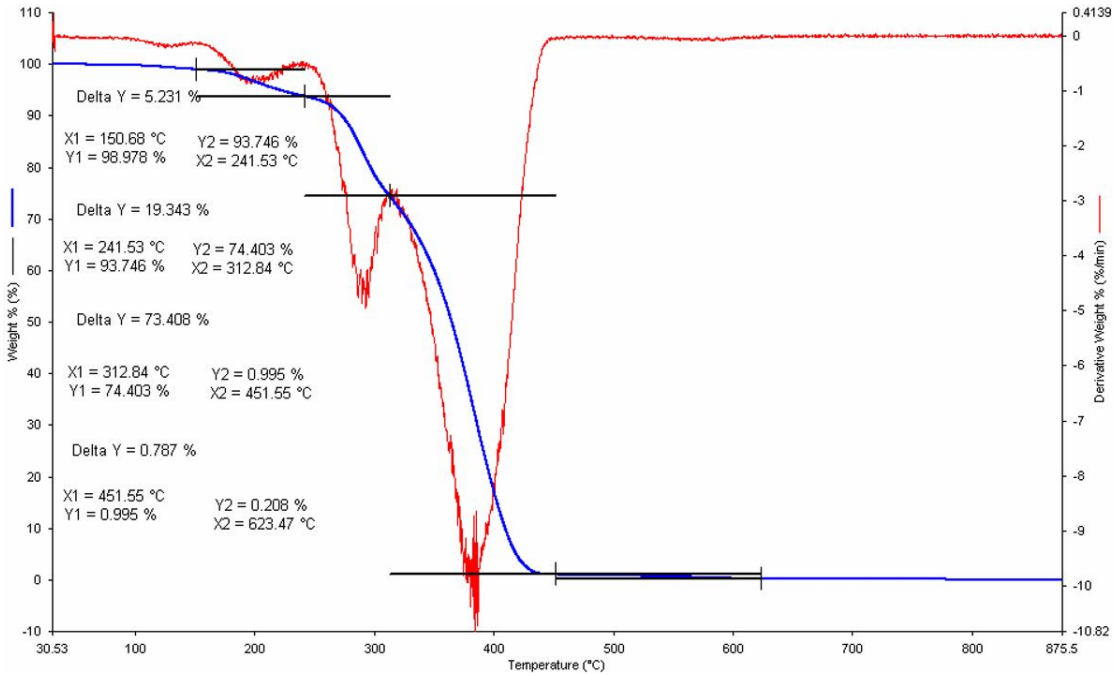


Figure 8 : TGA graph for AS2B(10%) containing 35% macromer

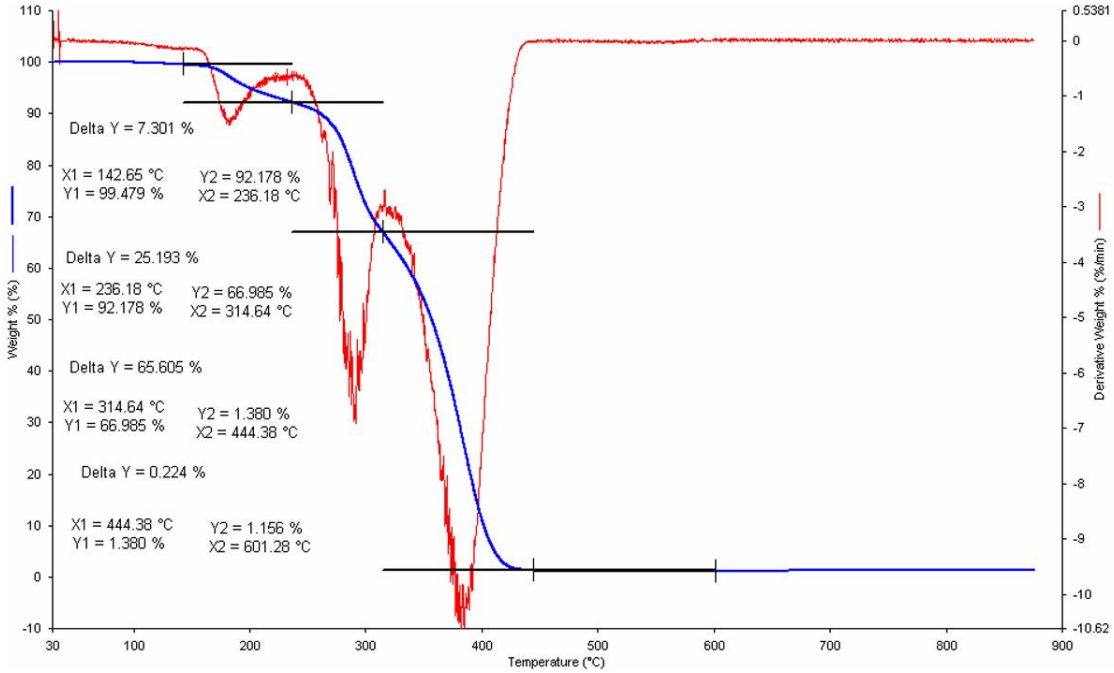


Figure 9 : TGA graph for AS3B (10%) containing 20% macromer

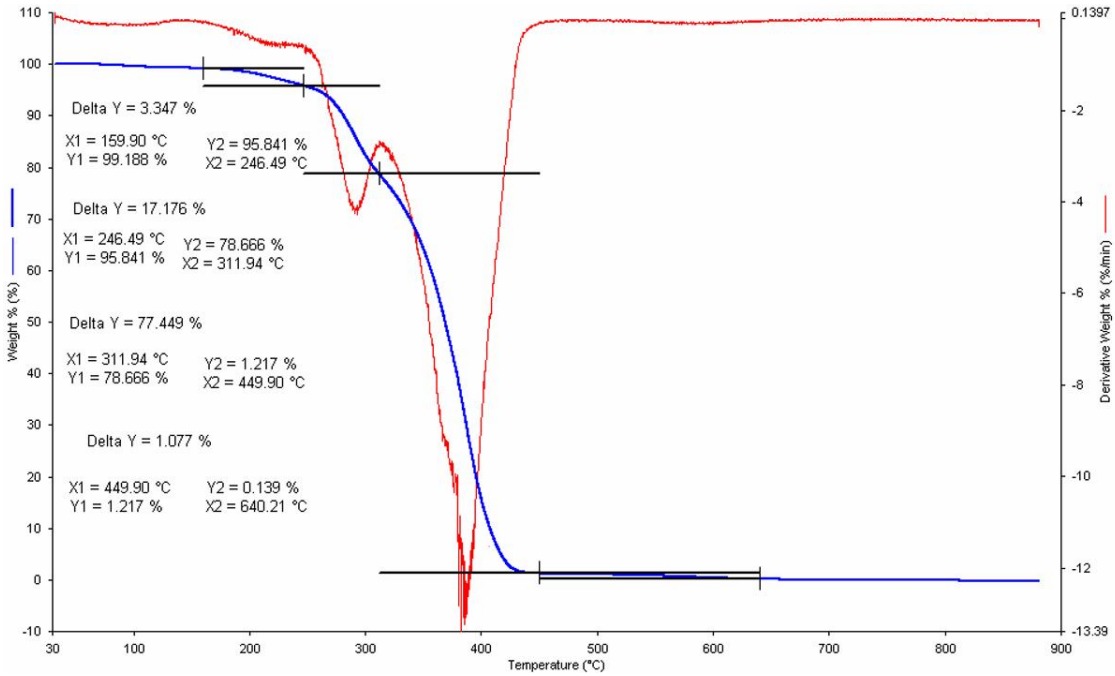


Figure 10 : TGA graph for AS1B(5%) containing 50% macromer

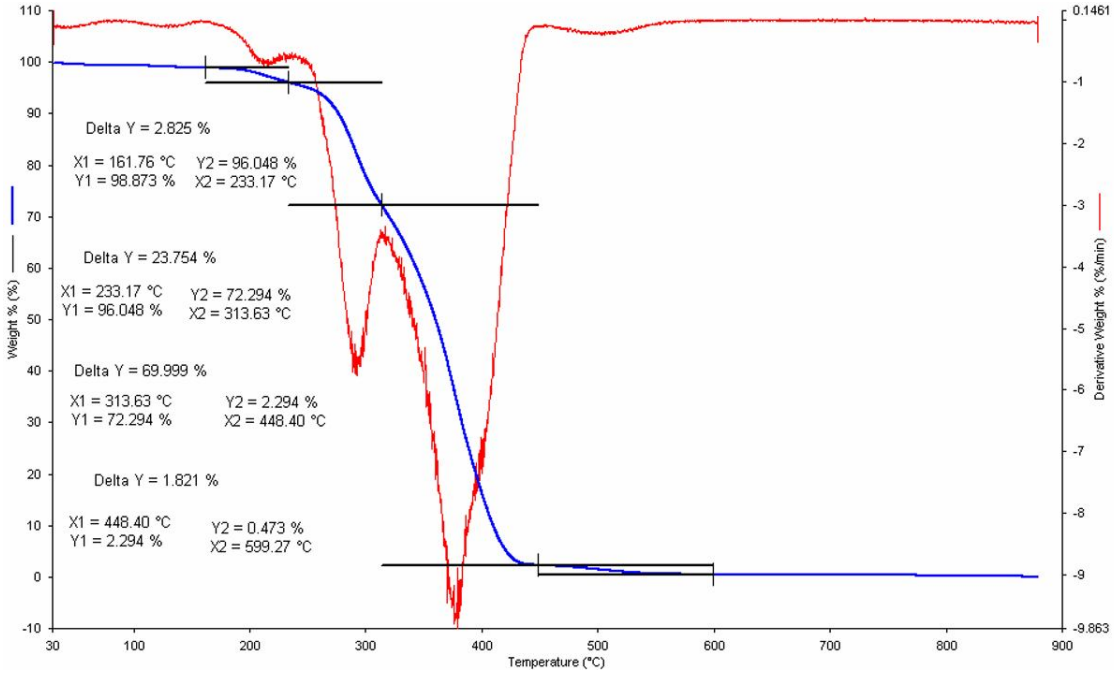


