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APPENDIX A

Calibration Data for Gel Permeation Chromatography

GPC is the technique that separated molecules by using the different elution time due to different size of polymer molecules. The smaller molecules can go through the pore of gel and then elute from the column later than the larger molecules. GPC can provide more information than other technique such as $\overline{M}_n$, $\overline{M}_w$, $\overline{M}_z$, and polydispersity.

The molecular weight of NR was determined by the room temperature gel permeation chromatography, Waters 600E. The column series of HT4 and HT5 were calibrated using narrow MWD polystyrene standard. By using flow rate 1 cm^3/min, tetrahydrofuran (THF) was used as a solvent for natural rubber and the polystyrene standard. The temperature of the column was controlled at 35°C and the injection volume was 60 µl.

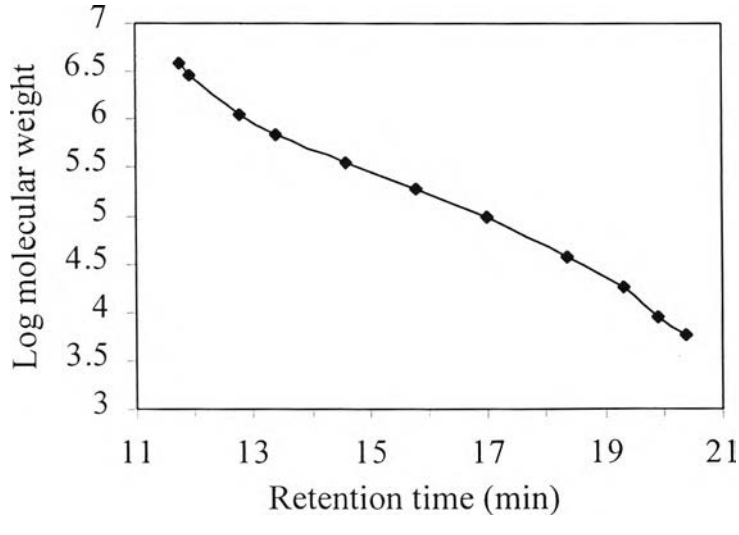

Figure A1 Calibration curve of standard polystyrene in THF at room temperature and flow rate of 1.0 ml/min.

Table A1 Retention time of standard polystyrene with known molecular weight at room temperature.

Retention time (min)	Specified Molecular weight	Calculated Molecular Weight
11.77	3840000	3687753
11.93	2890000	2958254
12.77	1090000	1159355
13.41	706000	688819
14.61	355000	338287
15.78	190000	191268
16.98	96400	100243
18.36	37900	38330
19.31	18100	16844
19.90	9100	9549
20.37	5970	5941

Curve Type: 4^{th} Order

Equation of Curve: $\log MW = +7.40E+01 - 1.55E+01*R + 1.32E+00*R^2 - 4.99E-02*R^3 + 6.89E-04*R^4$

where R = retention time (min).

Correlation Coefficient: $r^2 = 0.99964536$

Standard Error of Estimate: 0.02387588

APPENDIX B

Amount of Extracted Part from Solvent Extractions

Table B1 Amount of free MA, extracted NR and gel content at various processing conditions.

Composition	Condition	% free MAH	% Rubber	% Gel
90/10/3/0.5	160/50	13.847	0.646	40.315
	140/50	13.753	1.301	0.062
	150/50	16.880	1.316	39.286
	150/30	12.400	2.340	6.397
	150/70	14.313	1.582	25.704
50/50/7/0.5	160/50	31.737	2.601	21.986
	140/50	43.161	9.069	6.479
	150/50	25.660	3.043	22.557
	150/30	33.124	4.064	16.019
	150/70	25.867	2.765	17.620

Table B2 Amount of free MA, extracted NR and gel content at various MA and DCP concentration for composition 90/10.

Composition	% free MAH	% Rubber	% Gel
90/10/1/0.5	60.760	2.0926	17.3615
90/10/3/0	31.412	3.3235	0
90/10/3/0.5	46.418	2.0264	21.8084
90/10/3/1.0	25.767	1.8709	41.491
90/10/3/1.5	18.542	2.1048	36.926
90/10/5/0.5	8.356	1.3806	20.7266
90/10/7/0.5	5.373	1.2543	2.8008

Table B3 Amount of free MA, extracted NR and gel content at various MA and DCP concentration for composition 50/50.

Composition	% free MAH	% Rubber	% Gel
50/50/1/0.5	87.356	6.2929	25.0291
50/50/3/0.5	76.400	7.2518	23.8034
50/50/5/0.5	64.868	24.6301	4.6020
50/50/7/0	51.149	31.8942	0
50/50/7/0.5	60.590	12.8262	5.9805
50/50/7/1.0	51.884	13.3167	16.8520
50/50/7/1.5	48.653	7.2367	19.2698

APPENDIX C

Integral Peak Area from Curve Fitting of FTIR

Table C1 Integral peak area of blend, extracted NR, and extracted LLDPE at various processing conditions for composition 90/10/3/0.5.

Temp /rpm (x10)	Integral area of the blend at wavenumber (cm^{-1})			Integral area of the extracted NR at wavenumber (cm^{-1})			Integral area of the extracted LLDPE at wavenumber (cm^{-1})		
	1713	1464	ratio	1713	1464	ratio	1713	1464	ratio
14/50	3.743	35.65	0.105	19.84	18.44	1.076	10.22	24.58	0.416
15/50	14.76	45.40	0.325	4.108	2.877	1.428	3.410	35.76	0.095
16/50	6.201	38.84	0.160	7.249	14.05	0.516	3.115	16.05	0.194
15/30	6.428	32.71	0.196	25.88	15.88	1.630	18.99	34.20	0.555
15/70	13.86	38.51	0.360	32.45	27.59	1.176	6.126	30.16	0.203

Table C2 Integral peak area of blend, extracted NR, and extracted LLDPE at various processing conditions for composition 50/50/7/0.5.

Temp /rpm (x10)	Integral area of the blend at wavenumber (cm^{-1})			Integral area of the extracted NR at wavenumber (cm^{-1})			Integral area of the extracted LLDPE at wavenumber (cm^{-1})		
	1713	1464	ratio	1713	1464	ratio	1713	1464	ratio
14/50	35.87	39.22	0.914	6.917	7.742	0.893	15.01	32.46	0.462
15/50	52.83	35.24	1.499	1.310	1.463	0.895	39.52	40.80	0.968
16/50	71.77	36.13	1.986	1.451	0.401	3.614	42.35	36.38	1.164
15/30	54.73	45.03	1.215	3.544	4.008	0.884	24.24	42.17	0.575
15/70	79.11	33.48	2.363	1.615	0.910	1.774	32.52	34.98	0.930

Table C3 Integral peak area of blend, extracted NR, and extracted LLDPE at various MA and DCP for composition 90/10.

MA/ DCP	Integral area of the blend at wave number (cm^{-1})			Integral area of the extracted NR at wavenumber (cm^{-1})			Integral area of the extracted LLDPE at wavenumber (cm^{-1})		
	1713	1464	ratio	1713	1464	ratio	1713	1464	ratio
1/0.5	3.503	31.59	0.111	0.804	1.289	0.624	1.945	17.81	0.109
3/0	0.957	31.82	0.030	1.256	0.780	1.609	0.421	7.914	0.053
3/0.5	4.779	45.24	0.106	0.998	0.430	2.318	4.110	21.54	0.191
3/1.0	9.522	47.08	0.202	2.992	1.581	1.893	6.574	21.69	0.303
3/1.5	12.72	39.69	0.320	1.449	0.492	2.948	9.991	20.16	0.496
5/0.5	15.85	38.50	0.412	0.782	0.324	2.414	4.866	24.61	0.198
7/0.5	17.73	39.46	0.449	10.85	4.336	2.502	14.24	34.20	0.416

Table C4 Integral peak area of blend, extracted NR, and extracted LLDPE at various MA and DCP for composition 50/50.

MA/ DCP	Integral area of the blend at wave number (cm^{-1})			Integral area of the extracted NR at wavenumber (cm^{-1})			Integral area of the extracted LLDPE at wavenumber (cm^{-1})		
	1713	1464	ratio	1713	1464	ratio	1713	1464	ratio
1/0.5	5.685	37.47	0.152	0.381	0.246	1.549	0.385	24.16	0.016
3/0.5	13.03	60.98	0.214	0.588	0.378	1.556	2.439	30.94	0.079
5/0.5	16.26	46.45	0.350	1.646	1.203	1.368	2.595	21.24	0.122
7/0	18.31	41.19	0.444	0.805	0.540	1.490	6.025	23.46	0.257
7/0.5	10.52	28.26	0.372	3.938	3.230	1.220	2.516	22.96	0.110
7/1.0	17.94	42.11	0.426	2.393	1.833	1.305	1.563	15.62	0.100
7/1.5	15.19	33.17	0.458	1.636	1.173	1.395	1.962	19.98	0.098

APPENDIX D

Degradation Temperature from TGA Thermogram (As Determined by Differential Thermogravimetry Analysis DTGA)

Table D1 Degradation temperature of pure NR and LLDPE.

Materials	Degradation temperature (T_d)
NR	374.56 (T_d 1)
LLDPE	476.03 (T_d 2)

Table D2 Degradation temperature of blend composition 90/10/3/0.5 at various processing conditions.

