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APPENDICES

Appendix A Scanning Electron Microscopy Analysis

TableA1 Number average particle size (d_n) of dispersed phase of uncompatibilized PA6/LDPE blends

PA6/LDPE blends ratio (%wt) without Surlyn®	80/20	60/40	50/50	40/60	20/80
Mean	15.3	13.1	13.3	12.3	13.4
Std. Error of Mean	3.5	4.5	5.4	3.8	4.7
Minimum	11.9	5.09	6.16	4.38	7.53
Maximum	32.5	27	39.1	21.1	25.9

TableA2 Number average particle size (d_n) of dispersed phase of PA6/LDPE blends with 0.5 phr of Na-EMAA ionomer (Surlyn®) compatibilized

PA6/LDPE blends ratio (%wt) with 0.5 phr Surlyn®	80/20	60/40	50/50	40/60	20/80
Mean	2.2	2.3	5.1	2.3	2.2
Std. Error of Mean	0.4	0.9	1.6	0.8	0.6
Minimum	1.15	0.897	2.05	1.3	1.28
Maximum	3.25	4.49	11.9	5.06	4.1

TableA3 Number average particle size (d_n) of dispersed phase of PA6/LDPE blends with 1.5 phr of Na-EMAA ionomer (Surlyn®) compatibilized

PA6/LDPE blends ratio (%wt) with 1.5 phr Surlyn®	80/20	60/40	50/50	40/60	20/80
Mean	1.6	2.1	2.3	2.2	1.6
Std. Error of Mean	0.3	0.6	0.6	0.4	0.4
Minimum	0.897	1.17	1.45	1.52	1.01
Maximum	2.95	3.77	3.95	3.67	2.44

TableA4 Number average particle size (d_n) of dispersed phase of PA6/LDPE blends with 5.0 phr of Na-EMAA ionomer (Surlyn®) compatibilized

PA6/LDPE blends ratio (%wt) with 5.0 phr Surlyn®	80/20	60/40	50/50	40/60	20/80
Mean	1.5	1.4	1.6	1.9	2.4
Std. Error of Mean	0.3	0.2	0.3	0.5	0.6
Minimum	0.909	1.03	1.15	1.27	1.58
Maximum	2.18	1.79	2.44	3.33	3.77

TableA5 Number average particle size (d_n) of dispersed phase of PA6/Surlyn® blends

PA6/Surlyn® blends ratio (%wt)	80/20	60/40	50/50	40/60	20/80
Mean	0.8757	1.8926	1.7573	1.7567	1.1722
Std. Error of Mean	0.1	0.5	0.4	0.6	0.2
Minimum	0.625	0.991	1.24	1.03	0.696
Maximum	1.25	2.79	2.86	3.46	1.5

Appendix B Mechanical properties

TableB1 Tensile Properties of pure PA6, pure LDPE and pure Na-EMAA ionomer (Surlyn®)

Pure materials	Tensile strength (MPa)	Tensile Modulus (MPa)
PA6	64.2 ± 1.7	3208.2 ± 365.8
LDPE	8.8 ± 0.2	291.5 ± 23.3
Na-EMAA)	15.5 ± 0.8	317.3 ± 13.9

TableB2 Tensile strength of PA6/Na-EMAA blends

Time	Tensile strength (MPa) of PA6/ionomer blends						
	100/0	80/20	60/40	50/50	40/60	20/80	0/100
1	61.2	38.8	33.5	27.1	18.7	17.8	15.7
2	64.9	36.8	33	27.4	18.4	18	16.5
3	64.8	42.2	33.8	27.2	18.8	18.1	14.3
4	65.6	41.7	32.6	26.1	18.9	17.4	15.6
5	64.6	41.4	33.5	28.8	18.7	17.5	15.5
Ave	64.2	40.2	33.3	27.3	18.7	17.8	15.5
STD	1.7	2.3	0.5	1.0	0.2	0.3	0.8