Figure 11 : TGA graph for AS2B(5%) containing 35% macromer

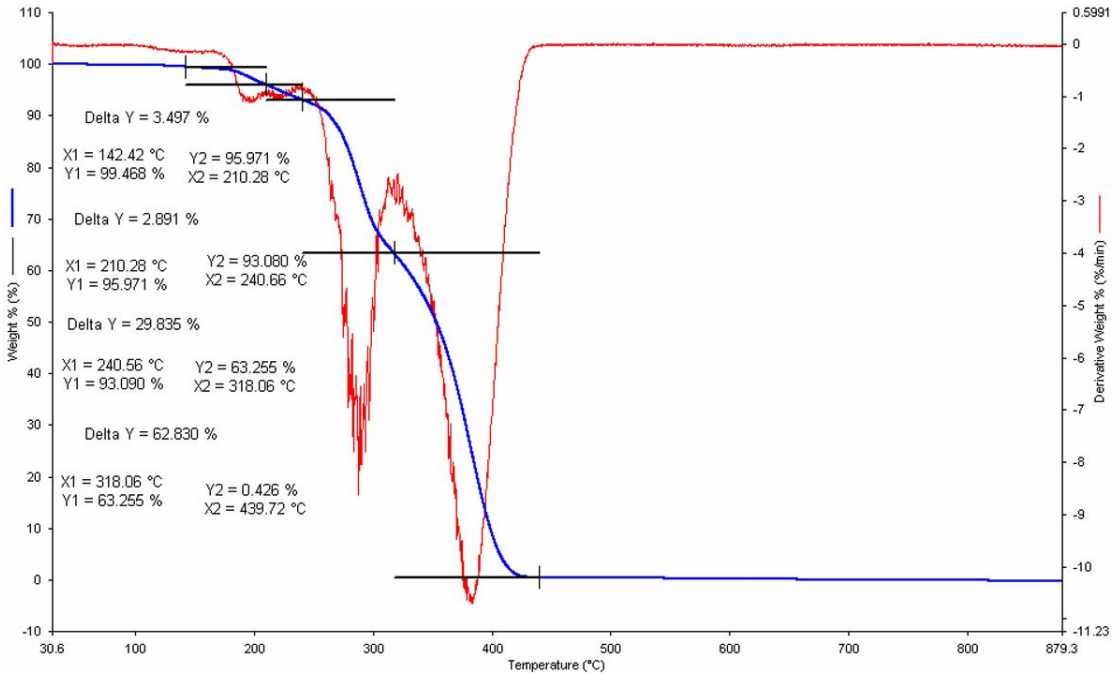


Figure 12 : TGA graph for AS3B (5%) containing 20% macromer

APPENDIX M: DMA graphs for copolymers modified with BA (MMBC)

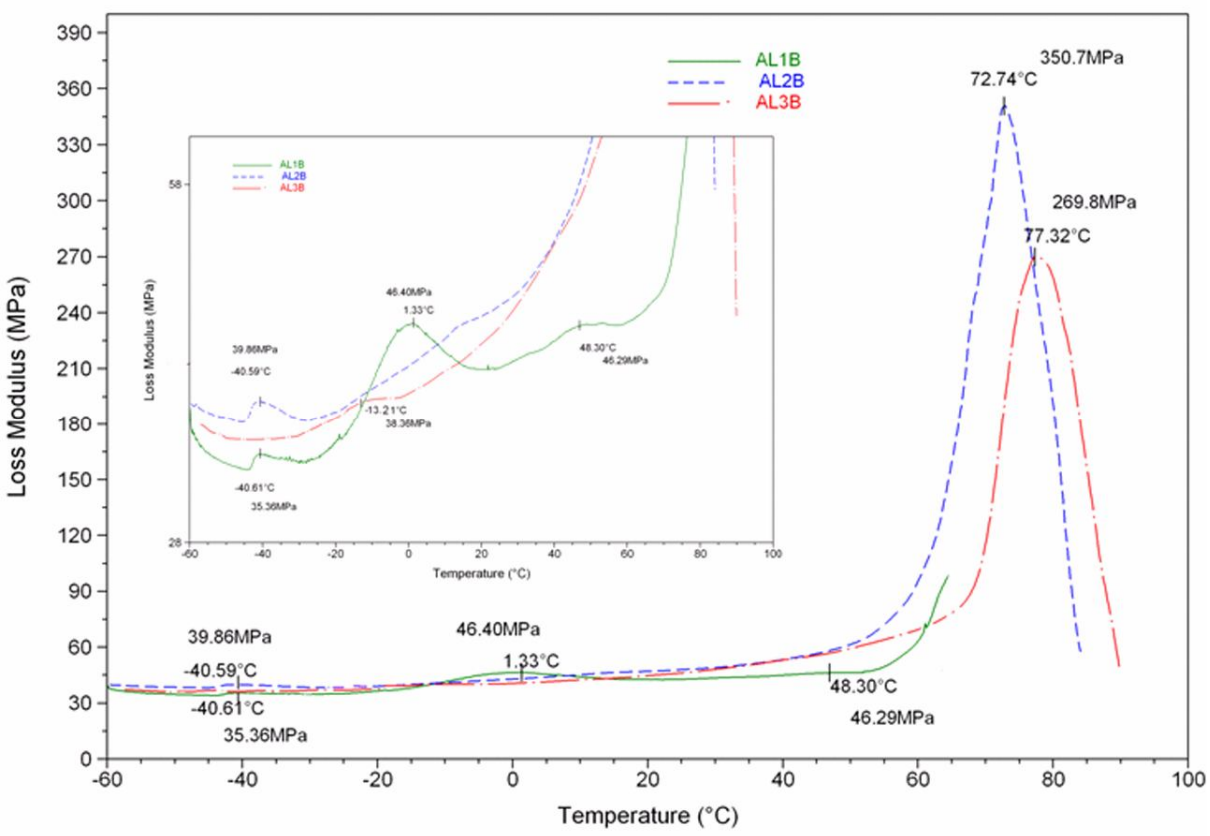


Figure 1 : Plots of loss modulus versus temperature for samples AL1B, AL2B and AL3B with 50%, 35% and 20% macromer respectively