Temp/ speed	T_d of blend		T_d of extracted NR		T_d of extracted LLDPE	
	T_d 1	T_d 2	T_d 1	T_d 2	T_d 1	T_d 2
140/50	375.81	475.33	372.67	462.09	373.98	474.95
150/50	364.93	475.99	370.61	462.92	-	473.58
160/50	375.33	474.84	370.79	463.10	339.41	473.54
150/30	369.05	475.79	368.43	460.74	377.15	473.78
150/70	364.54	475.6	370.96	458.94	-	472.26

Table D3 Weight loss of blend composition 90/10/3/0.5 at various processing conditions.

Temp/ speed	Weight loss of blend		Weight loss of extracted NR		Weight loss of extracted LLDPE	
	@ T_d 1	@ T_d 2	@ T_d 1	@ T_d 2	@ T_d 1	@ T_d 2
140/50	9.385	90.14	23.85	54.28	8.605	89.48
150/50	10.20	88.55	27.68	50.18	-	97.00
160/50	10.23	88.17	29.97	54.99	1.772	97.28
150/30	9.870	88.96	17.61	54.95	9.527	88.45
150/70	10.40	88.33	33.52	48.20	-	99.13

Table D4 Degradation temperature of blend composition 50/50/7/0.5 at various processing conditions.

Temp/ Speed	T_d of blend		T_d of extracted NR		T_d of extracted LLDPE	
	T_d 1	T_d 2	T_d 1	T_d 2	T_d 1	T_d 2
140/50	377.57	472.76	373.35	458.69	374.68	472.76
150/50	378.83	472.58	370.97	459.91	374.20	472.28
160/50	380.23	472.54	372.01	465.76	374.04	472.28
150/30	379.45	474.64	369.84	458.79	374.74	472.81
150/70	376.75	473.38	371.98	463.33	375.49	473.57

Table D5 Weight loss of blend composition 50/50/7/0.5 at various processing conditions.

Temp/ speed	Weight loss of blend		Weight loss of extracted NR		Weight loss of extracted LLDPE	
	@ T_d 1	@ T_d 2	@ T_d 1	@ T_d 2	@ T_d 1	@ T_d 2
140/50	44.92	50.07	71.27	26.38	32.98	64.74
150/50	45.92	51.02	52.77	41.14	33.88	63.97
160/50	46.53	52.37	48.53	44.22	36.22	61.93
150/30	46.63	52.30	57.60	36.57	26.50	71.62
150/70	45.46	50.87	57.20	34.61	29.71	68.22

Table D6 Degradation temperature of blend composition 90/10 at various amounts of MA and DCP.

Composition	T_d of Blend		T_d of Extracted NR		T_d of Extracted LLDPE	
	T_d 1	T_d 2	T_d 1	T_d 2	T_d 1	T_d 2
90/10/0/0	371.61	469.69	370.83	458.81	-	470.65
90/10/1/0.5	378.12	470.43	366.71	459.02	-	474.09
90/10/3/0	371.19	473.59	371.39	455.53	-	475.02
90/10/3/0.5	372.76	475.17	367.79	460.34	-	475.71
90/10/3/1.0	363.76	476.26	368.01	461.01	-	473.98
90/10/3/1.5	365.01	476.07	361.04	462.00	-	472.75
90/10/5/0.5	364.22	478.16	363.14	456.89	-	476.30
90/10/7/0.5	365.75	476.80	361.30	459.37	-	476.75

Table D7 Weight loss of blend composition 90/10 at various amounts of MA and DCP.

Compositi on	Weight loss of blend		Weight loss of extracted NR		Weight loss of extracted LLDPE	
	@ T_d 1	@ T_d 2	@ T_d 1	@ T_d 2	@ T_d 1	@ T_d 2
90/10/0/0	8.548	90.92	30.27	51.91	-	98.30
90/10/1/0.5	9.887	88.52	30.20	66.27	-	95.23
90/10/3/0	9.050	88.18	48.80	46.10	-	95.28
90/10/3/0.5	8.801	88.94	29.91	58.17	-	99.31
90/10/3/1.0	6.564	91.03	23.49	74.66	-	99.93
90/10/3/1.5	7.715	90.78	24.67	71.97	-	99.70
90/10/5/0.5	8.379	89.21	19.84	77.80	-	98.22
90/10/7/0.5	7.345	89.80	33.08	64.00	-	95.74

Table D8 Degradation temperature of blend composition 50/50 at various amounts of MA and DCP.

Compositi on	T_d of blend		T_d of extracted NR		T_d of extracted LLDPE	
	T_d 1	T_d 2	T_d 1	T_d 2	T_d 1	T_d 2
50/50/0/0	375.07	471.70	373.96	456.18	373.54	468.73
50/50/1/0.5	379.73	470.59	369.74	451.95	-	470.71
50/50/3/0.5	381.50	473.81	373.47	458.57	364.64	471.37
50/50/5/0.5	376.09	471.29	374.99	455.75	370.27	468.35
50/50/7/0	374.57	471.20	371.39	457.93	373.30	471.38
50/50/7/0.5	375.15	471.78	371.65	459.39	371.72	469.80
50/50/7/1.0	382.46	473.33	374.03	457.69	369.25	468.77
50/50/7/1.5	376.93	472.12	374.08	462.06	370.37	469.89

Table D9 Weight loss of blend composition 50/50 at various amounts of MA and DCP.

Compositi on	Weight loss of blend		Weight loss of extracted NR		Weight loss of extracted LLDPE	
	@ T_d 1	@ T_d 2	@ T_d 1	@ T_d 2	@ T_d 1	@ T_d 2
50/50/0/0	47.81	50.90	89.49	9.706	18.31	80.04
50/50/1/0.5	45.71	52.30	71.29	28.06	-	94.84
50/50/3/0.5	45.58	51.40	75.87	23.12	5.018	94.66
50/50/5/0.5	45.37	50.41	82.53	15.99	25.08	74.93
50/50/7/0	43.72	50.73	87.74	9.504	26.99	72.31
50/50/7/0.5	43.77	52.30	74.33	22.11	22.64	76.84
50/50/7/1.0	44.87	50.34	75.34	21.63	16.52	83.30
50/50/7/1.5	44.83	50.19	62.73	33.72	41.65	56.87

Table D10 Degradation temperature and weight loss of gel content for blend composition 90/10/3/0.5 at various processing conditions.

Temp/ speed	T_d 1		T_d 2	
	Temp (°C)	Weight loss (g)	Temp (°C)	Weight loss (g)
140/50	372.16	22.05	467.35	73.86
150/50	374.02	16.17	472.09	81.15
160/50	376.07	16.09	472.71	81.16
150/30	377.52	26.32	472.72	69.80
150/70	379.53	16.05	471.84	82.52

Table D11 Degradation temperature and weight loss of gel content for blend composition 50/50/7/0.5 at various processing conditions.

Temp/ speed	T_d 1		T_d 2	
	Temp (°C)	Weight loss (g)	Temp (°C)	Weight loss (g)
140/50	373.29	78.96	465.59	17.36
150/50	374.04	68.86	467.79	26.39
160/50	375.30	68.90	467.61	28.31
150/30	372.86	71.22	468.05	26.95
150/70	374.34	72.43	468.09	25.41

Table D12 Degradation temperature and weight loss of gel content of blend composition 90/10 at various amounts of MA and DCP.

Compositi on	T_d 1		T_d 2	
	Temp (°C)	Weight loss (g)	Temp (°C)	Weight loss (g)
90/10/1/0.5	375.21	16.72	471.85	81.91
90/10/3/0.5	374.35	16.90	472.43	83.14
90/10/3/1.0	-	-	471.82	90.02
90/10/3/1.5	-	-	472.11	92.12
90/10/5/0.5	381.66	13.10	473.97	84.00
90/10/7/0.5	371.38	22.49	475.23	71.90

Table D13 Degradation temperature and weight loss of gel content of blend composition 50/50 at various amounts of MA and DCP.

Compositi on	T_d 1		T_d 2	
	Temp (°C)	Weight loss (g)	Temp (°C)	Weight loss (g)
50/50/1/0.5	373.62	75.24	467.37	22.99
50/50/3/0.5	373.38	76.16	467.13	20.88
50/50/5/0.5	372.95	70.01	465.26	24.45
50/50/7/0.5	373.29	78.96	465.59	17.36
50/50/7/1.0	373.22	75.53	466.98	20.37
50/50/7/1.5	373.03	71.48	466.78	26.00

APPENDIX E

Tensile Properties

Table E1 Tensile properties of blend composition 90/10 at various process conditions.

Composition	Condition	Tensile Strength (MPa)	Elongation @ break (%)	Modulus (MPa)
90/10/3/0.5	140/50	13.07±1.76	407.86±48.92	305.83±77.00
	150/50	14.77±1.18	274.38±33.36	290.75±83.38
	160/50	12.43±0.97	189.80±49.90	231.70±23.06
	150/30	10.76±0.51	144.95±27.11	250.66±25.72
	150/70	9.96±1.10	144.92±33.28	305.72±37.15

Table E2 Tensile properties of blend composition 50/50 at various process conditions.

Composition	Condition	Tensile Strength (MPa)	Elongation @ break (%)	Modulus (MPa)
50/50/7/0.5	140/50	5.18±0.17	233.38±13.06	27.20±4.17
	150/50	10.94±0.42	355.80±62.22	40.77±2.10
	160/50	9.79±0.499	420.23±8.09	35.61±4.26
	150/30	11.08±1.04	656.86±189.27	31.14±4.59
	150/70	12.19±1.73	596.06±211.28	33.48±4.57

Table E3 Tensile properties of blend composition 90/10 at various compositions.

