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## APPENDIX A

### Scanning Electron Microscopic Analysis

**Table A1** Number average particle size ( $D_n$ ) of dispersed phase of noncompatibilized PA6/LDPE blends.

PA6/LDPE blend (wt%)	20/80	40/60	50/50	60/40	80/20
Mean	12.0955	20.7886	25.7070	26.0210	22.1990
Std. Error of Mean	0.36431	0.55319	0.45854	0.41374	0.42991
Std. Deviation	3.64312	5.53189	4.58542	4.13742	4.29913
Range	22.62	20.45	21.40	23.10	18.10
Minimum	5.28	9.05	17.80	14.50	11.70
Maximum	27.90	29.50	39.20	37.60	29.80

**Table A2** Number average particle size ( $D_n$ ) of dispersed phase of PA6/LDPE blends with 0.5 phr Surlyn<sup>®</sup> ionomer compatibilizer.

PA6/LDPE blend (wt%) with 0.5 phr Surlyn <sup>®</sup>	20/80	40/60	50/50	60/40	80/20
Mean	11.1841	12.2216	19.1256	20.5708	2.7763
Std. Error of Mean	0.41597	0.60957	0.86526	0.57911	0.08323
Std. Deviation	4.15968	6.09573	8.65259	5.79109	0.83233
Range	16.09	26.06	42.86	35.45	3.83
Minimum	3.71	3.64	4.44	6.45	1.39
Maximum	19.80	29.70	47.30	41.90	5.22

**Table A3** Number average particle size ( $D_n$ ) of dispersed phase of PA6/LDPE blends with 1.5 phr Surlyn<sup>®</sup> ionomer compatibilizer.

PA6/LDPE blend (wt%) with 1.5 phr Surlyn <sup>®</sup>	20/80	40/60	50/50	60/40	80/20
Mean	9.5444	10.5040	18.0790	20.1553	2.0544
Std. Error of Mean	0.29753	0.25770	0.47317	0.76836	0.06838
Std. Deviation	2.97534	2.57701	4.73167	7.68363	0.68381
Range	14.10	10.30	22.10	42.86	2.83
Minimum	5.20	6.10	6.50	4.44	0.98
Maximum	19.30	16.40	28.600	47.30	3.81

**Table A4** Number average particle size ( $D_n$ ) of dispersed phase of PA6/LDPE blends with 5.0 phr Surlyn<sup>®</sup> ionomer compatibilizer.

PA6/LDPE blend (wt%) with 5.0 phr Surlyn <sup>®</sup>	20/80	40/60	50/50	60/40	80/20
Mean	7.6654	8.2211	15.7098	17.1860	1.0343
Std. Error of Mean	0.24451	0.29186	0.47379	0.41677	0.02860
Std. Deviation	2.44509	2.91859	4.73792	4.16772	0.28604
Range	17.10	13.50	20.70	23.30	1.22
Minimum	3.20	3.40	4.60	5.60	0.40
Maximum	20.30	16.90	25.30	28.90	1.61

**Table A5** Number average particle size ( $D_n$ ) of dispersed phase of PA6/Surlyn<sup>®</sup> blends.

PA6/Surlyn <sup>®</sup> blend (wt%)	20/80	40/60	50/50	60/40	80/20
Mean	0.7966	0.4674	0.4674	0.3991	0.3991
Std. Error of Mean	0.02614	0.01547	0.01547	0.00986	0.00986
Std. Deviation	0.26136	0.15468	0.15468	0.09861	0.09861
Range	1.09	0.75	0.75	0.58	0.58
Minimum	0.25	0.23	0.23	0.18	0.18
Maximum	1.33	0.98	0.98	0.76	0.76



## APPENDIX B

### Thermogravimetric Analysis

**Table B1** Degradation temperature, activation energy ( $E_a$ ), and pre-exponential factor ( $\ln A$ ) at 0.1 fractional conversion for pure components.

Pure component		PA6	LDPE	Surlyn <sup>®</sup>
Heating rate (°C/min)	5	370.7	256.8	396.2
	10	382.5	293.2	410.0
	20	408.7	337.2	425.0
Degradation temperature (°C)		357.6	243.8	338.7
$E_a$ (kJ/mol)		127.8	46.3	187.1
$\ln A$ (min <sup>-1</sup> )		21.9	6.2	30.3
$r^2$		0.9994	0.9816	0.9725

**Table B2** Degradation temperature, activation energy ( $E_a$ ), and pre-exponential factor ( $\ln A$ ) at 0.1 fractional conversion for noncompatibilized PA6/LDPE blends.