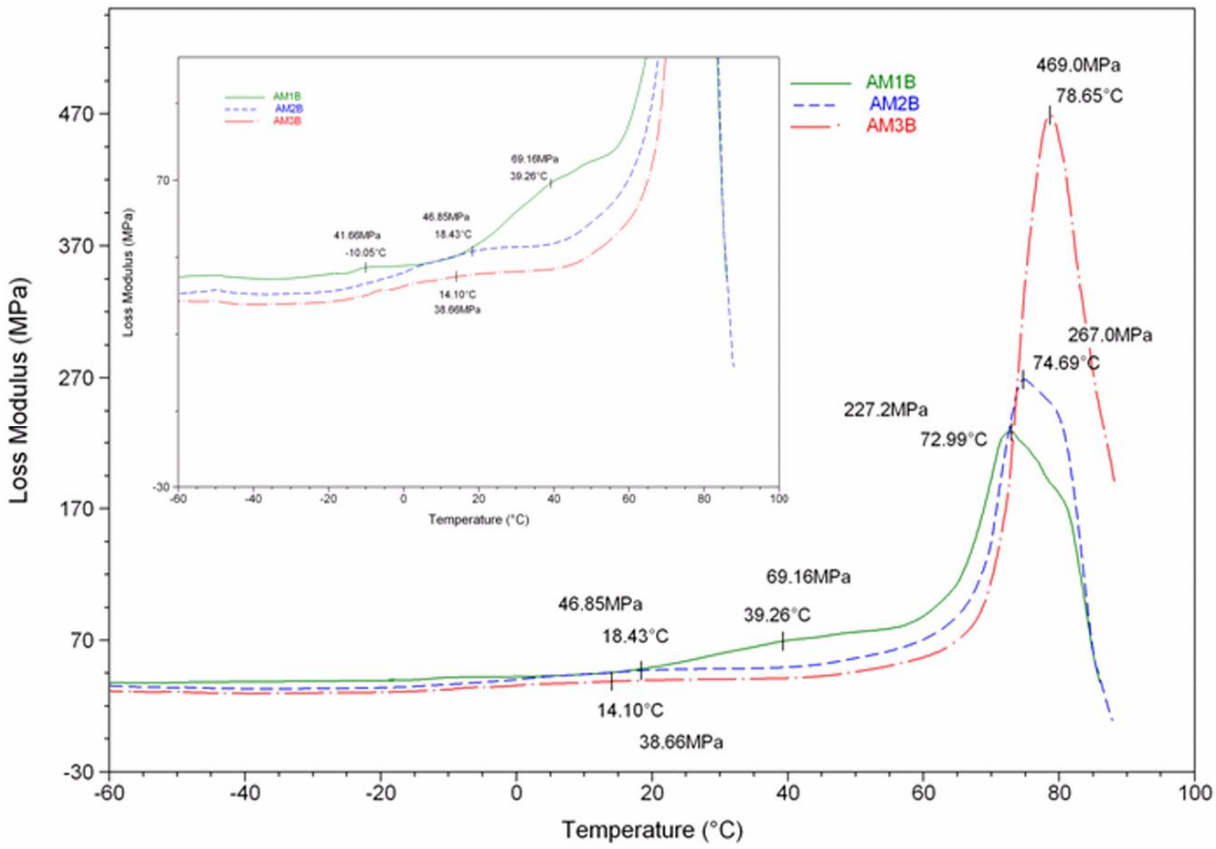


Figure 2 : Plots of loss modulus versus temperature for samples AM1B, AM2B and AM3B with 50%, 35% and 20% macromer respectively

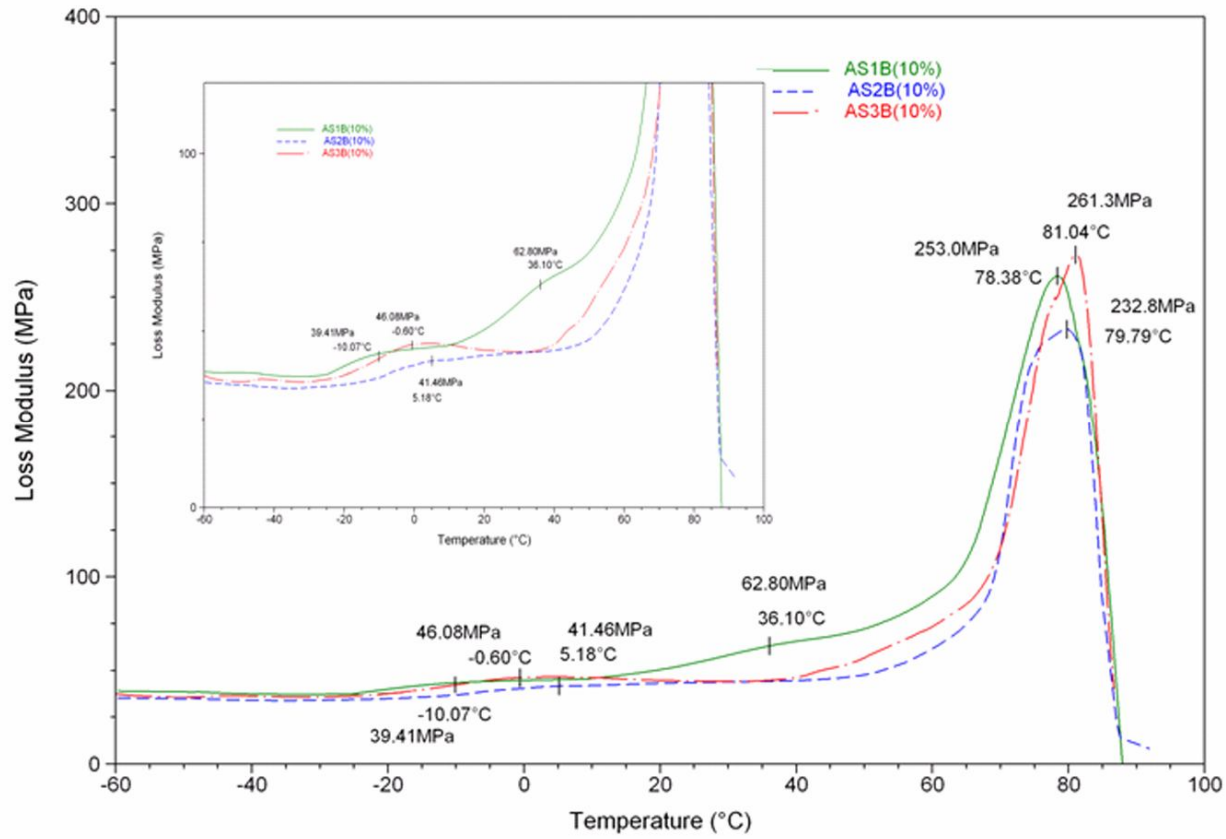


Figure 3 : Plots of loss modulus versus temperature for samples AS1B(10%), AS2B(10%) and AS3B(10%) with 50%, 35% and 20% macromer respectively

