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APPENDIX A

Viscosity and Normal Stress of Nylon12 and NR

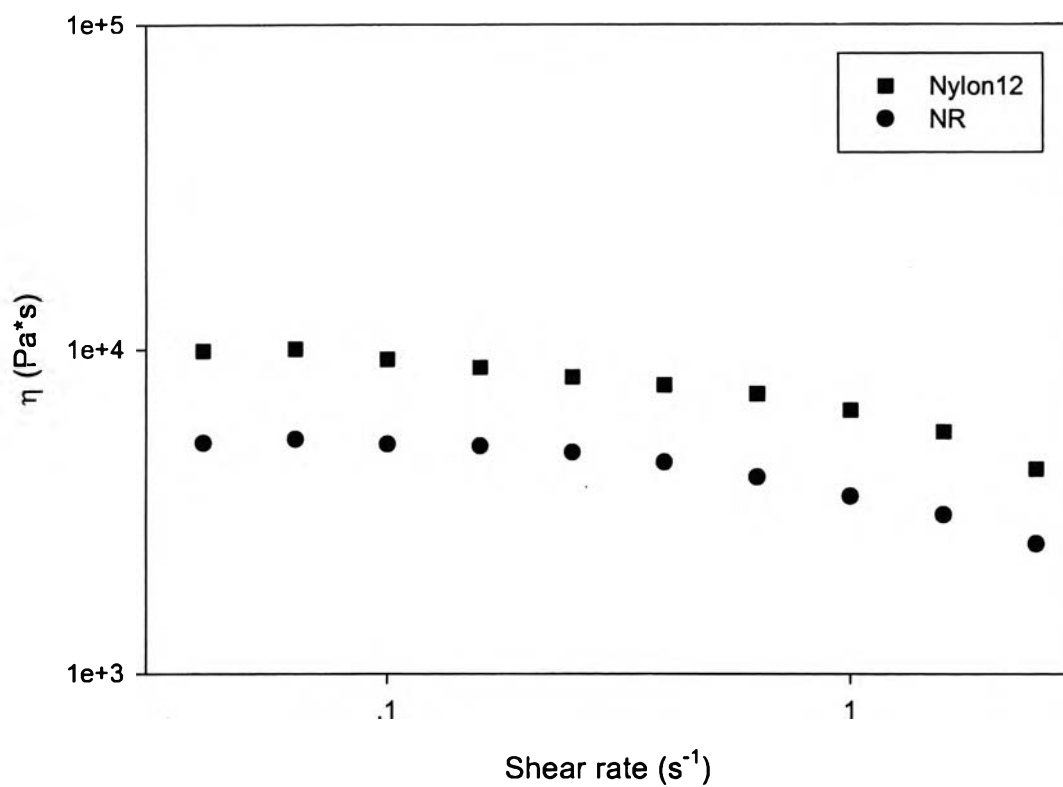


Figure A1 Viscosity versus shear rate of Nylon12 and NR at 190°C.