TableB3 Tensile modulus of PA6/Na-EMAA blends

Time	Tensile Modulus (MPa) of PA6/ionomer blends						
	100/0	80/20	60/40	50/50	40/60	20/80	0/100
1	2662.3	1146.9	1144.6	915.3	566.8	445.2	321.3
2	3203.9	3406.2	1259.1	896.9	585.8	452.1	316.3
3	3620.1	1334.7	1136.1	877.4	614.3	423.3	301.3
4	3106.9	1453.1	1285.5	1028.5	578.5	430.7	338.4
5	3447.5	1440.1	1220.9	975.7	625.8	426.4	309.3
Ave	3208.1	1756.2	1209.2	938.8	594.2	435.5	317.3
STD	365.8	930.5	67.0	62.2	24.9	12.5	14.0

TableB4 Elongation at break of PA6/Na-EMAA blends

Time	Elongation at break (%) (MPa) of PA6/ionomer blends						
	100/0	80/20	60/40	50/50	40/60	20/80	0/100
1	32.6	33.2	65.6	21.4	82.3	263.1	231.5
2	25.1	35.1	61.4	24.4	86.7	270.6	260.3
3	28.2	29.2	67.7	34.3	68.3	281.2	206.6
4	33.7	32.5	39.5	14.4	72.8	269.5	235.5
5	36.1	24.4	59.6	34.9	69.7	258.5	231.8
Ave	31.1	30.9	58.8	25.9	76.0	268.6	233.1
STD	4.4	3.8	11.2	8.8	8.1	8.6	19.1

TableB5 Impact strength of PA6/Na-EMAA blends

Time	Impact strength (kJ/m^2) of PA6/Na-EMAA blends			
	80/20	60/40	50/50	40/60
1	5.8	9.3	11.8	10.9
2	5.6	10.8	12.5	12.6
3	6.0	17.8	13.2	10.8
4	5.5	8.2	19.1	10.0
5	5.1	12.1	13.1	10.4
6	7.5	11.2	11.1	12.2
7	6.7	11.0	10.4	12.9
8	5.8	16.3	17.1	12.8
9	5.8	14.5	12.6	13.5
10	6.5	15.4	12.3	14.3
Ave	6.03	12.7	13.3	12.0
STD	0.7	3.2	2.7	1.4

TableB6 Hardness of PA6/Na-EMAA blends

Time	Hardness of PA6/ionomer blends (Shore D)						
	100/0	80/20	60/40	50/50	40/60	20/80	0/100
1	77	70	68	66.2	60	55	51
2	75	69	68	66	60	55	5i
3	75	69	68	67	59	55	51
4	74	71	68	65	60	55	52
5	74	70	69	66	60	56	52
6	75	70	67	67	59	55	53
7	74	70	67	68	60	55	54
8	75	70	68	67	59	55	53
9	74	70	68	65	60	55	53
10	76	70	68	65	60	56	51
Ave	74.9	69.9	67.8	66.2	59.7	55.2	52.1
STD	1.0	0.5	0.5	1.0	0.5	0.4	1.1

TableB7 Tensile strength of PA6/LDPE blends without Na-EMAA ionomer (Surlyn®)

PA6/LDPE composition	100/0	80/20	60/40	50/50	40/60	20/80	0/100
Tensile strength (MPa)	64.2	37.2	15.3	15.6	13.3	10.2	8.8

TableB8 Tensile strength of PA6/LDPE blends with Na-EMAA ionomer (Surlyn®)

Surlyn®(%wt.)	Tensile strength of PA6/LDPE blends (MPa)				
	80/20	60/40	50/50	40/60	20/80
0	37.2	15.3	15.6	13.3	10.2
0.5	40.8	19.9	13.0	13.2	10.5
1.5	37.1	16.7	14.0	12.8	10.3
5.0	14.0	15.3	13.5	12.3	10.3

TableB9 Tensile modulus of PA6/LDPE blends without Na-EMAA ionomer (Surlyn®)

PA6/LDPE composition	100/0	80/20	60/40	50/50	40/60	20/80	0/100
Tensile modulus (MPa)	3208.1	1636.6	706.1	720.5	634.7	1636.6	291.5

TableB10 Tensile modulus of PA6/HDPE blends with Na-EMAA ionomer (Surlyn®)