Composition	Tensile Strength (MPa)	Elongation @ break (%)	Modulus (MPa)
LLDPE	25.45±0.72	508.62±4.88	282.30±28.00
90/10/0/0	20.15±1.16	1488.5±83.03	266.68±39.18
90/10/0/0.5	23.73±1.28	1447.8±40.74	256.04±50.48
90/10/1/0.5	15.34±0.94	297.58±39.96	178.74±13.04
90/10/3/0	19.57±1.11	1613.60±63.85	256.04±50.48
90/10/3/0.5	15.93±1.30	190.30±63.88	170.85±15.49
90/10/3/1.0	13.47±1.43	116.57±26.65	197.61±31.85
90/10/3/1.5	12.44±0.75	114.90±55.51	132.75±4.67
90/10/5/0.5	15.61±0.65	272.65±28.47	200.90±7.20
90/10/7/0.5	19.52±1.06	397.40±20.00	247.96±10.23

Table E4 Tensile properties of blend composition 50/50 at various compositions.

Composition	Tensile Strength (MPa)	Elongation @ break (%)	Modulus (MPa)
50/50/0/0	6.260±1.56	1192.67±52.32	142.06±26.80
50/50/0/0.5	11.64±1.31	290.98±30.44	36.310±4.58
50/50/1/0.5	12.19±1.23	346.98±23.26	27.540±3.34
50/50/3/0.5	12.31±0.89	401.60±37.74	30.130±2.61
50/50/5/0.5	7.710±0.53	313.31±106.1	18.669±4.54
50/50/7/0	3.491±0.15	294.93±81.62	23.916±0.85
50/50/7/0.5	8.520±1.26	321.24±47.47	31.136±4.59
50/50/7/1.0	10.82±0.90	417.02±26.65	27.600±2.49
50/50/7/1.5	14.42±0.43	459.60±8.66	30.780±4.87

APPENDIX F

Calculation for Amount of Materials that used in Brabender

From $D = M/V$ (H.1)

Then $D_{total} = M_{total}/V_{total}$ (H.2)

And $M_{total} = (M_x+M_y+M_z+\ldots)$ (H.3)

$V_{total} = [(M_x/D_x)+(M_y/D_y)+(M_z/D_z)+\ldots]$ (H.4)

where D = density of material (g/cm^3)

M = weight of material (g)

V = volume of material (cm^3)

Example of calculation

For LLDPE/NR blend composition 90/10/5/1 consists of materials as shown below:

LLDPE has melt density 0.718 g/cm^3

NR has melt density 0.7 g/cm^3

MA has melt density 1.2712 g/cm^3

Note: melt density = bulk density – 0.2

From $D_{total} = M_{total}/V_{total}$

$D_{total} = [90+10+5]/[(90/0.718)+(10/0.7)+(5/1.2712)]$

$= 0.7314$ g/cm^3

Due to a chamber of Brabender has volume 55 cm^3 and to achieve a good mixing the materials should be filled in 80 % of chamber volume that is $(55x80)/100 = 44$ cm^3

Then weight of materials that wanted in blending is

$0.7314x44 = 32.1816$ g

LLDPE that used in this composition is 90 part then

Materials have total amount at 105 part = 32.1816 g

Then LLDPE has 90 part = (90x32.1816)/105

= 27.5842 g

And NR has 10 part = (10x32.1816)/105

= 3.0649 g

Also MA has 5 part = (5x32.1816)/105

= 1.5324 g

This composition also consists of 1 % wt of DCP that has no density and was used in small amount then calculated in % weight: (1x32.1816)/105 = 0.30649 g.

APPENDIX G

Time Temperature and Torque Relationship

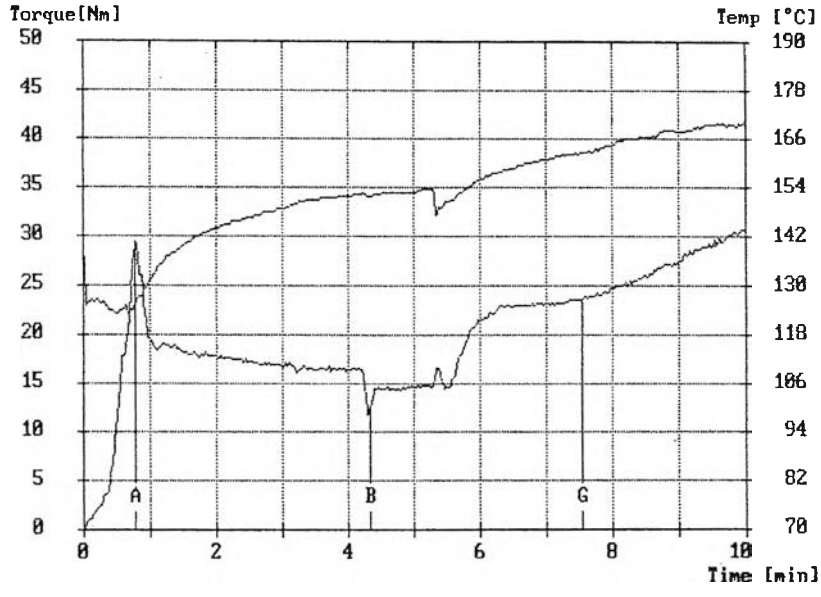

Figure G1 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 90/10/3/0.5 at temperature 140°C and rotor speed 50 rpm.

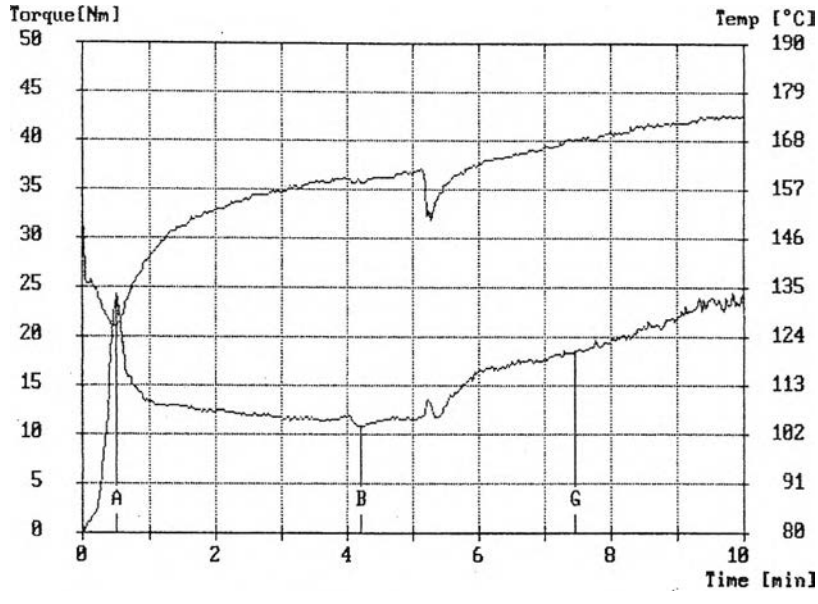

Figure G2 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 90/10/3/0.5 at temperature 150°C and rotor speed 50 rpm.

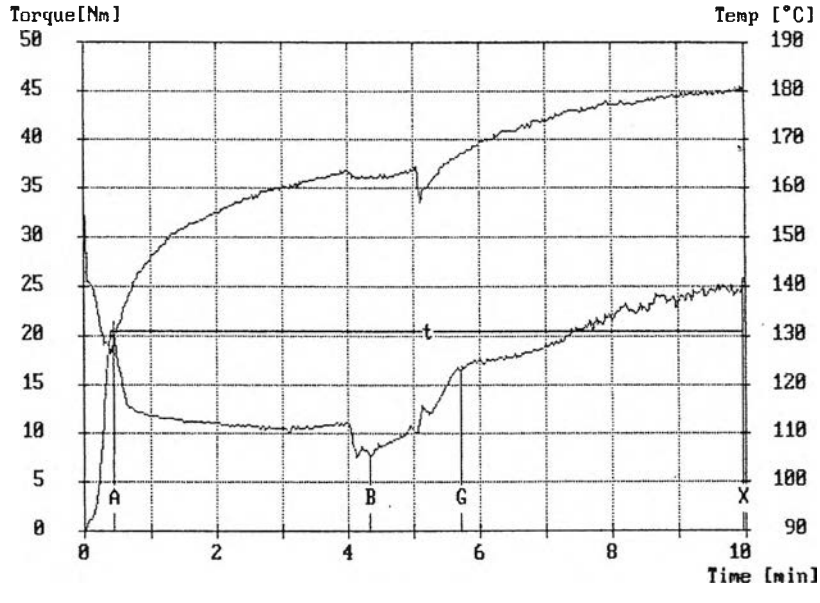

Figure G3 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 90/10/3/0.5 at temperature 160°C and rotor speed 50 rpm.