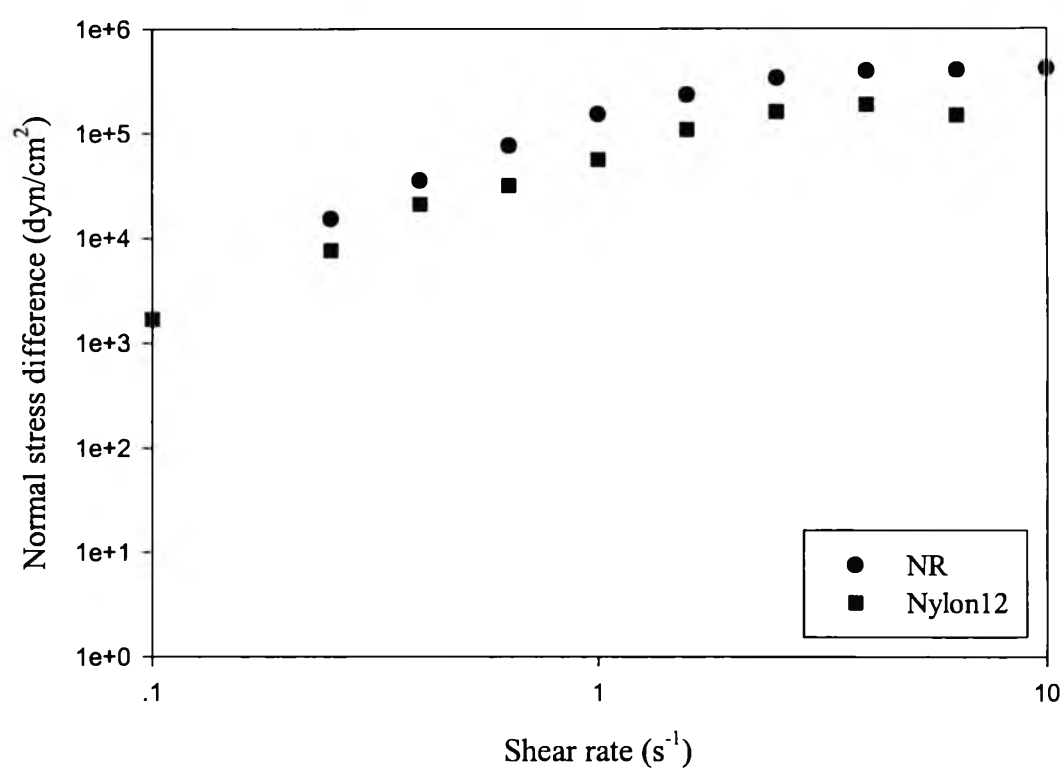


Figure A2 Normal stress difference versus shear rate of Nylon12 and NR at 190°C.

APPENDIX B

Dispersed Phase Determination of Nylon12/NR Blends

Table B1 Dispersed phase size and distribution of [Nylon12/NR]/SEBS G1652 blends with 0, 1, 2, 4, 8, and 16 phr of SEBS.

SEBS G1652 content (phr)	Dispersed phase size (μm)			
	Mean	S.D.	Min	Max
0	0.268	0.119	0.092	0.667
1	0.303	0.165	0.092	0.725
2	0.354	0.200	0.092	0.892
4	0.381	0.263	0.083	1.100
8	0.417	0.251	0.117	1.208
16	0.564	0.306	0.107	1.340

Table B2 Dispersed phase size and distribution of [Nylon12/NR]/SEBS-g-MA FG1901x blends with 0, 1, 2, 4, 8, and 16 phr of SEBS-g-MA.

SEBS FG1901x content (phr)	Dispersed phase size (μm)			
	Mean	S.D.	Min	Max
0	0.268	0.119	0.092	0.667
1	0.221	0.092	0.083	0.458
2	0.190	0.063	0.092	0.400
4	0.168	0.049	0.081	0.304
8	0.152	0.043	0.075	0.267
16	0.153	0.036	0.083	0.233

Table B3 Dispersed phase size and distribution of [Nylon12/NR]/SEBS G1650 blends with 0, 1, 2, 4, 8, and 16 phr of SEBS.

SEBS G1650 content (phr)	Dispersed phase size (μm)			
	Mean	S.D.	Min	Max
0	0.268	0.119	0.092	0.667
1	0.296	0.155	0.083	0.701
2	0.331	0.182	0.092	0.892
4	0.376	0.208	0.092	1.042
8	0.416	0.291	0.108	1.458
16	0.444	0.358	0.102	1.783

Table B4 Dispersed phase size and distribution of [Nylon12/NR]/SEBS G1657 blends with 0, 1, 2, 4, 8, and 16 phr of SEBS.

SEBS G1657 content (phr)	Dispersed phase size (μm)			
	Mean	S.D.	Min	Max
0	0.268	0.119	0.092	0.667
1	0.286	0.137	0.083	0.775
2	0.342	0.152	0.100	1.017
4	0.403	0.199	0.117	1.108
8	0.501	0.329	0.107	1.617
16	0.682	0.443	0.092	1.883

Table B5 Dispersed phase size and distribution of [Nylon12/NR]/PSNR05 blends with 0, 1, 2, 4, 8, and 16 phr of PSNR05.