Surlyn® (% wt.)	Tensile modulus of PA6/LDPE blends (MPa)				
	80/20	60/40	50/50	40/60	20/80
0	1636.6	706.1	720.5	634.7	462.9
0.5	1862.8	1002.8	880.2	623.9	473.6
1.5	1426.3	862.5	764.4	614.9	425.8
5.0	1075.0	706.1	532.2	468.4	384.4

TableB11 Impact strength of PA6/LDPE blends without Na-EMAA ionomer (Surlyn®)

PA6/LDPE composition	100/0	80/20	60/40	20/80	100/0
Impact strength (KJ/m^2)	6.03	4.92	5.62	4.35	26.8

TableB12 Impact strength of PA6/LDPE blends with Na-EMAA ionomer (Surlyn®)

Surlyn® (% wt.)	Impact strength of PA6/HDPE blends (kJ/m^2)		
	80/20	60/40	20/80
0	4.92	5.62	4.35
0.5	9.68	5.98	4.58
1.5	11.4	3.4	9.0
5.0	4.69	3.19	9.27

TableB13 Hardness of PA6/LDPE blends without Na-EMAA ionomer (Surlyn®)

PA6/LDPE composition	100/0	80/20	60/40	50/50	40/60	20/80	0/100
Hardness (Shore D)	74.9	65.1	51.4	46.6	46.5	40.6	42.7

TableB14 Hardness of PA6/LDPE blends with Na-EMAA ionomer (Surlyn®)

Surlyn® (% wt.)	Hardness of PA6/LDPE blends (Shore D)				
	80/20	60/40	50/50	40/60	20/80
0	65.1	51.4	46.6	46.5	40.6
0.5	66.7	60.1	51.9	52.8	45.6
1.5	65.4	55.9	54	50.9	45.7
5.0	56.6	54.8	51.2	50.3	46.7