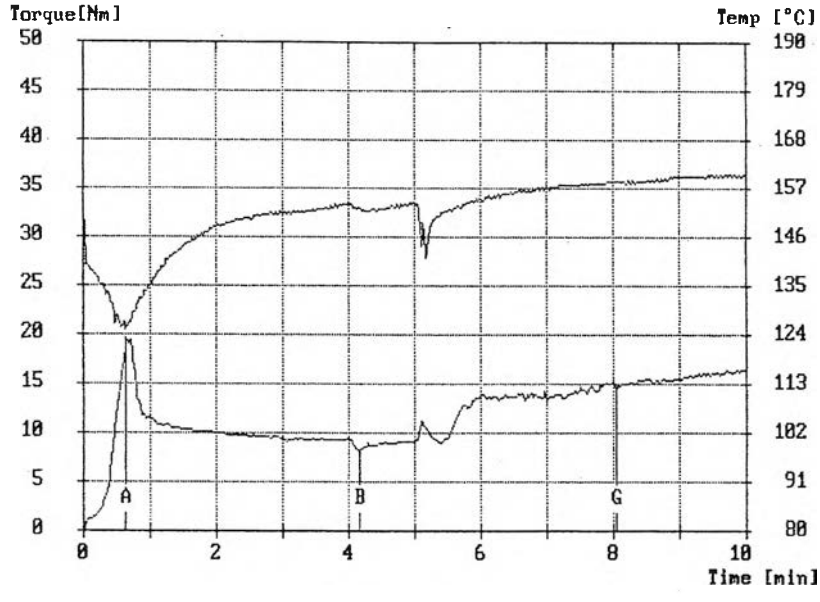

Figure G4 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 90/10/3/0.5 at temperature 150°C and rotor speed 30 rpm.

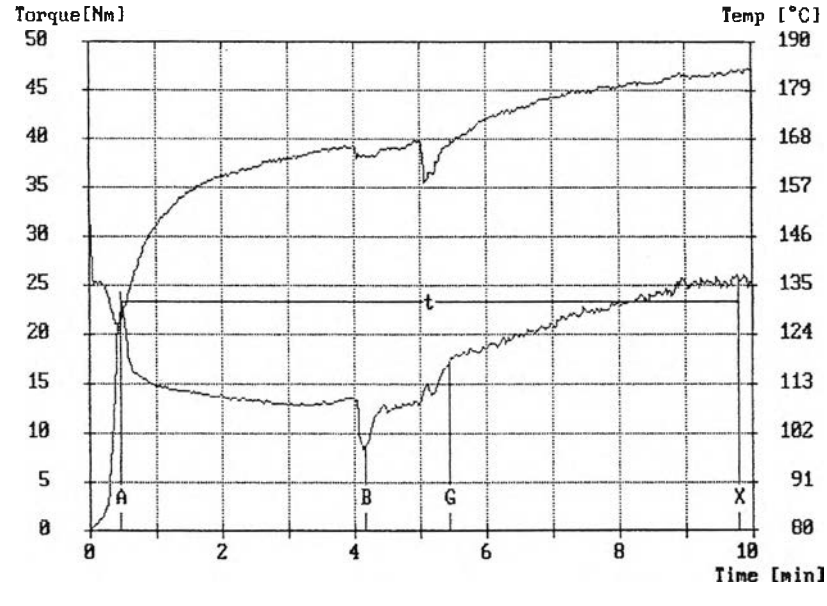

Figure G5 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 90/10/3/0.5 at temperature 150°C and rotor speed 70 rpm.

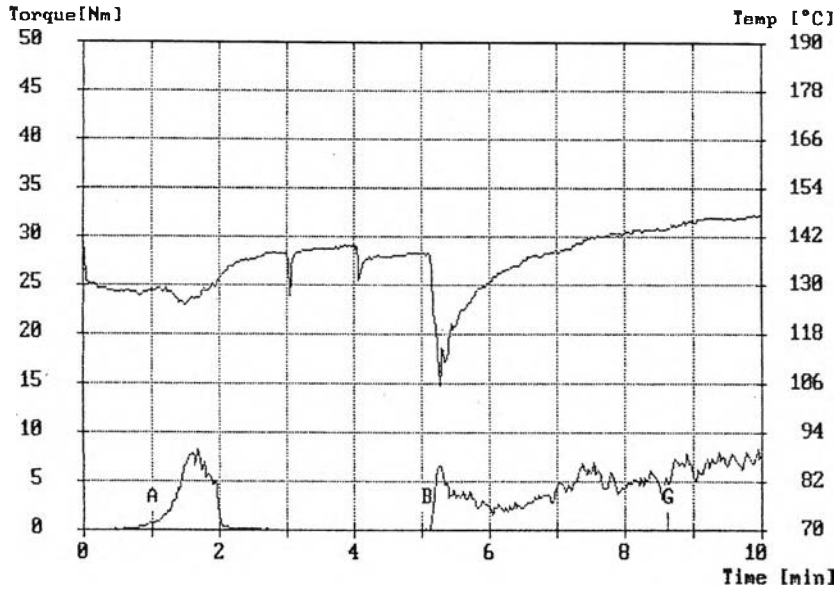

Figure G6 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 50/50/7/0.5 at temperature 140°C and rotor speed 50 rpm.

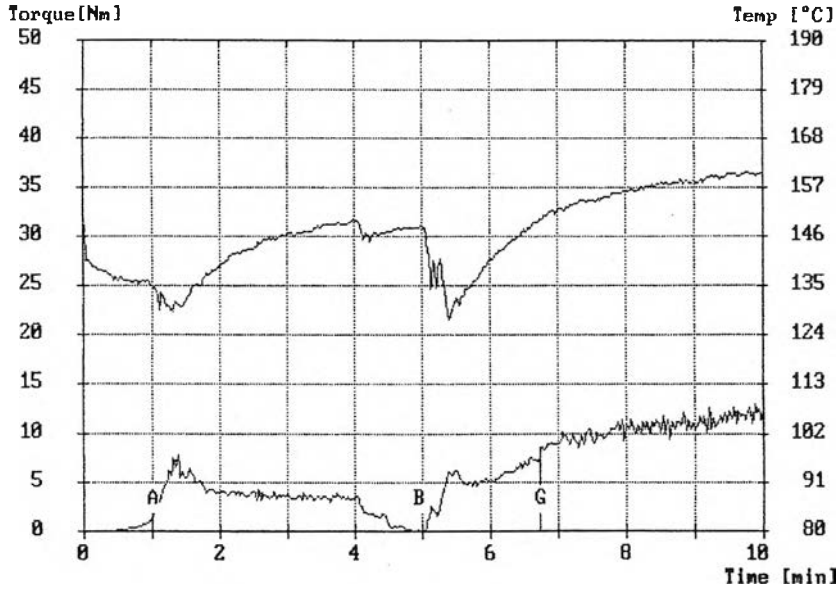

Figure G7 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 50/50/7/0.5 at temperature 150°C and rotor speed 50 rpm.

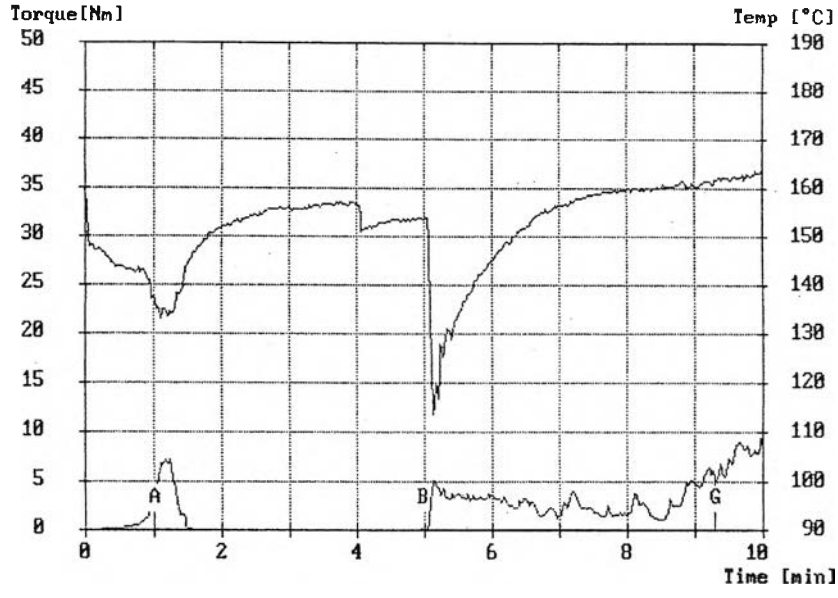

Figure G8 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 50/50/7/0.5 at temperature 160°C and rotor speed 50 rpm.

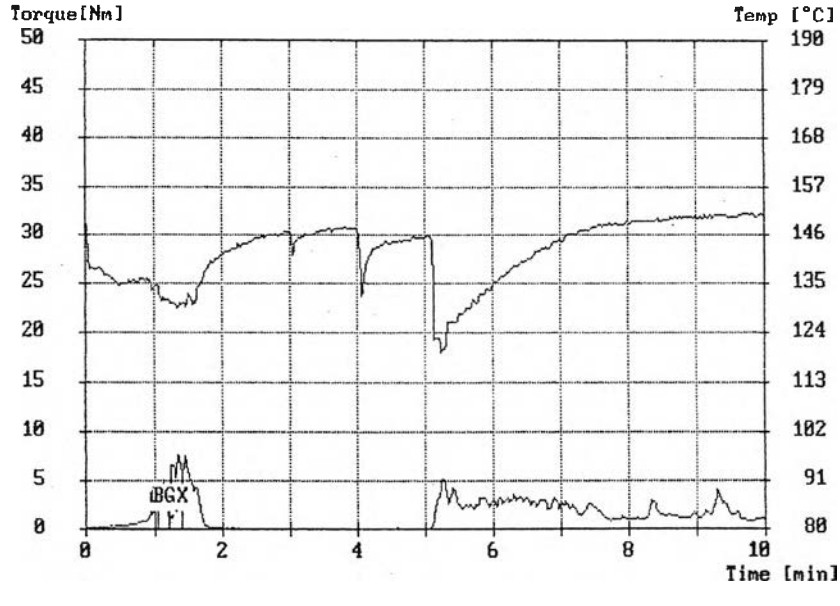

Figure G9 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 50/50/7/0.5 at temperature 150°C and rotor speed 30 rpm.

