

APPENDIX

Table A.1 Number-average molecular weight of natural rubber solution

Time of UV exposure (min)	NR		0.5% w/w		10% w/w		20% w/w		100% w/w	
	\bar{M}_n	% Reduction	\bar{M}_n	% Reduction	\bar{M}_n	% Reduction	\bar{M}_n	% Reduction	\bar{M}_n	% Reduction
0	206989	0	285693	0	183255	0	284569	0	158232	0
5	204158	1.4	217453	23.9	168523	8.0	269863	5.2	154126	2.6
10	200239	3.3	196258	31.3	143985	21.4	245896	13.6	110258	30.3
15	196618	5.0	174852	38.8	133786	27.0	214628	24.6	83459	47.3
30	180983	12.6	145896	32.9	82842	54.8	132985	53.3	24053	81.5
45	180500	12.8	135419	52.6	49442	73.0	139450	51.0	29262	
60	181226	12.4	78925	72.4						
90	129339	37.5								
120	120256	41.9								
150	71686	65.4								

Table A.2 Number-average molecular weight of unvulcanized natural rubber sheets containing 0-0.5 %w/w TiO₂

Time of UV exposure (h)	NR		0.1% w/w		0.5% w/w	
	\bar{M}_n	% Reduction	\bar{M}_n	% Reduction	\bar{M}_n	% Reduction
0	182910	0	249022	0	214991	0
4	126310	30.9	178135	28.47	104845	39.2
8	101557	44.5	86735	53.47	97843	54.5
12	76058	58.4	ND	ND	81719	62.0

Table A.3 Number-average molecular weight of unvulcanized natural rubber sheets containing 1-10 %w/w TiO₂

Time of UV exposure (h)	1% w/w		5% w/w		10% w/w	
	\bar{M}_n	% Reduction	\bar{M}_n	% Reduction	\bar{M}_n	% Reduction
0	161586	0	246421	0	241510	0
4	159683	1.2	207396	15.8	231153	4.3
8	115701	28.4	180411	26.8	234974	2.7
12	88100	45.5	151540	38.5	187355	22.4

Table A.4 Number-average molecular weight of unvulcanized natural rubber sheets as a function of TiO₂ after 12 h of UV exposure

% w/w of TiO ₂	Initial \bar{M}_n	Final \bar{M}_n	% Reduction of \bar{M}_n
0	182910	76058	58.4
1	161586	88100	45.5
5	246421	151540	38.5
10	241510	187355	22.4

Table A.5 Number-average molecular weight of unvulcanized natural rubber sheets as a function of TiO₂ after 20 h of sunlight exposure

% w/w of TiO ₂	Initial \bar{M}_n	Final \bar{M}_n	% Reduction of \bar{M}_n
0	247439	82256	66.8
1	322766	139361	56.8
5	246421	210986	14.4
10	241510	223098	7.62

Table A.6 Tensile strength of vulcanized natural rubber sheets after UV exposure under accelerated condition

Time to UV exposure (h)	1 st Experiment	2 nd Experiment	3 rd Experiment	Average Tensile strength (MPa)	Standard deviation
NR					
0	22.2	21.7	19.8	21.2	1.3
4	13.0	11.8	12.7	12.5	0.6
8	1.6	1.0	1.8	1.5	0.4
NR + 0.5 %w/w TiO ₂					
0	32.4	30.7	30.9	31.3	0.9
4	9.8	8.6	10.0	9.5	0.8
8	1.3	1.0	1.2	1.2	0.2
NR + 3 %w/w TiO ₂					
0	22.0	21.5	20.5	21.4	0.9
4	18.5	17.4	18.0	18.0	0.6
8	7.5	7.0	8.4	7.6	0.7
12	1.7	1.3	1.6	1.5	0.2
NR + 5 %w/w TiO ₂					
0	23.4	23.7	24.1	23.7	0.4
4	20.0	19.0	19.5	19.5	0.5
8	10.0	8.9	9.5	9.5	0.6
12	5.3	6.0	4.9	5.4	0.6
24	1.7	1.5	1.9	1.7	0.2

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Table A.7 Elongation at break of vulcanized natural rubber sheets after UV exposure under accelerated condition

Time to UV exposure (h)	1 st Experiment	2 nd Experiment	3 rd Experiment	Average Elongation at break (%)	Standard deviation
NR					
0	1056	1011	1009	1025	26.2
4	899	867	900	889	18.8
8	570	544	574	563	16.3
NR + 0.5 %w/w TiO ₂					
0	1150	1165	1180	1165	15.0
4	1110	1080	1097	1096	15.0
8	640	620	603	621	18.5
NR + 3% w/w TiO ₂					
0	1050	1040	1019	1036	15.8
4	1010	990	987	996	12.5
8	970	967	950	962	10.8
12	697	660	698	685	21.7
NR + 5%w/w TiO ₂					
0	1080	1060	1038	1059	21.0
4	990	1046	1030	1020	26.5
8	988	998	978	988	10.0
12	880	915	870	888	23.6
24	780	800	801	794	11.8

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