AppendixC Dynamic Mechanical Analysis

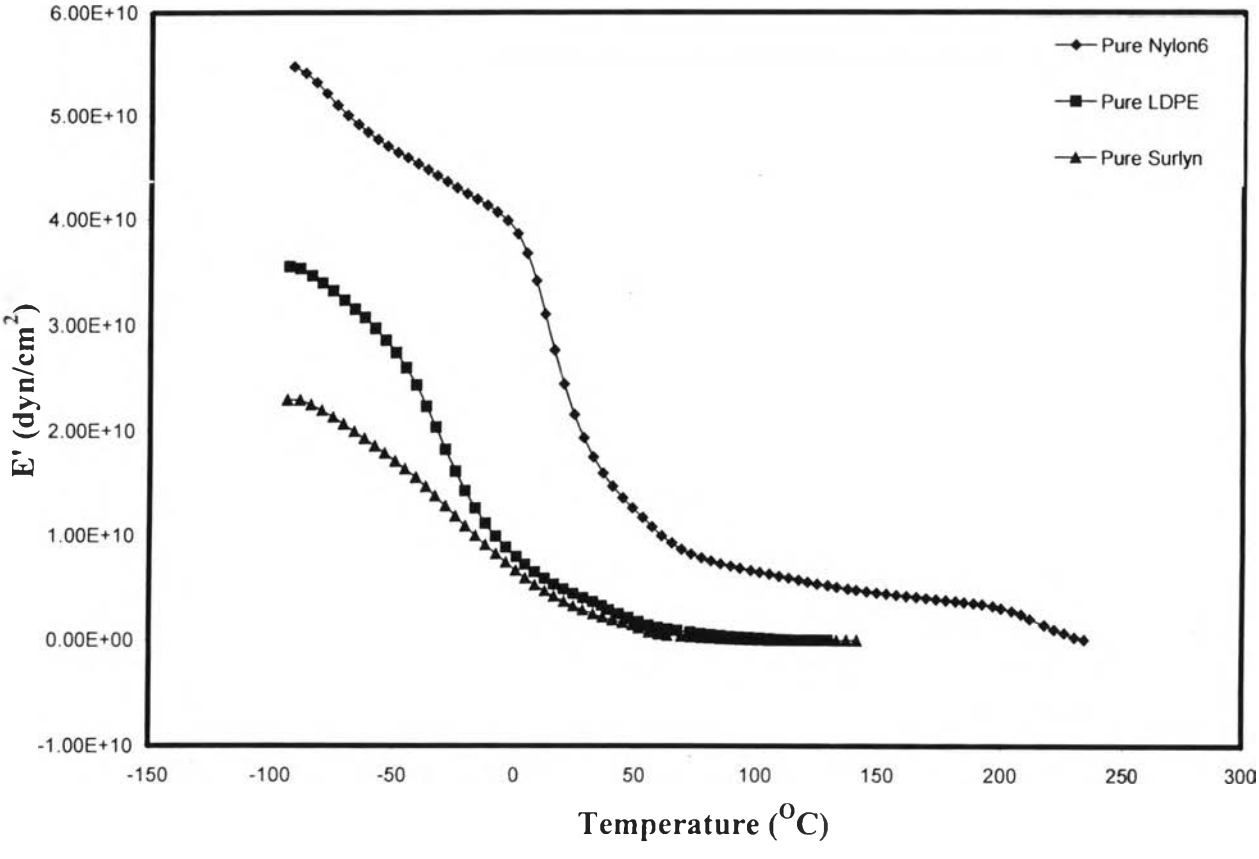

Figure D1 Temperature dependence of storage modulus of Pure materials: (•) Pure PA6; (■) Pure LDPE; (▲) Pure Na-EMAA ionomer