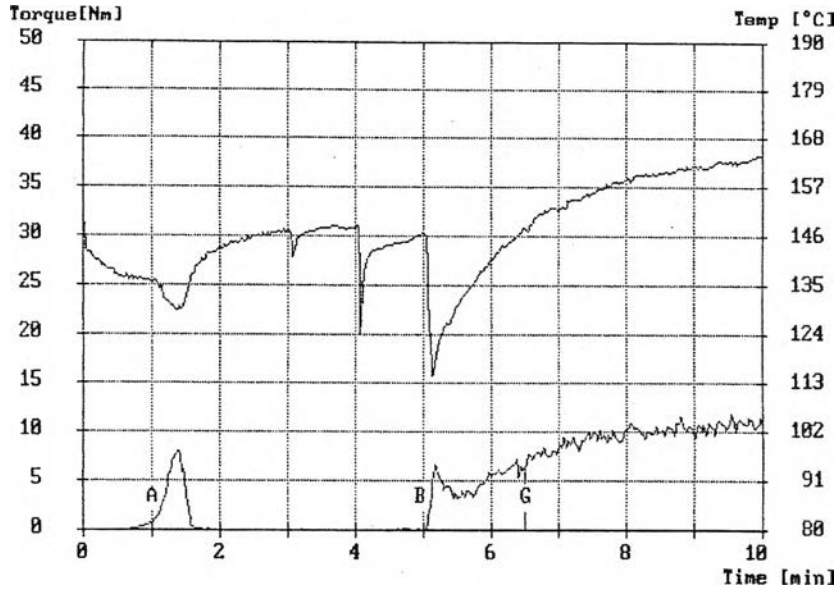

Figure G10 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 50/50/7/0.5 at temperature 150°C and rotor speed 70 rpm.

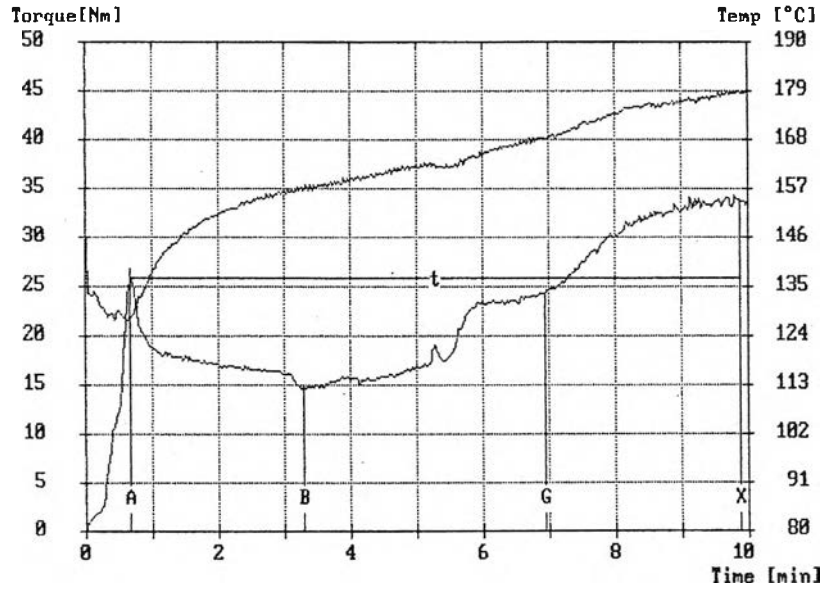

Figure G11 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 90/10/1/0.5.

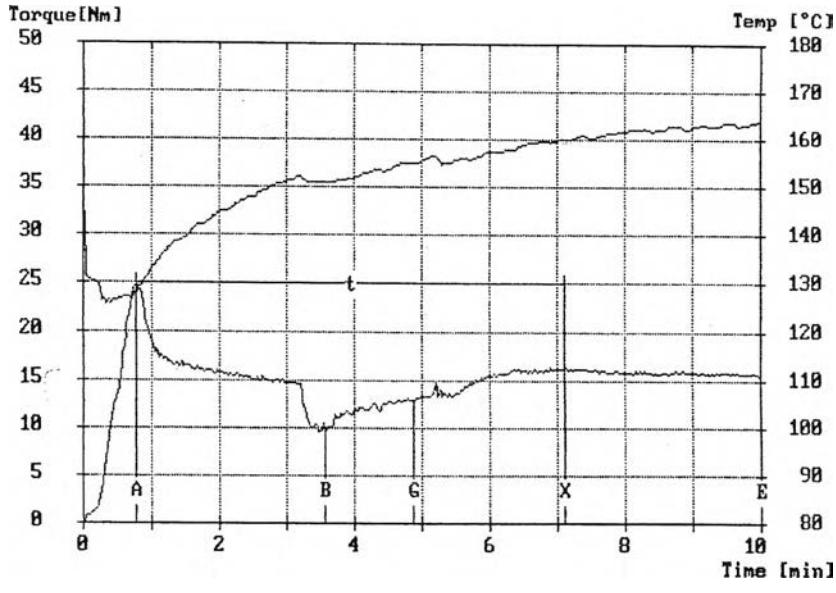

Figure G12 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 90/10/3/0.

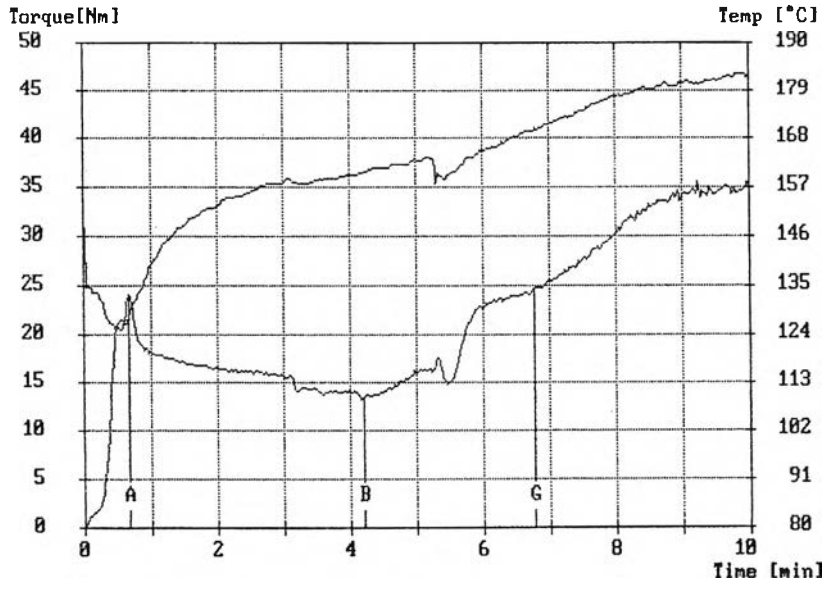

Figure G13 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 90/10/3/0.5.

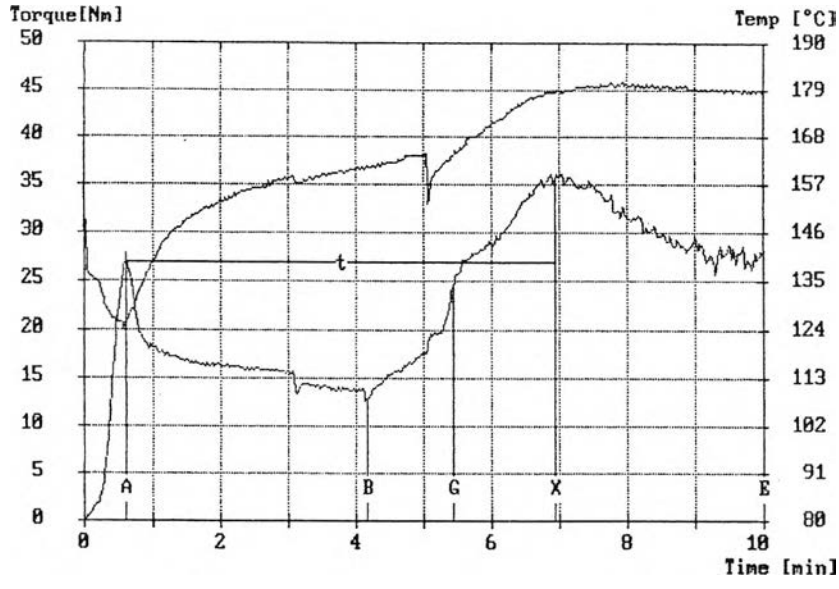

Figure G14 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 90/10/3/1.0.

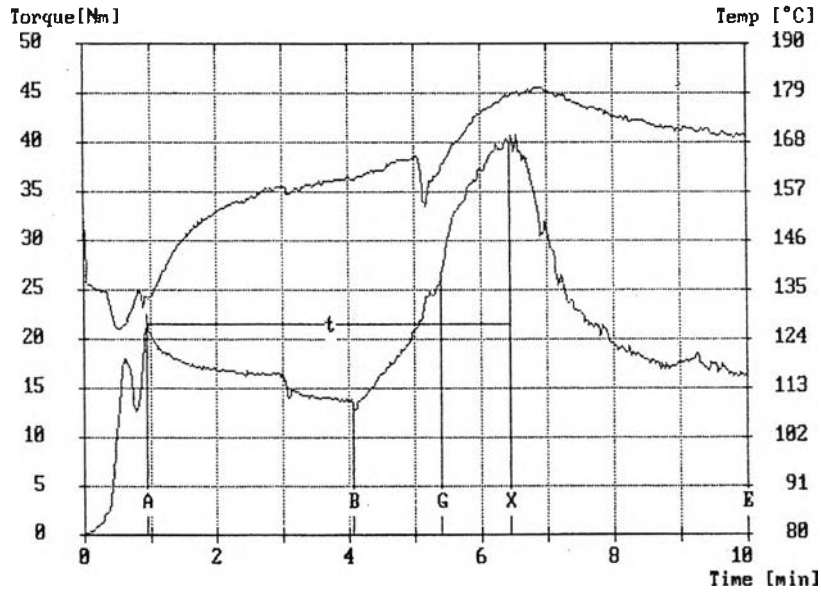

Figure G15 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 90/10/3/1.5.