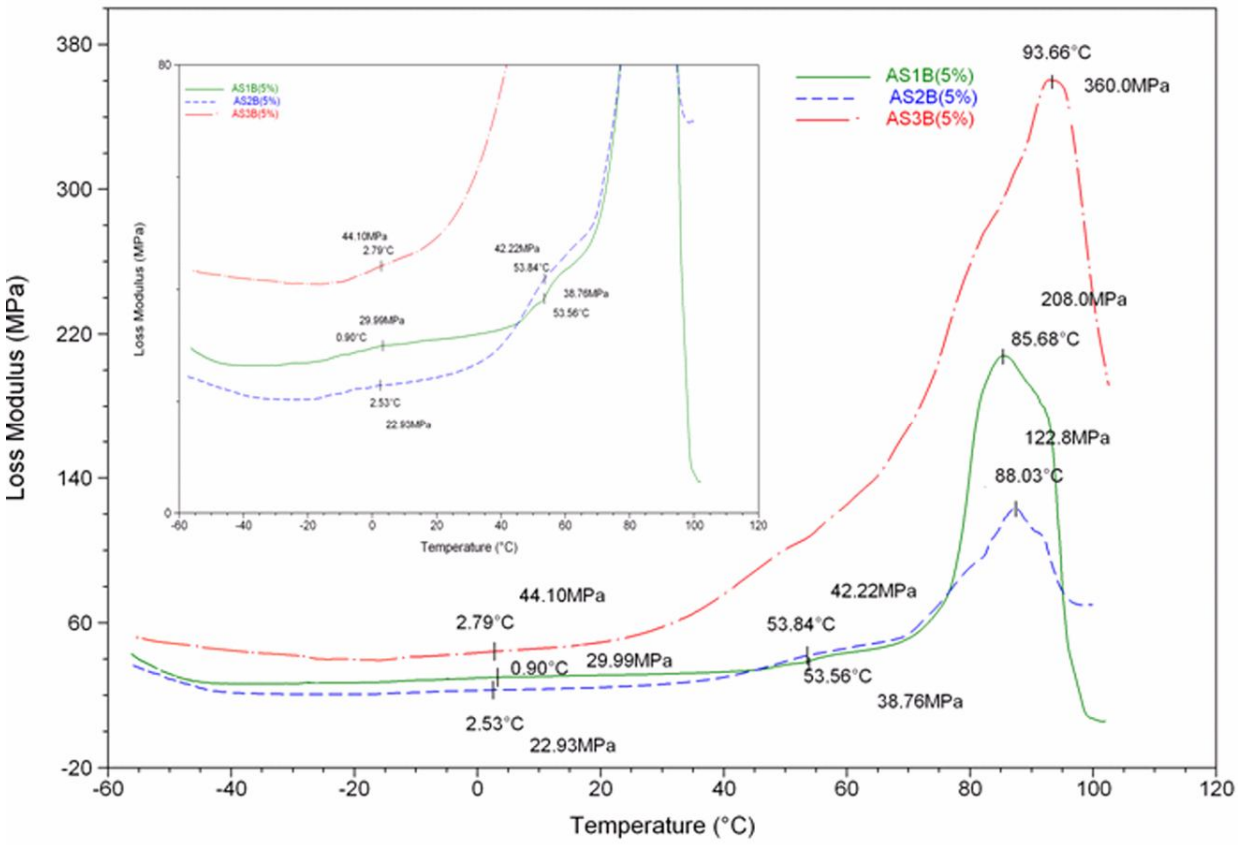


Figure 4 : Plots of loss modulus versus temperature for samples AS1B (5%), AS2B(5%) and AS3B (5%) with 50%, 35% and 20% macromer respectively

APPENDIX N: Description of Figures 3.12, 3.14, 3.16 and Table 3.20 in Chapter 3

Table 1 : Measuring of the temperatures corresponding to $0.1 \geq \alpha \leq 0.9$ at different heating rates to calculate activation energy for AlkOA28 macromer

Conversion (α)	q ($Kmin^{-1}$)	T_p (K)	1/ T_p (K^{-1})	ln(q)	E_d (kJ/mol)
0.1	10	601	0.001664	2.302	109.6
	15	605	0.001653	2.708	
	20	614.4	0.001628	2.996	
	25	601	0.001664	3.219	
	30	616	0.001623	3.401	
0.2	10	619.3	0.001615	2.302	168.3
	15	625.4	0.001599	2.708	
	20	634	0.001577	2.996	
	25	625.4	0.001599	3.219	
	30	635.2	0.001574	3.401	
0.3	10	631.5	0.001584	2.303	243.9
	15	634.9	0.001575	2.708	
	20	641.3	0.001559	2.996	
	25	639.7	0.001563	3.219	
	30	646.2	0.001548	3.401	
0.4	10	638.9	0.001565	2.302	247..9
	15	642	0.001558	2.708	
	20	648.6	0.001542	2.996	
	25	646.8	0.001546	3.219	
	30	653.5	0.001530	3.401	
0.5	10	644.7	0.001551	2.302	247.5
	15	649.2	0.001540	2.708	
	20	653.5	0.001530	2.996	
	25	654	0.001529	3.219	
	30	660.8	0.001513	3.401	
0.6	10	649.6	0.001539	2.302	252.6
	15	654.43	0.001528	2.708	
	20	658.4	0.001519	2.996	
	25	658.7	0.001518	3.219	
	30	665.7	0.001502	3.401	
0.7	10	653.5	0.001530	2.302	254.4
	15	659.9	0.001515	2.708	
	20	663.2	0.001508	2.996	
	25	663.5	0.001507	3.219	
	30	670	0.001493	3.401	
0.8	10	660.8	0.001513	2.302	284.1
	15	664.7	0.001504	2.708	
	20	668.2	0.001497	2.996	
	25	668.7	0.001495	3.219	
	30	675.4	0.001481	3.401	

‘ Table 1, continued ’

0.9	10	673	0.001486	2.302	302.1
	15	677.8	0.001475	2.708	
	20	680.3	0.001470	2.996	
	25	682	0.001466	3.219	
	30	687.6	0.001454	3.401	

Ozawa Plots for calculation of activation energy using OFW method for AlkOA28 at different heating rates corresponding to fixed value of degree of conversion, ($0.1 \geq \alpha \leq 0.9$).

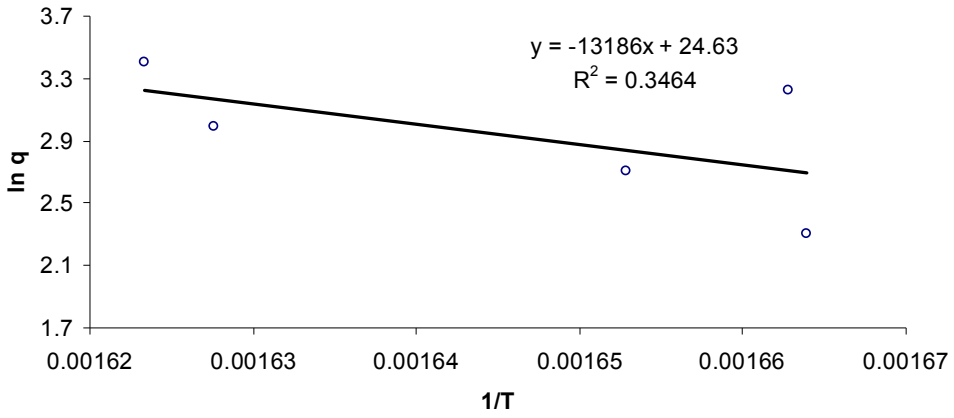


Figure 1 : Plot of ln (q) versus 1/T at 10% decomposition ($\alpha = 0.1$) for AlkOA28

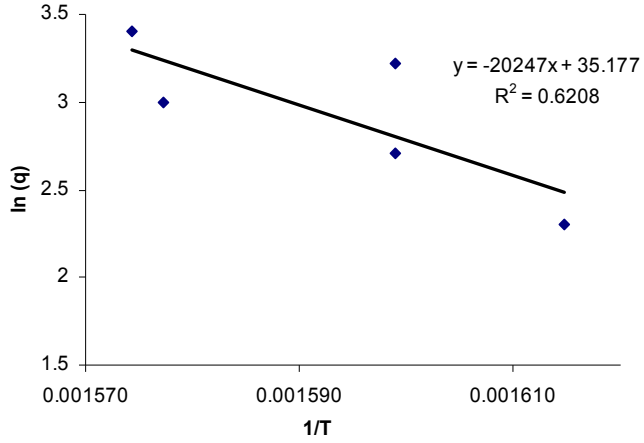


Figure 2 : Plot of ln (q) versus 1/T at 20% decomposition ($\alpha = 0.2$) for AlkOA28