PA6/LDPE blend ratio		20/80	40/60	50/50	60/40	80/20
Heating rate (°C/min)	5	262.9	267.9	280.9	300.5	340.9
	10	284.5	313.2	315.6	359.1	368.2
	20	339.1	330.0	340.6	367.2	393.6
Degradation temperature (°C)		235.6	259.5	268.4	291.98	328.23
$E_a$ (kJ/mol)		47.37	55.84	64.65	50.80	89.39
$\ln A$ (min <sup>-1</sup> )		7.3	7.5	8.7	12.6	14.3
$r^2$		0.9970	0.8108	0.9217	0.8725	0.9980

**Table B3** Degradation temperature, activation energy ( $E_a$ ), and pre-exponential factor ( $\ln A$ ) at 0.1 fractional conversion for PA6/LDPE blends with 0.5 phr Surlyn®.

PA6/LDPE blend ratio		20/80	40/60	50/50	60/40	80/20
Heating rate (°C/min)	5	295.6	301.4	325.6	334.4	342.9
	10	315.7	360.5	366.7	367.6	384.4
	20	363.9	378.5	390.4	393.6	400.1
Degradation temperature (°C)		271.5	295.6	313.8	321.4	335.3
$E_a$ (kJ/mol)		58.5	55.39	68.36	78.10	77.56
$\ln A$ (min <sup>-1</sup> )		8.6	11.3	12.8	11.9	20.5
$r^2$		0.9579	0.8796	0.8863	0.9910	0.8145

**Table B4** Degradation temperature, activation energy ( $E_a$ ), and pre-exponential factor ( $\ln A$ ) at 0.1 fractional conversion for PA6/LDPE blends with 1.5 phr Surlyn®.

PA6/LDPE blend ratio		20/80	40/60	50/50	60/40	80/20
Heating rate (°C/min)	5	291.7	335.7	334.4	348.5	360.5
	10	330.5	380.6	367.6	360.9	370.5
	20	360.1	410.0	393.6	395.6	400.0
Degradation temperature (°C)		277.4	321.0	327.2	331.2	345.7
$E_a$ (kJ/mol)		59.6	63.0	80.23	95.39	115.9
$\ln A$ (min <sup>-1</sup> )		9.2	12.4	17.2	20.6	21.5
$r^2$		0.9881	0.9069	0.8221	0.9941	0.9313

**Table B5** Degradation temperature, activation energy ( $E_a$ ), and pre-exponential factor ( $\ln A$ ) at 0.1 fractional conversion for PA6/LDPE blends with 5.0 phr Surlyn<sup>®</sup>.

PA6/LDPE blend ratio		20/80	40/60	50/50	60/40	80/20
Heating rate (°C/min)	5	316.4	347.9	334.9	350.5	359.3
	10	333.5	366.7	358.9	357.6	367.8
	20	381.1	380.4	380.6	380.9	385.5
Degradation temperature (°C)		292.6	328.0	324.1	338.9	351.5
$E_a$ (kJ/mol)		64.7	80.1	99.8	141.9	176.9
$\ln A$ (min <sup>-1</sup> )		9.7	13.8	21.3	25.7	29.9
$r^2$		0.9942	0.9234	0.9521	0.9883	0.9999

**Table B6** Degradation temperature, activation energy ( $E_a$ ), and pre-exponential factor ( $\ln A$ ) at 0.1 fractional conversion for PA6/ Surlyn<sup>®</sup> blends.

PA6/LDPE blend ratio		20/80	40/60	50/50	60/40	80/20
Heating rate (°C/min)	5	389.4	387.8	388.9	383.6	377.7
	10	406.1	400.5	402.8	404.3	382.4
	20	418.8	417.2	419.7	413.4	405.9
Degradation temperature (°C)		383.0	379.4	380.5	379.0	365.9
$E_a$ (kJ/mol)		178.1	177.8	171.4	165.3	157.7
$\ln A$ (min <sup>-1</sup> )		25.6	27.4	30.0	36.5	41.7
$r^2$		0.9290	0.9875	0.9820	0.8404	0.9689

**Table B7** Degradation temperature, activation energy ( $E_a$ ), and pre-exponential factor ( $\ln A$ ) at 0.1 fractional conversion for Surlyn<sup>®</sup>/LDPE blends.

PA6/LDPE blend ratio		20/80	40/60	50/50	60/40	80/20
Heating rate (°C/min)	5	386.1	316.4	312.2	351.1	365.5
	10	306.4	359.9	350.1	365.9	380.5
	20	362.5	384.3	370.1	412.8	421.9
Degradation temperature (°C)		258.0	303.9	311.7	327.7	344.8
$E_a$ (kJ/mol)		50.2	63.1	71.0	74.2	85.2
$\ln A$ (min <sup>-1</sup> )		7.9	9.6	14.8	16.2	19.4
$r^2$		0.9948	0.8855	0.8715	0.9898	0.9945

## CURRICULUM VITAE

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