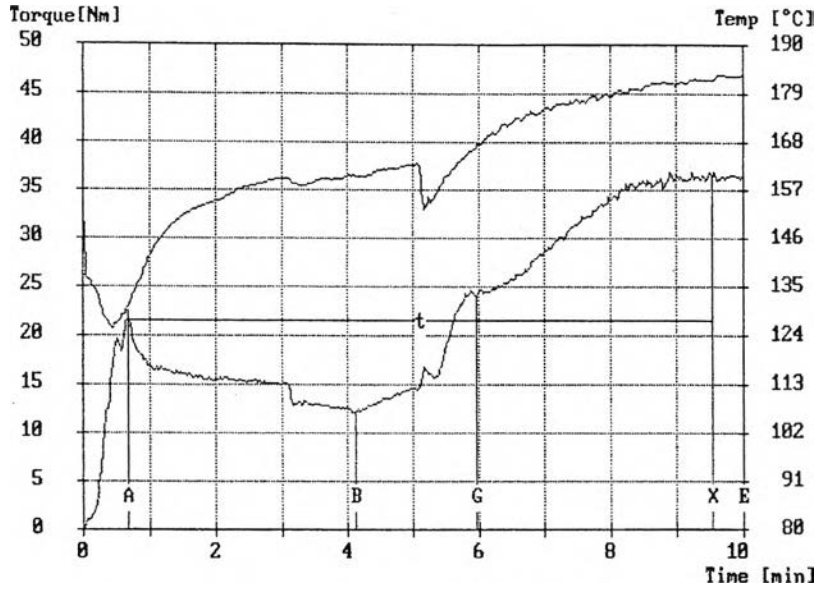

Figure G16 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 90/10/5/0.5.

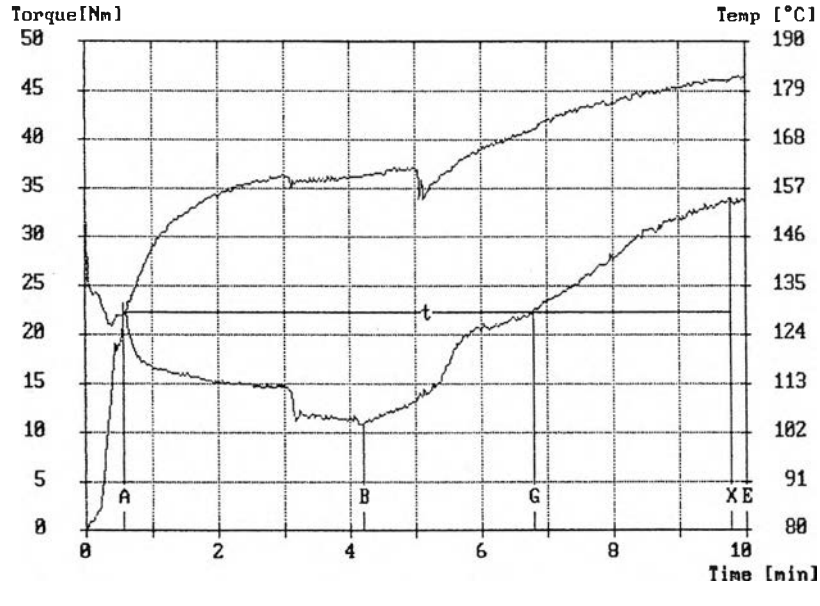

Figure G17 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 90/10/7/0.5.

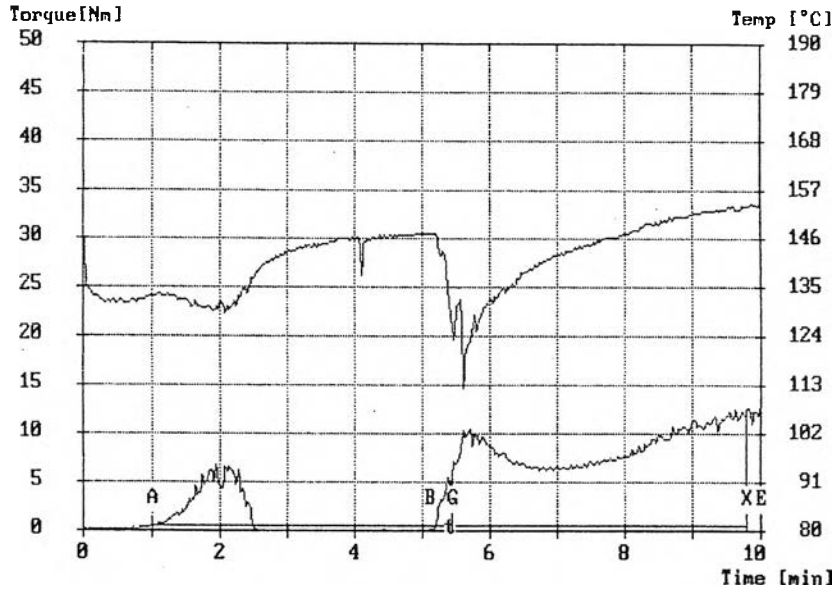

Figure G18 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 50/50/1/0.5.

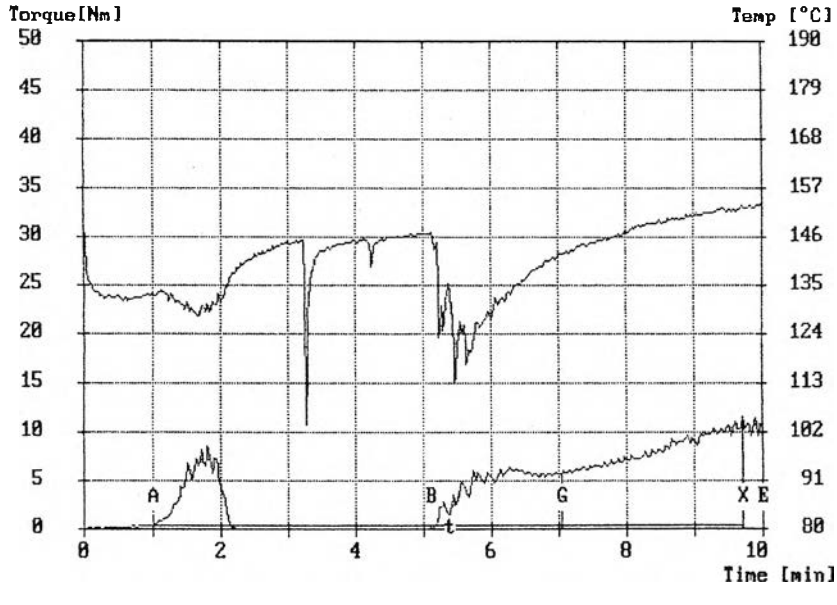

Figure G19 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 50/50/3/0.5.

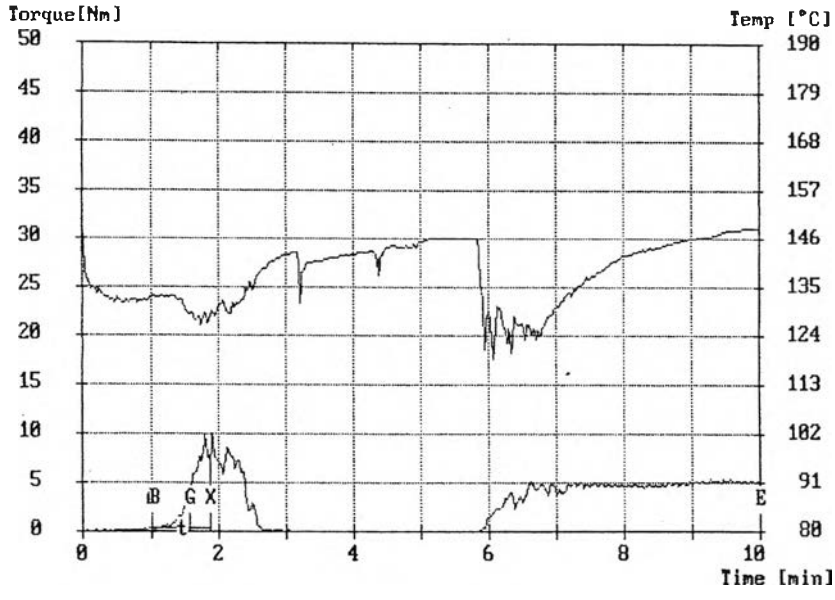

Figure G20 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 50/50/5/0.5.