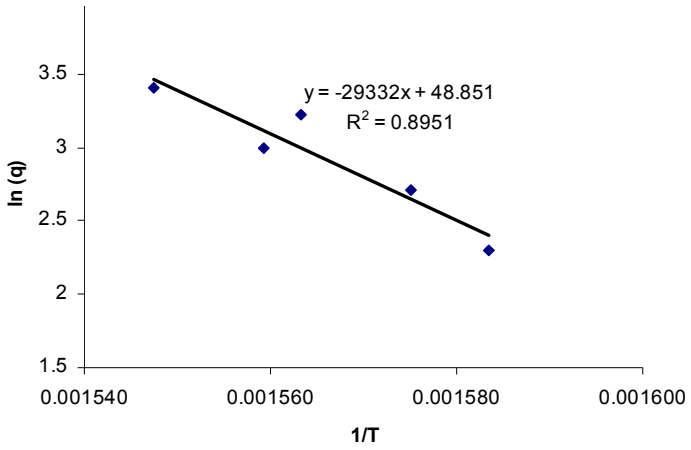


Figure 3 : Plot of ln (q) versus 1/T at 30% decomposition (α = 0.3) for AlkOA28

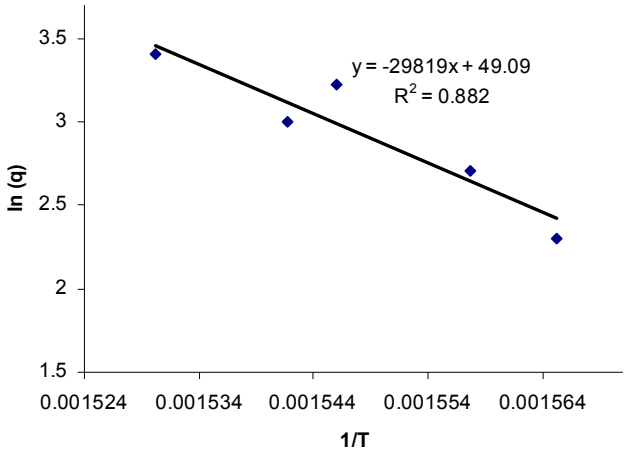


Figure 4 : Plot of ln (q) versus 1/T at 40% decomposition (α = 0.4) for AlkOA28

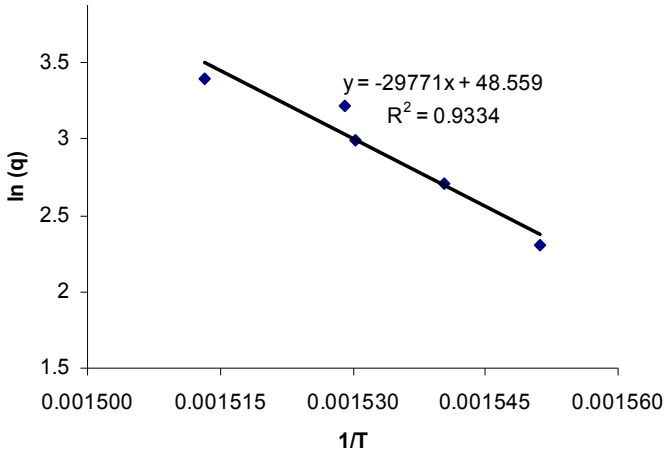


Figure 5 : Plot of ln (q) versus 1/T at 50% decomposition (α = 0.5) for AlkOA28

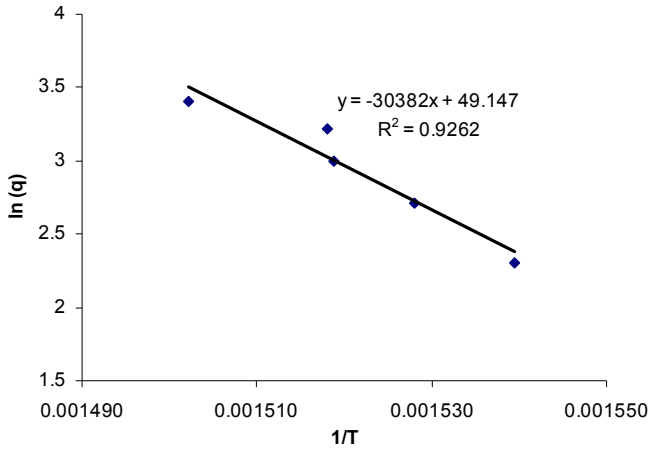


Figure 6 Plot of ln (q) versus 1/T at 60% decomposition (α = 0.6) for AlkOA28

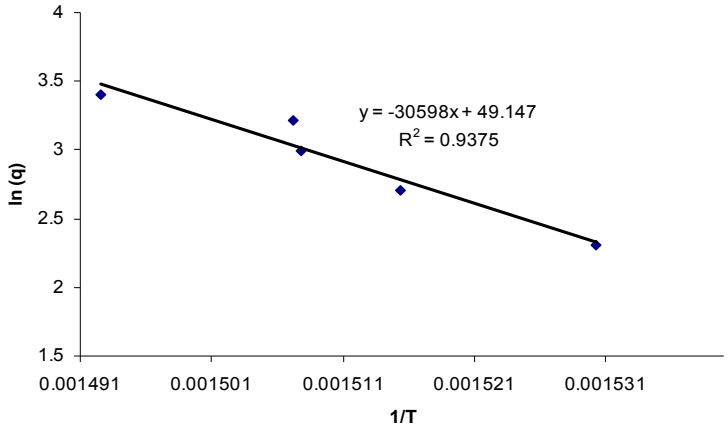


Figure 7 : Plot of ln (q) versus 1/T at 70% decomposition (α = 0.7) for AlkOA28

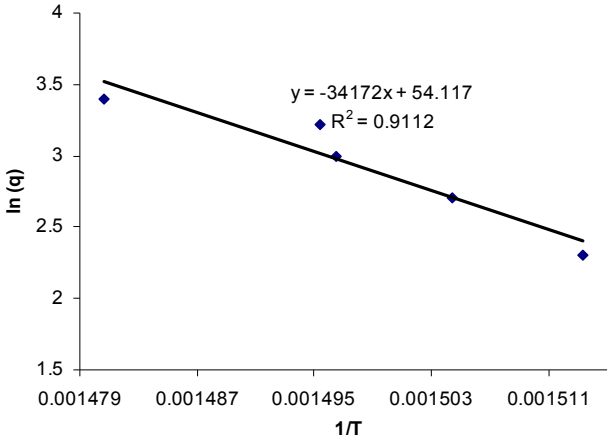


Figure 8 : Plot of ln (q) versus 1/T at 80% decomposition (α = 0.8) for AlkOA28

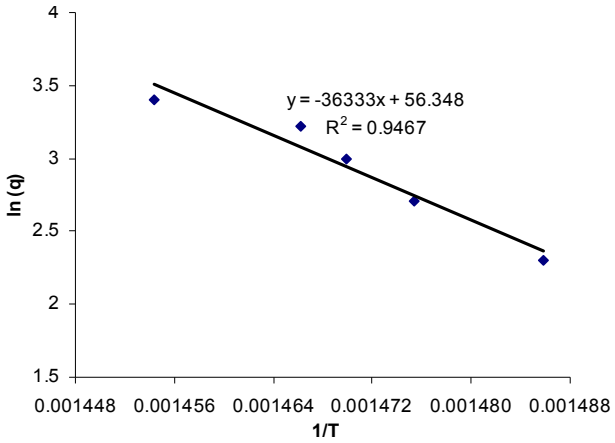


Figure 9 : Plot of ln (q) versus 1/T at 90% decomposition (α = 0.9) for AlkOA28

Table 2 : Measuring of the temperatures corresponding to $0.1 \geq \alpha \leq 0.9$ at different heating rates to calculate activation energy for AlkOA40 macromer

Conversion (α)	q ($Kmin^{-1}$)	T_p (K)	1/ T_p (K^{-1})	ln(q)	E_d (kJ/mol)
0.1	10	553.5	0.001807	2.302	107
	15	565.9	0.001767	2.708	
	20	568.2	0.001760	2.996	
	25	580.1	0.001724	3.219	
	30	575.4	0.001738	3.401	
0.2	10	599.8	0.001667	2.303	151.3
	15	608.7	0.001643	2.708	
	20	611.1	0.001636	2.996	
	25	620.6	0.001611	3.219	
	30	620.1	0.001613	3.401	
0.3	10	617.9	0.001618	2.302	165.4
	15	626.6	0.001596	2.708	
	20	630.1	0.001587	2.996	
	25	637.3	0.001569	3.219	
	30	639	0.001565	3.401	
0.4	10	629.4	0.001589	2.302	176.6
	15	638.7	0.001566	2.708	
	20	642	0.001558	2.996	
	25	648.7	0.001542	3.219	
	30	649.7	0.001539	3.401	
0.5	10	637.7	0.001568	2.302	187.1
	15	647.3	0.001545	2.708	
	20	650.1	0.001538	2.996	
	25	654.9	0.001527	3.219	
	30	658.7	0.001518	3.401	
0.6	10	646	0.001548	2.302	195.6
	15	654.4	0.001528	2.708	
	20	658.7	0.001518	2.996	
	25	663	0.001508	3.219	
	30	666.3	0.001501	3.401	
0.7	10	653.4	0.001530	2.302	208.6
	15	663	0.001508	2.708	
	20	666.3	0.001501	2.996	
	25	669.7	0.001493	3.219	
	30	673	0.001486	3.401	
0.8	10	664.1	0.001506	2.302	209.2
	15	673	0.001486	2.708	
	20	677.3	0.001476	2.996	
	25	678.7	0.001473	3.219	
	30	684.9	0.001460	3.401	
0.9	10	685.3	0.001459	2.302	243.6
	15	691.6	0.001446	2.708	
	20	696.8	0.001435	2.996	
	25	696.8	0.001435	3.219	
	30	704	0.001420	3.401	

Ozawa Plots for calculation of activation energy using OFW method for AlkOA40 at different heating rates corresponding to fixed value of degree of conversion, ($0.1 \geq \alpha \leq 0.9$).