PSNR05	Dispersed phase size (μm)			
content (phr)	Mean	S.D.	Min	Max
0	0.268	0.119	0.092	0.667
1	0.294	0.148	0.083	0.733
2	0.378	0.227	0.092	1.167
4	0.444	0.298	0.092	1.358
8	0.520	0.328	0.095	1.883
16	0.583	0.464	0.100	2.133

APPENDIX C

Mechanical Properties of Nylon12/NR Blends

Table C1 Tensile modulus and strength of Nylon 12

Material	Tensile modulus (MPa)	Tensile strength (MPa)
Nylon12	2001.976±139.474	36.332±2.861

Table C2 Effect of SEBS G1652 content on tensile modulus of 80/20 Nylon12/NR blends with 1, 2, 4, 8, 16 phr.

SEBS G1652 content (phr)	Tensile modulus (MPa)
0	827.463±88.011
1	852.881±48.645
2	910.500±72.120
4	844.340±94.208
8	800.654±44.298
16	694.199±54.312

Table C3 Effect of SEBS FG1901x content on tensile modulus of 80/20 Nylon12/NR blends with 1, 2, 4, 8, 16 phr.

SEBS-g-MA FG1901x cont. (phr)	Tensile modulus (MPa)
0	827.463±88.011
1	907.399±98.534
2	947.893±106.149
4	882.386±97.043
8	752.386±66.443
16	599.134±107.084

Table C4 Effect of SEBS G1650 content on tensile modulus of 80/20 Nylon12/NR blends with 1, 2, 4, 8, 16 phr.

SEBS G1650 content (phr)	Tensile modulus (MPa)
0	827.463±88.011
1	927.884±82.943
2	927.048±54.057
4	892.964±70.336
8	811.819±68.205
16	742.669±63.136

Table C5 Effect of SEBS G1657 content on tensile modulus of 80/20 Nylon12/NR blends with 1, 2, 4, 8, 16 phr.

SEBS G1657 content (phr)	Tensile modulus (MPa)
0	827.463±88.011
1	897.350±43.533
2	957.594±88.608
4	864.444±81.473
8	805.523±118.979
16	758.865±69.750

Table C6 Effect of PSNR05 content on tensile modulus of 80/20 Nylon12/NR blends with 1, 2, 4, 8, 16 phr.

PSNR05 content (phr)	Tensile modulus (MPa)
0	827.463±88.011
1	1093.837±80.994
2	1142.489±128.603
4	1078.471±138.017
8	1004.690±96.259
16	821.245±42.024

Table C7 Effect of SEBS G1652 content on tensile yield stress of 80/20 Nylon12/NR blends with 1, 2, 4, 8, 16 phr.

SEBS G1652 content (phr)	Tensile yield stress (MPa)
0	25.508±0.891
1	25.737±2.431
2	26.346±0.907
4	24.838±1.175
8	21.888±1.391
16	19.252±1.295

Table C8 Effect of SEBS FG1901x content on tensile yield stress of 80/20 Nylon12/NR blends with 1, 2, 4, 8, 16 phr.

SEBS-g-MA FG1901x cont. (phr)	Tensile yield stress (MPa)
0	25.508±0.891
1	27.710±0.707
2	27.215±0.480
4	25.536±0.463
8	22.096±1.005
16	19.668±1.275

Table C9 Effect of SEBS G1650 content on tensile yield stress of 80/20 Nylon12/NR blends with 1, 2, 4, 8, 16 phr.

SEBS G1650 content (phr)	Tensile yield stress (MPa)
0	25.508±0.891
1	26.790±0.758
2	26.853±0.371
4	24.912±0.533
8	23.605±0.921
16	19.803±1.482

Table C10 Effect of SEBS G1657 content on tensile yield stress of 80/20 Nylon12/NR blends with 1, 2, 4, 8, 16 phr.