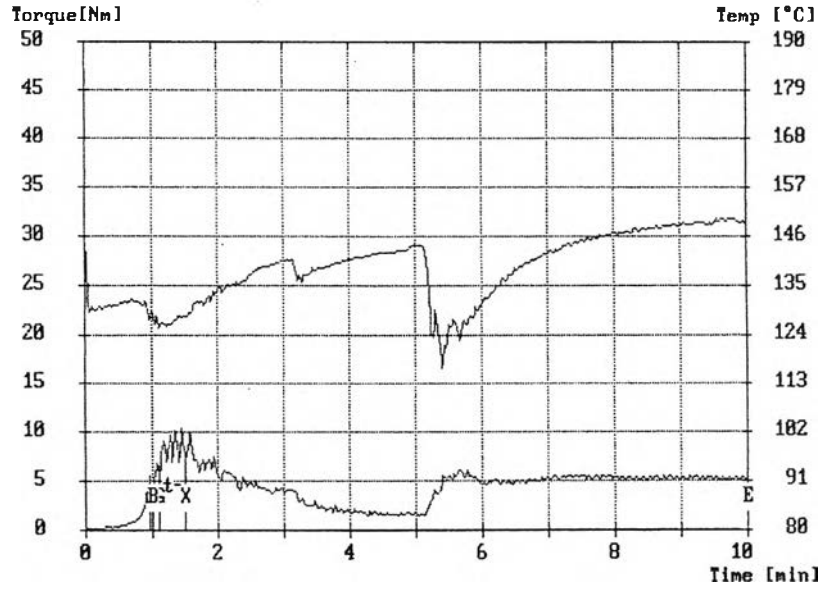

Figure G21 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 50/50/7/0.

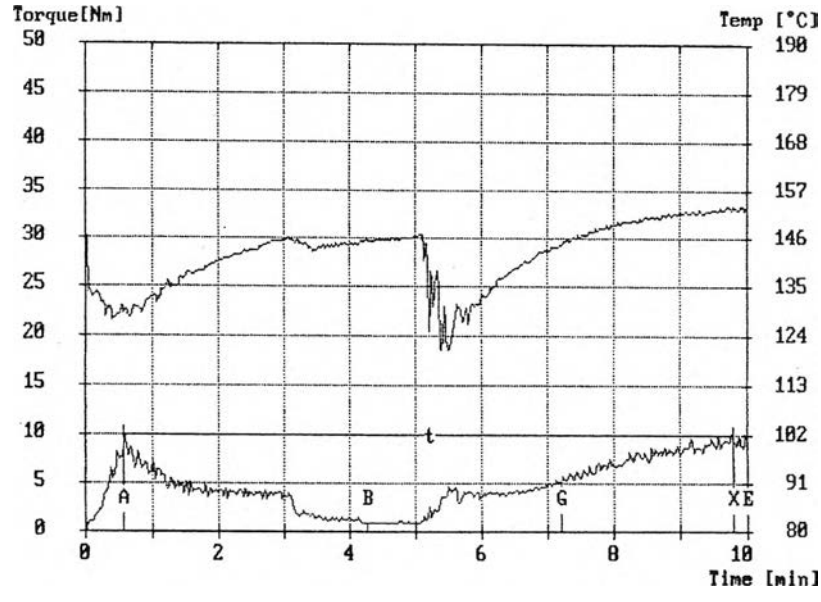

Figure G22 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 50/50/7/0.5.

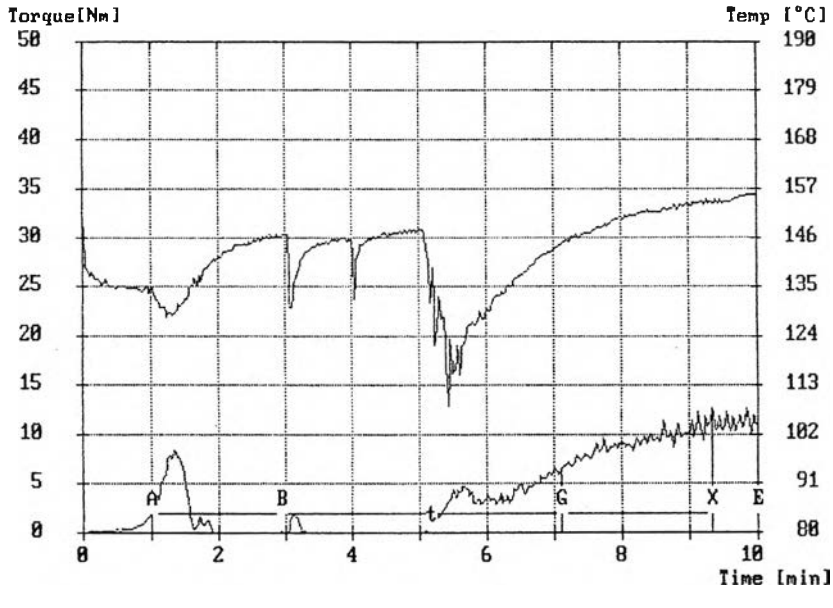

Figure G23 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 50/50/7/1.0.

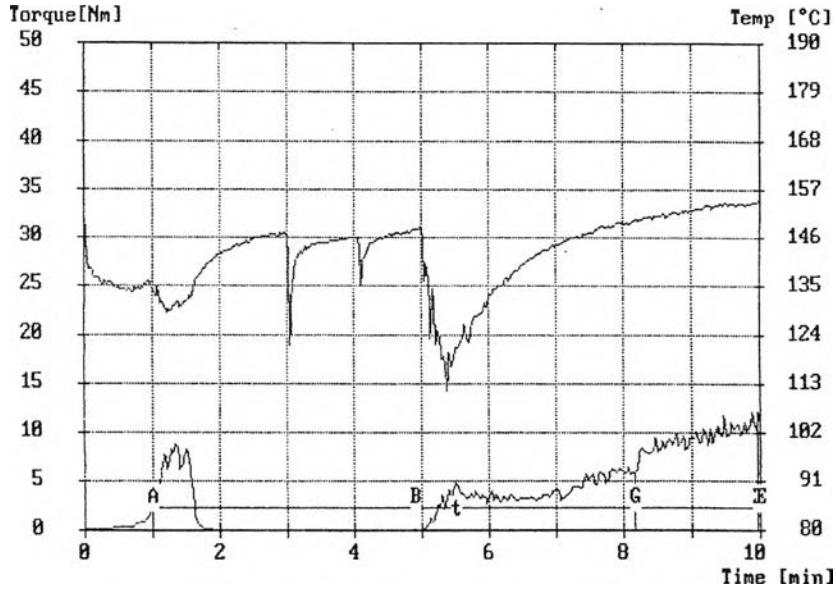

Figure G24 Time Temperature and Torque Relationship of LLDPE/NR/MA/DCP blend composition 50/50/7/1.5.

APPENDIX H

FTIR Spectra of Pure, Crude and Extracted Samples

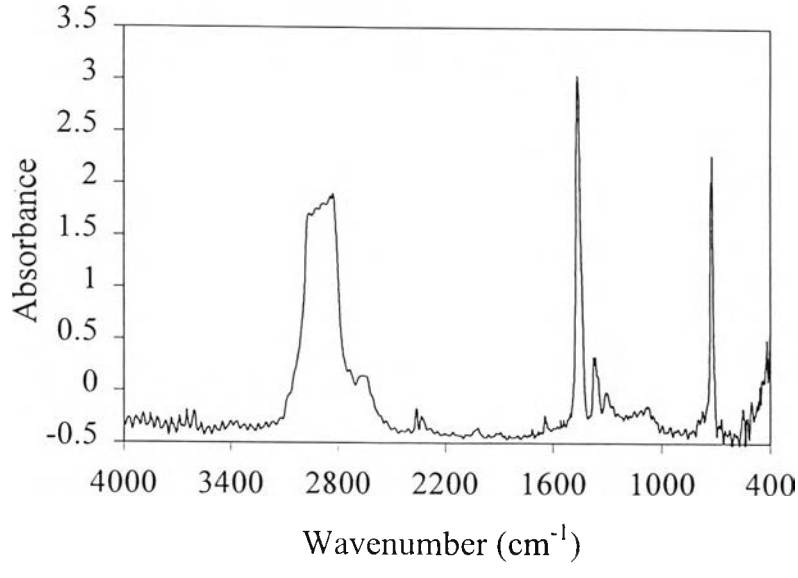

Figure H1 FTIR Spectra of pure LLDPE.

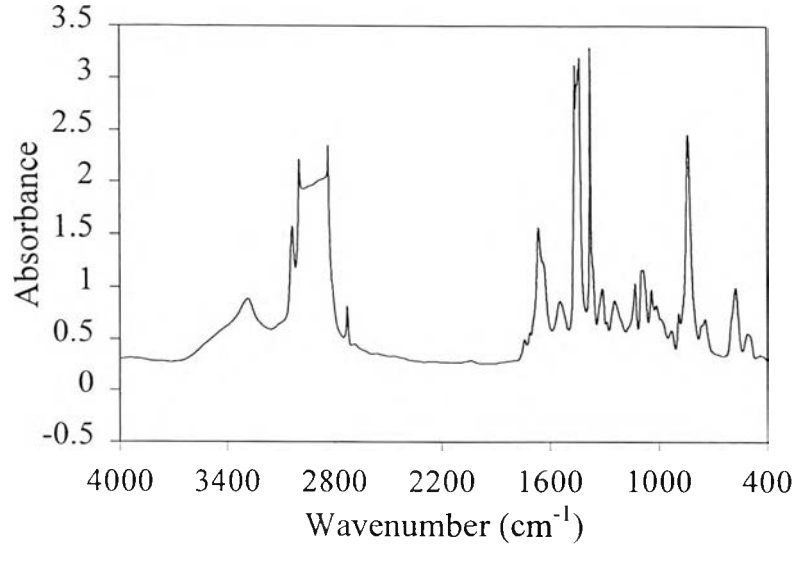

Figure H2 FTIR Spectra of pure NR.