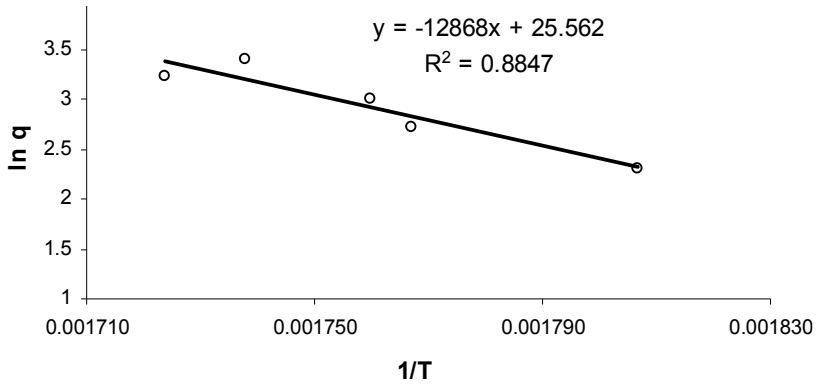


Figure 1 : Plot of ln (q) versus 1/T at 10% decomposition ($\alpha = 0.1$) for AlkOA40

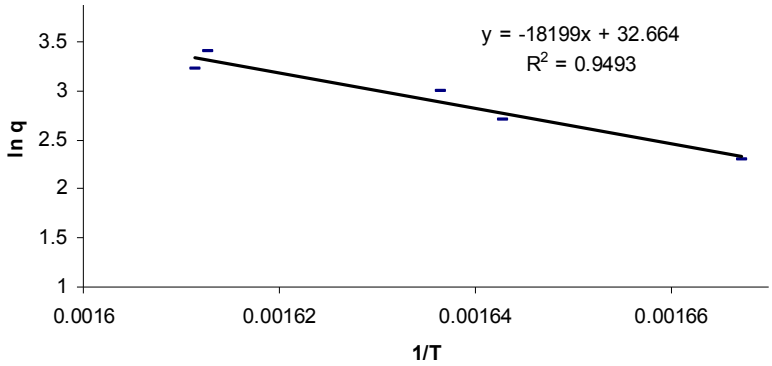


Figure 2 : Plot of ln (q) versus 1/T at 20% decomposition ($\alpha = 0.2$) for AlkOA40

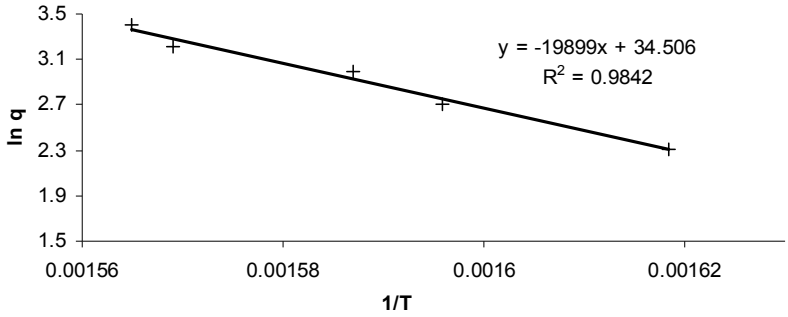


Figure 3 : Plot of ln (q) versus 1/T at 30% decomposition ($\alpha = 0.3$) for AlkO40