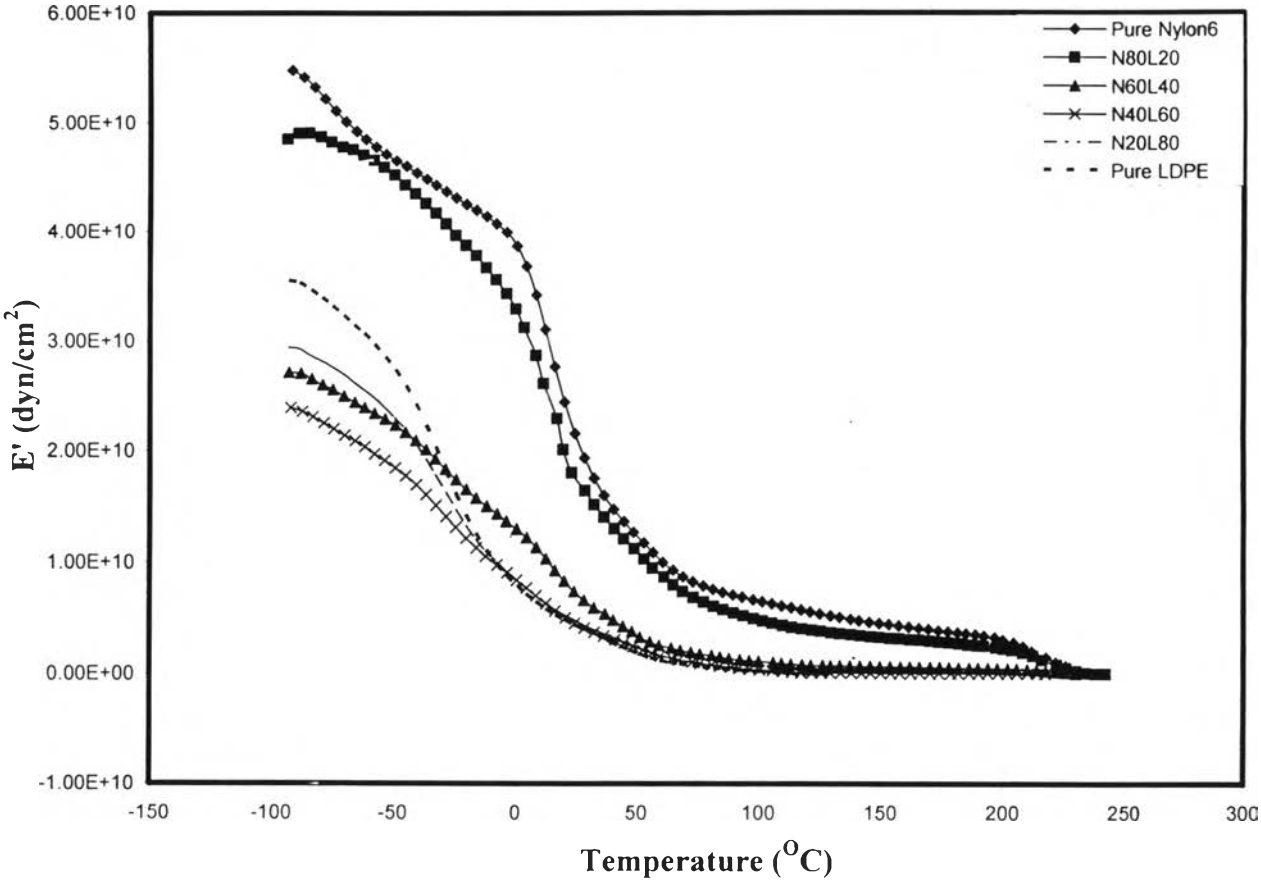

Figure D2 Temperature dependence of Storage modulus of PA6/LDPE blends: (—) 100/0; (▪) 80/20; (▲) 60/40; (×) 40/60; (·····) 20/80; (---) 0/100

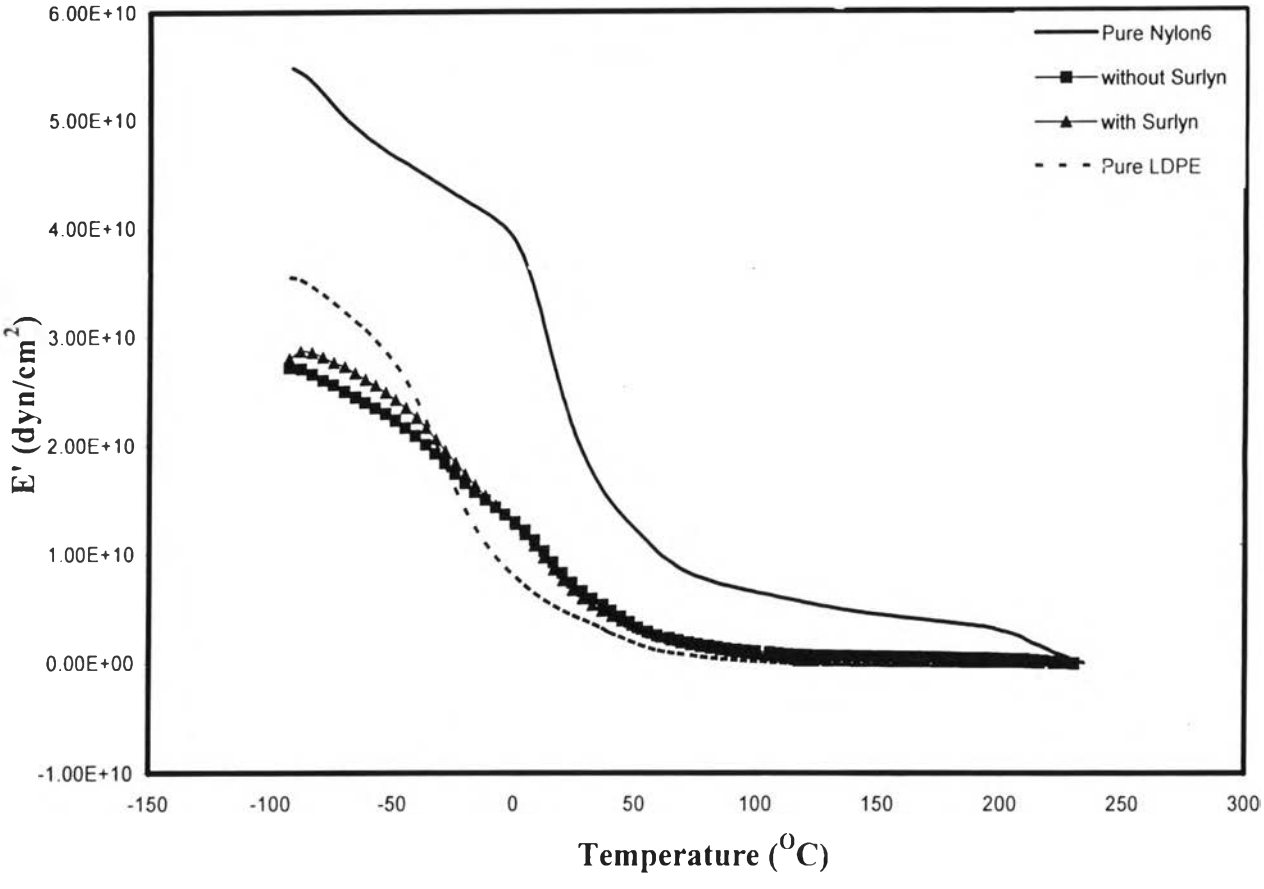

Figure D3 Temperature dependence of storage modulus of PA6/LDPE blends with and without compatibilizer