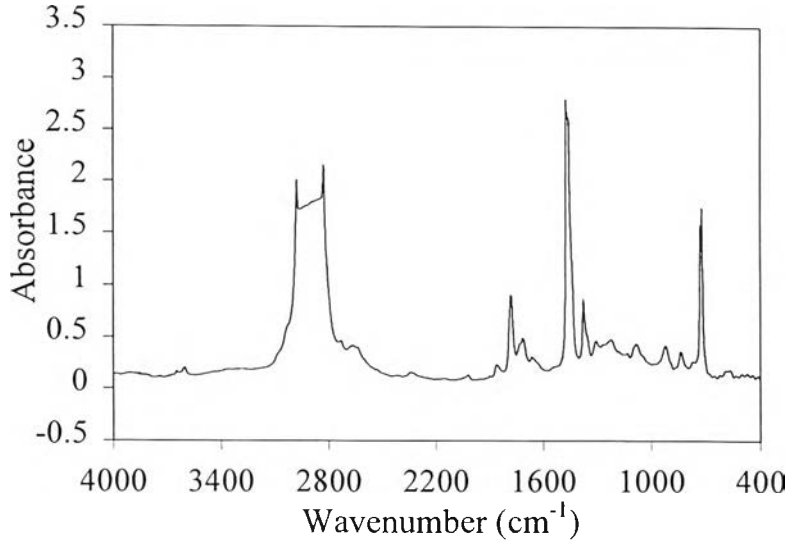

Figure H3 FTIR spectra of LLDPE/NR blend 90/10.

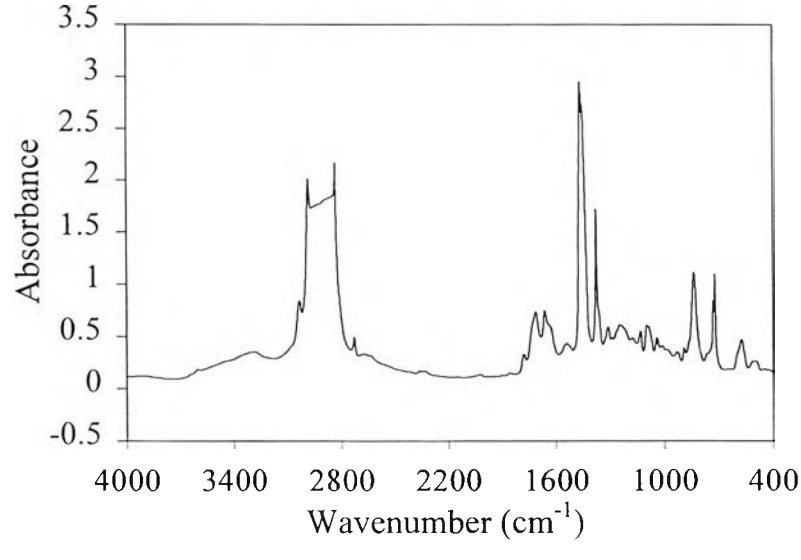

Figure H4 FTIR spectra of LLDPE/NR blend 50/50.

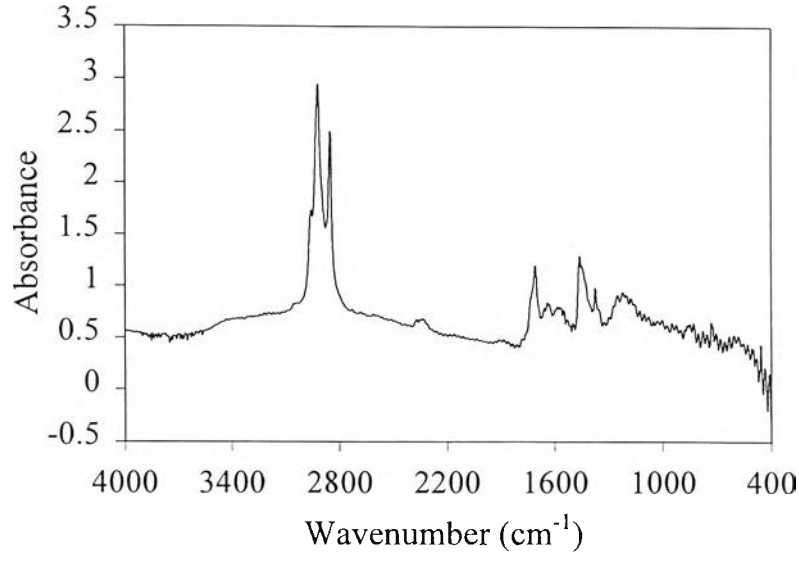

Figure H5 FTIR spectra of extracted NR of LLDPE/NR 90/10.

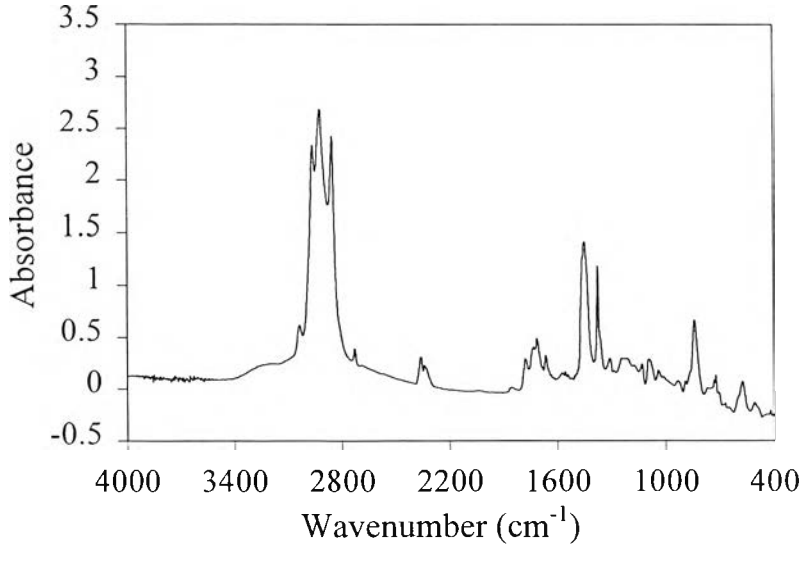

Figure H6 FTIR spectra of extracted NR of LLDPE/NR 50/50.

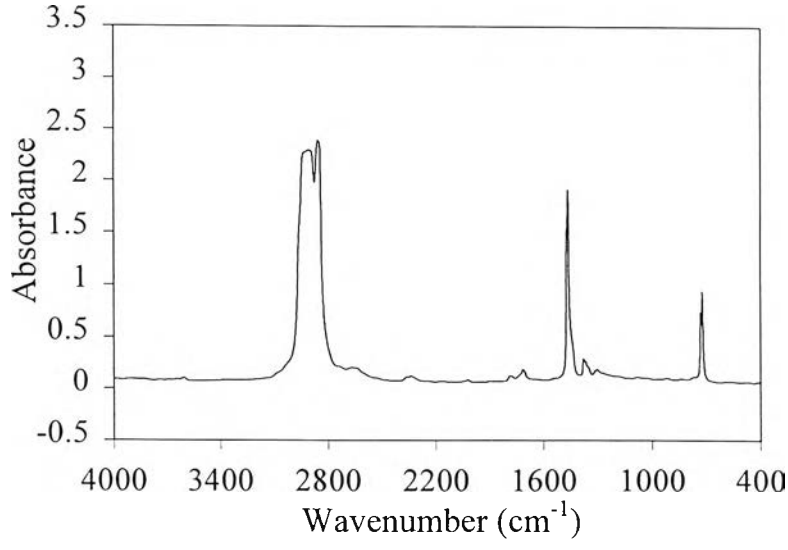

Figure H7 FTIR spectra of extracted LLDPE of LLDPE/NR 90/10.

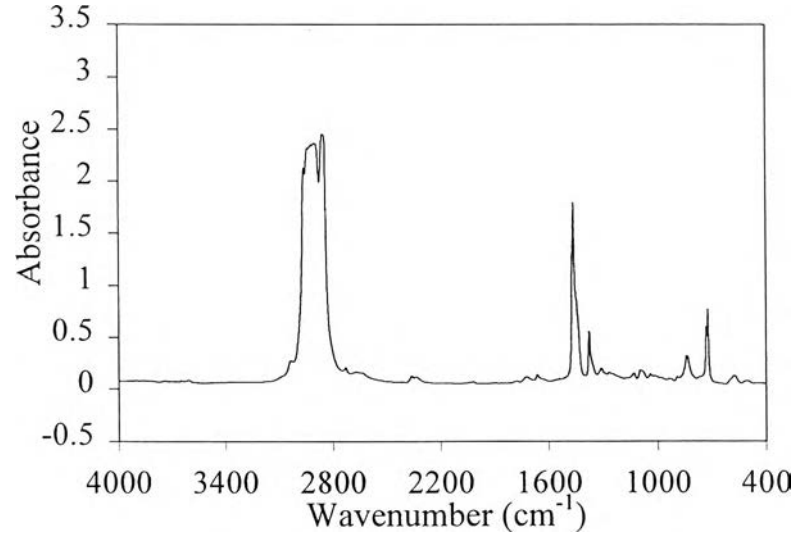

Figure H8 FTIR spectra of extracted LLDPE of LLDPE/NR 50/50.

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