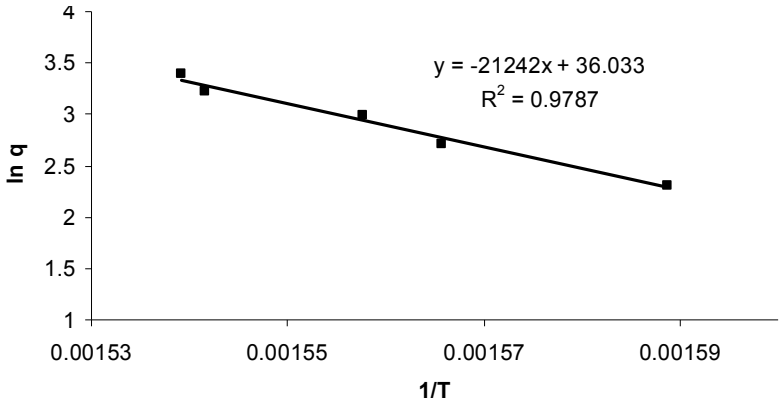


Figure 4 : Plot of ln (q) versus 1/T at 40% decomposition (α = 0.4) for AlkOA40

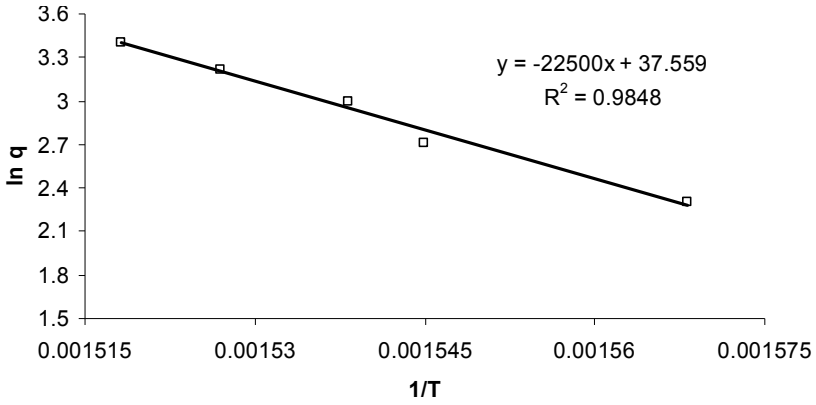


Figure 5 : Plot of ln (q) versus 1/T at 50% decomposition (α = 0.5) for AlkOA40

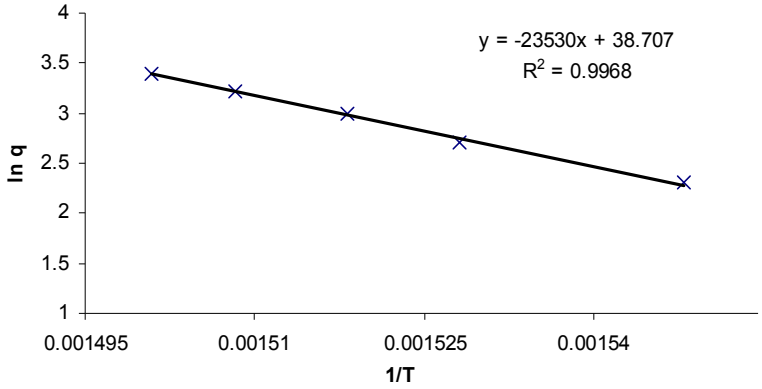


Figure 6 : Plot of ln (q) versus 1/T at 60% decomposition (α = 0.6) for AlkOA40

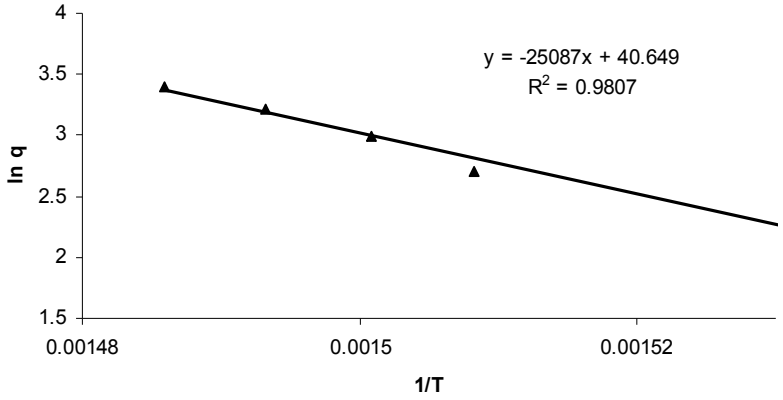


Figure 7 : Plot of ln (q) versus 1/T at 70% decomposition (α = 0.7) for AlkOA40

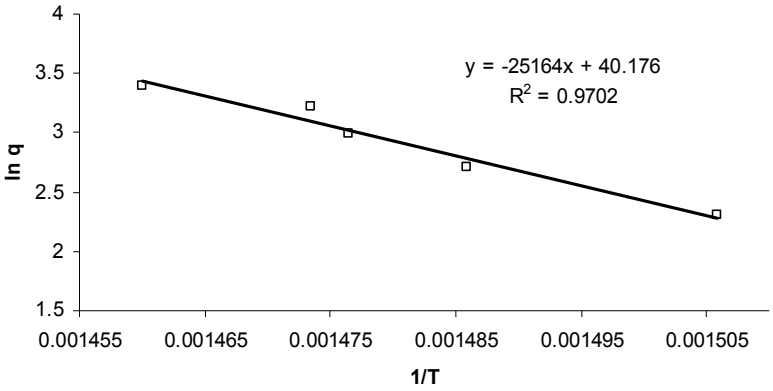


Figure 8 : Plot of ln (q) versus 1/T at 80% decomposition (α = 0.8) for AlkOA40

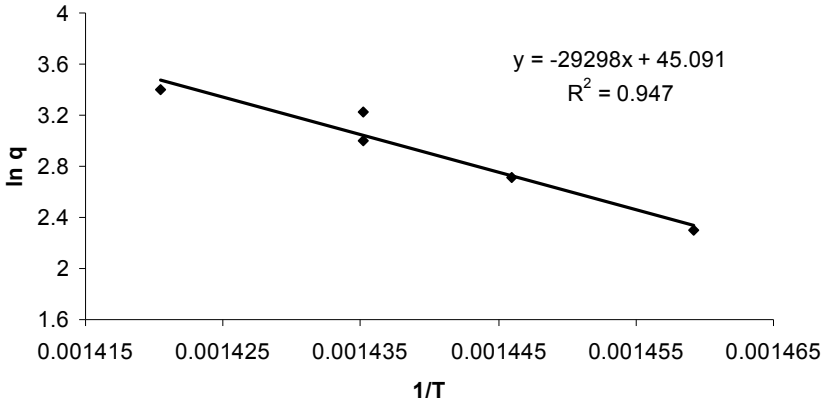


Figure 9 : Plot of ln (q) versus 1/T at 90% decomposition (α = 0.9) for AlkOA40

Table 3 : Measuring of the temperatures corresponding to $0.1 \geq \alpha \leq 0.9$ at different heating rates to calculate activation energy for AlkOA65 macromer

Conversion (α)	q ($Kmin^{-1}$)	T_p (K)	1/ T_p (K^{-1})	ln(q)	E_d (kJ/mol)
0.1	10	575.4	0.00174	2.302	105.8
	15	577.4	0.00173	2.708	
	20	590.2	0.00169	2.996	
	25	592.6	0.00169	3.219	
	30	602.4	0.00166	3.401	
0.2	10	608.3	0.00164	2.303	141.5
	15	612.0	0.00163	2.708	
	20	623.0	0.00161	2.996	
	25	624.2	0.00160	3.219	
	30	631.5	0.00158	3.401	
0.3	10	626.9	0.00160	2.302	169.0
	15	631.8	0.00158	2.708	
	20	640.2	0.00156	2.996	
	25	641.6	0.00156	3.219	
	30	648.5	0.00154	3.401	
0.4	10	639.2	0.00156	2.302	177.3
	15	645.5	0.00155	2.708	
	20	651.4	0.00154	2.996	
	25	655.4	0.00153	3.219	
	30	661.2	0.00151	3.401	
0.5	10	651.4	0.00154	2.302	191.5
	15	655.8	0.00152	2.708	
	20	664.2	0.00151	2.996	
	25	666.1	0.00150	3.219	
	30	671.5	0.00149	3.401	
0.6	10	663.7	0.00151	2.302	192.7
	15	668.6	0.00150	2.708	
	20	675.5	0.00148	2.996	
	25	676.4	0.00148	3.219	
	30	685.3	0.00146	3.401	
0.7	10	674.0	0.00148	2.302	194.8
	15	678.9	0.00147	2.708	
	20	685.7	0.00146	2.996	
	25	687.7	0.00145	3.219	
	30	696.5	0.00144	3.401	
0.8	10	685.7	0.00146	2.302	219.8
	15	690.2	0.00145	2.708	
	20	696.5	0.00144	2.996	
	25	697.0	0.00143	3.219	
	30	705.8	0.00142	3.401	
0.9	10	698.0	0.00143	2.302	244.4
	15	704.9	0.00142	2.708	
	20	709.8	0.00141	2.996	
	25	709.6	0.00141	3.219	
	30	719.1	0.00139	3.401	

Ozawa Plots for calculation of activation energy using OFW method for AlkOA65 at different heating rates corresponding to fixed value of degree of conversion, ($0.1 \geq \alpha \leq 0.9$).

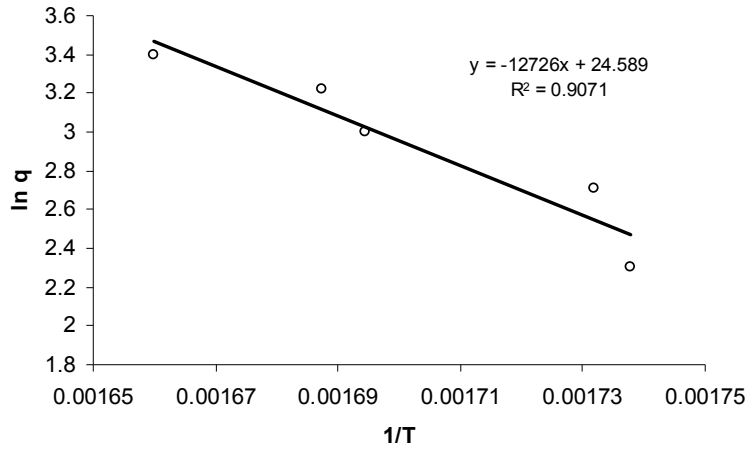


Figure 1 : Plot of ln (q) versus 1/T at 10% decomposition ($\alpha = 0.1$) for AlkOA65

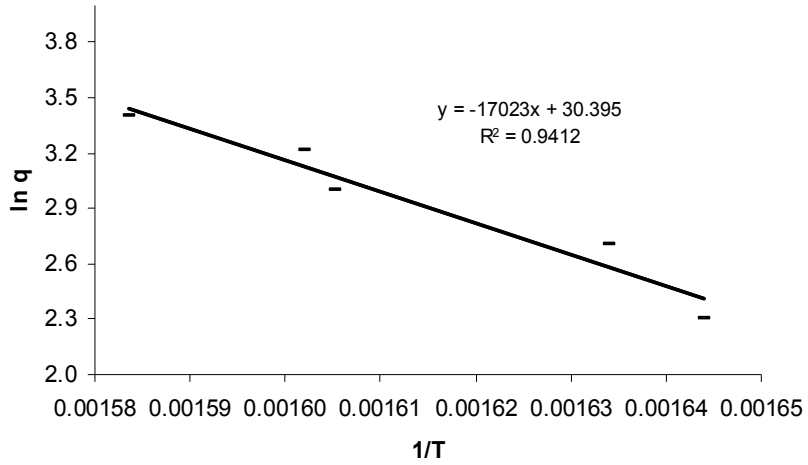
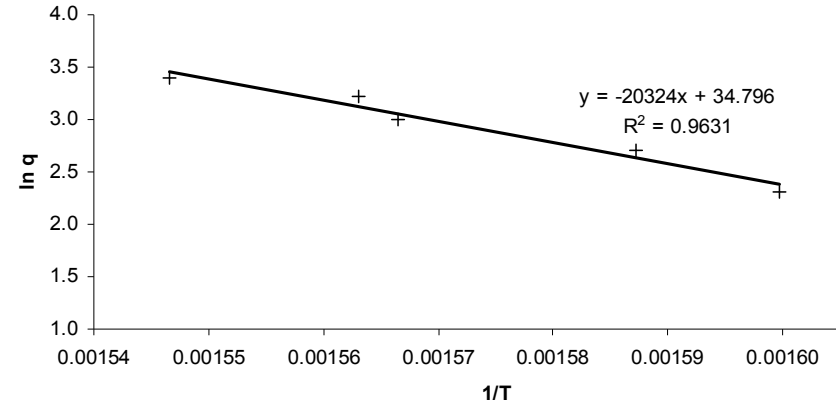