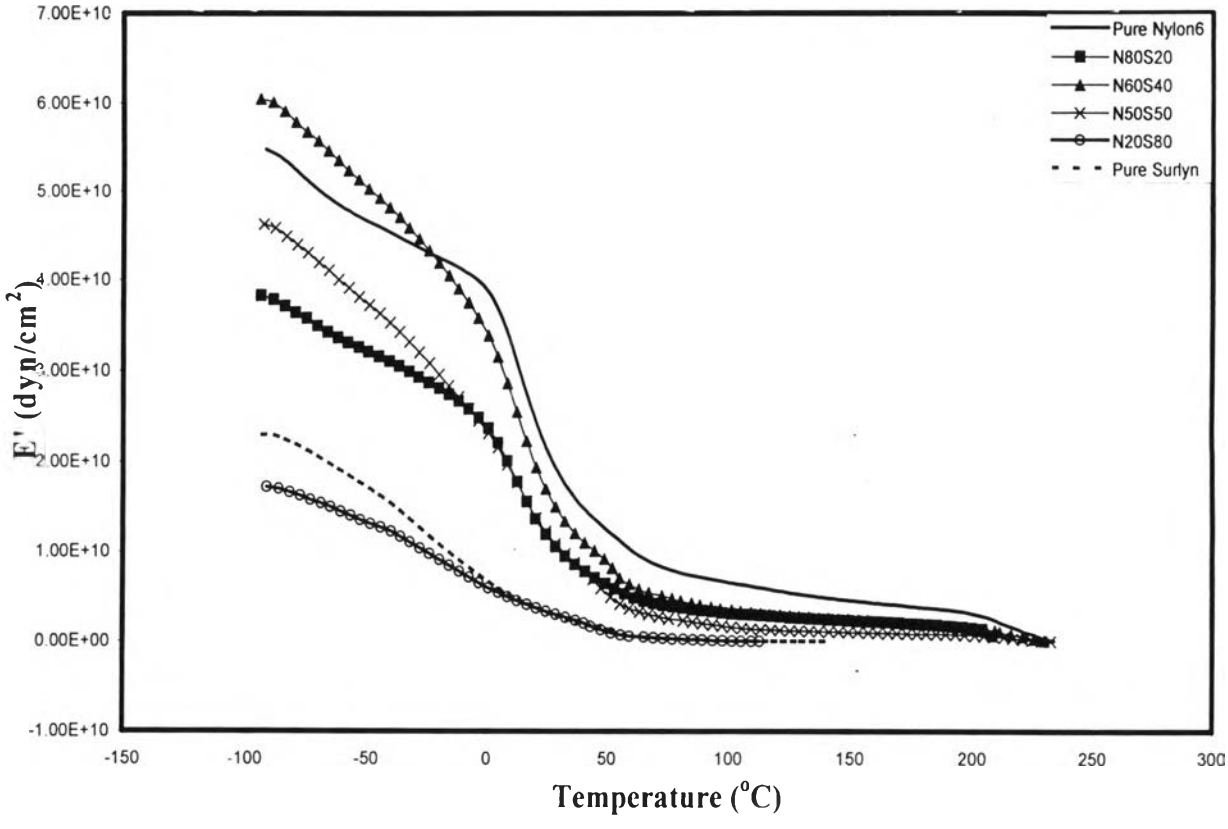

Figure D4 Temperature dependence of storage modulus of PA6/Na-EMAA ionomer blends: (—) 100/0; (▪) 80/20; (▲) 60/40; (×) 50/50; (o) 20/80; (---) 0/100

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