SEBS G1657 content (phr)	Tensile yield stress (MPa)
0	25.508±0.891
1	25.689±1.118
2	25.776±1.377
4	23.894±1.342
8	20.121±1.309
16	16.573±0.821

Table C11 Effect of PSNR05 content on tensile yield stress of 80/20 Nylon12/NR blends with 1, 2, 4, 8, 16 phr.

PSNR05 content (phr)	Tensile yield stress (MPa)
0	25.508±0.891
1	27.784±0.582
2	26.407±0.788
4	25.361±1.698
8	22.863±1.584
16	17.010±1.705

APPENDIX D

Thermal Properties of Nylon12/NR Blends

Table D1 T_g , T_m , and T_c of [Nylon12/NR]/SEBS G1652 blends with 0, 1, 2, 4, 8, and 16 phr of SEBS.

SEBS G1652 content (phr)	T_g ($^{\circ}\text{C}$)	T_c ($^{\circ}\text{C}$)	T_m ($^{\circ}\text{C}$)
0	46.300	149.800	180.000
1	46.100	149.500	178.300
2	46.400	149.600	179.300
4	46.500	150.100	178.700
8	46.600	150.500	179.100
16	45.900	150.300	178.900

Table D2 T_g , T_m , and T_c of [Nylon12/NR]/SEBS-g-MA FG1901x blends with 0, 1, 2, 4, 8, and 16 phr of SEBS-g-MA.

SEBS FG1901x content (phr)	T_g ($^{\circ}\text{C}$)	T_c ($^{\circ}\text{C}$)	T_m ($^{\circ}\text{C}$)
0	46.300	180.000	149.800
1	47.500	180.100	150.200
2	47.900	178.300	150.800
4	48.300	179.200	150.300
8	49.900	178.900	151.100
16	52.700	178.200	150.400

Table D3 T_g , T_m , and T_c of [Nylon12/NR]/PSNR05 blends with 0, 1, 2, 4, 8, and 16 phr of PSNR05.

PSNR05 content (phr)	T_g ($^{\circ}\text{C}$)	T_c ($^{\circ}\text{C}$)	T_m ($^{\circ}\text{C}$)
0	149.800	180.000	149.800
1	151.100	178.500	151.100
2	150.600	178.900	150.600
4	151.000	178.700	151.000
8	151.400	179.500	151.400
16	152.000	178.600	152.000

APPENDIX E

%Relative crystallinity of Nylon12 in Nylon12/NR Blends

Table E1 %Relative crystallinity of Nylon12 in [Nylon12/NR]/Copolymer blends with variation of copolymer types and content.

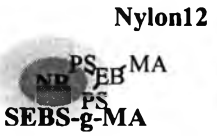
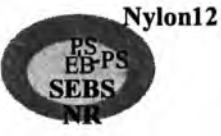
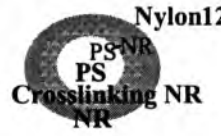
Copolymer Content (phr)	%Relative crystallinity of Nylon12		
	G1652 Blends	FG1901x Blends	PSNR05 Blends
0	98.61	98.61	98.61
1	95.89	95.69	95.36
2	93.44	91.93	96.3
4	92.11	90.48	95.58
8	89.56	85.91	96.49
16	91.29	85.19	95.66

*Heat of fusion of pure Nylon12 = 55.85 J/g

APPENDIX F

Comparison of Nylon12/NR Blends at 2 phr

Table F1 Comparison of [Nylon12/NR]/compatibilizer Blends at 2 phr

Blend composition	[80/20] [Nylon12/NR]		
	SEBS-g-MA FG1901x	SEBS G1652	PSNR05
Phase morphology			
Dispersed phase size (μm)	0.190	0.354	0.378
Dispersed phase distributio	0.063	0.200	0.227
Tensile modulus (MPa)	947.893	910.500	1142.489
Tensile yield stress (MPa)	27.215	26.346	26.407
T_g of Nylon12 ($^{\circ}\text{C}$)	47.9	46.4	48.1
T_m of Nylon12 ($^{\circ}\text{C}$)	178.3	179.3	178.9
T_c of Nylon12 ($^{\circ}\text{C}$)	150.8	149.6	150.6
%Crystallinity	91.93	93.44	96.30

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