Figure 2 : Plot of ln (q) versus 1/T at 20% decomposition ($\alpha = 0.2$) for AlkOA65



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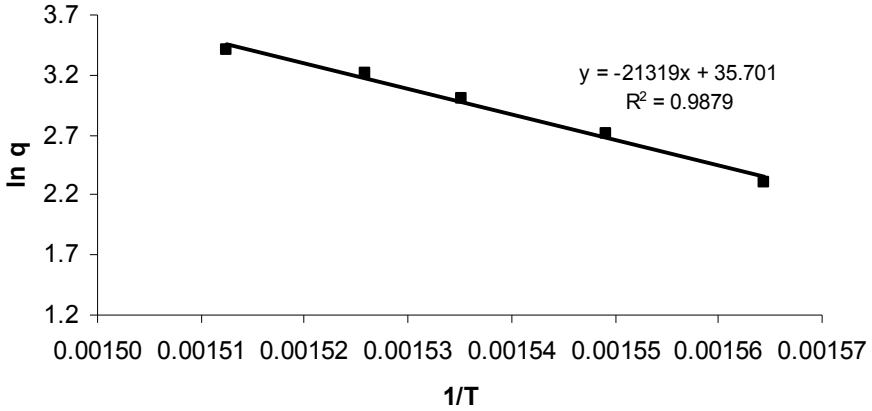


Figure 4 : Plot of ln (q) versus 1/T at 40% decomposition (α = 0.4) for AlkOA65

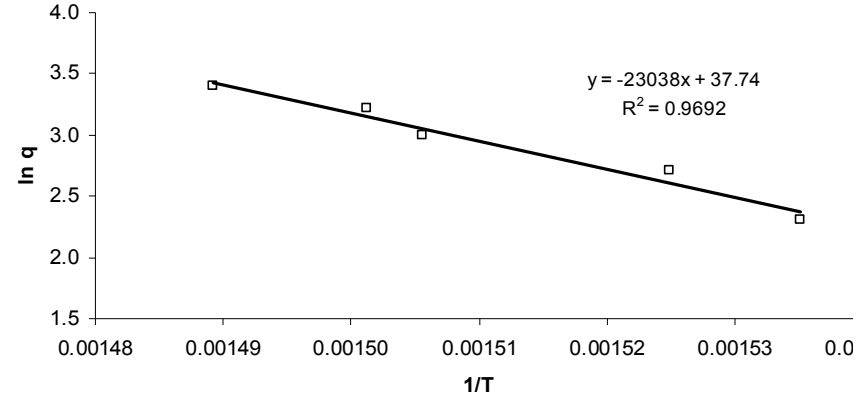


Figure 5 : Plot of ln (q) versus 1/T at 50% decomposition (α = 0.5) for AlkOA65

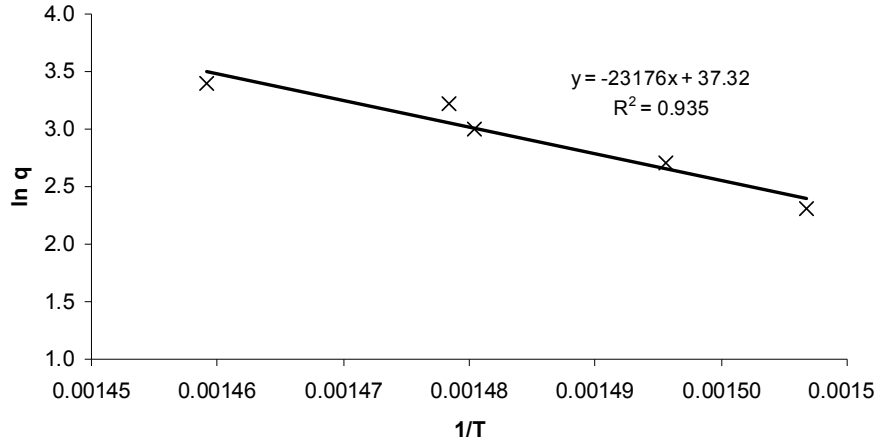


Figure 6 : Plot of ln (q) versus 1/T at 60% decomposition (α = 0.6) for AlkOA65

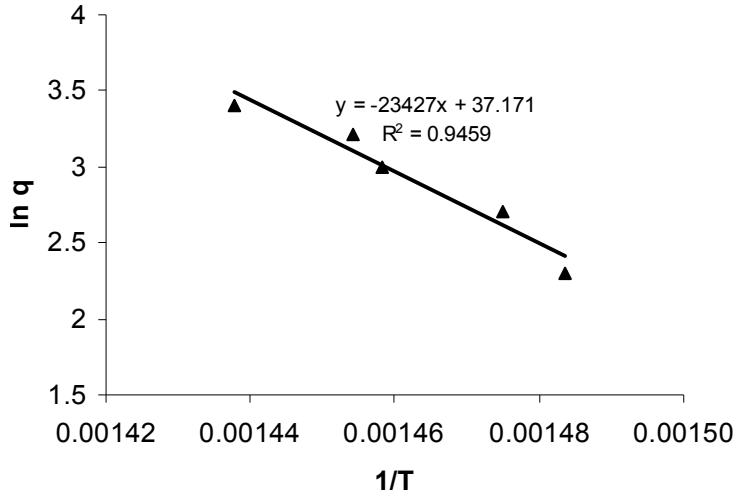


Figure 7 : Plot of ln (q) versus 1/T at 70% decomposition (α = 0.7) for AlkOA65

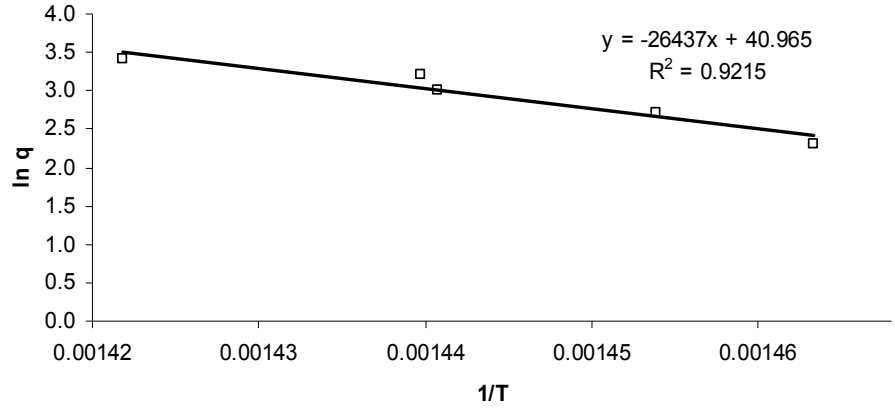
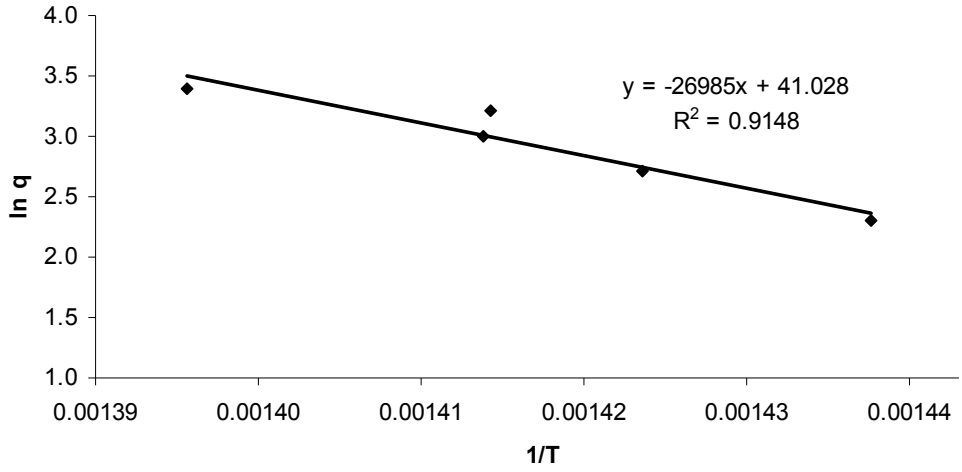


Figure 8 : Plot of ln (q) versus 1/T at 80% decomposition (α = 0.8) for AlkOA65



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