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APPENDIX A

Contact Angle

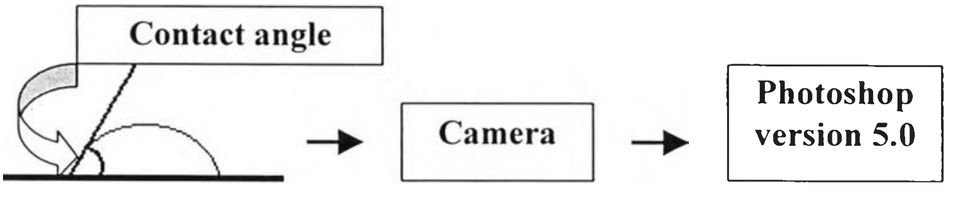

Figure A1 Contact angle measurement.

Ethylene glycol drop of 20 μl is placed on horizontal rubber surface. After 3 minutes of contact, drop is photographed by camera. Then contact angle is measured by Photoshop version 5.0.

Table A1 The data of contact angle of vulcanized rubber sheet.

Material	Contact angle (°)				
	1	2	3	Average	SD
CPD	61.0	65.2	63.6	63.3	2.1
CSE5	59.7	62.5	57.1	59.7	2.7
CSE10	56.4	52.6	55.3	54.8	2.0
CSE15	51.7	50.8	51.3	51.3	0.5
CSE20	47.0	50.9	52.5	50.1	2.8

Table A2 The data of contact angle of vulcanized rubber film.

Material	Contact angle (°)				
	1	2	3	Average	SD
CPD	61.4	63.1	60.9	61.8	1.2
CSE5	53.7	54.0	56.2	54.6	1.4

APPENDIX B

T-peel Test

T-peel test condition

Each sample has thickness of 2.5 cm. Two pieces of sample are pressed and backed with cotton cloth. Then it is gripped on LLOYD and pulled apart.

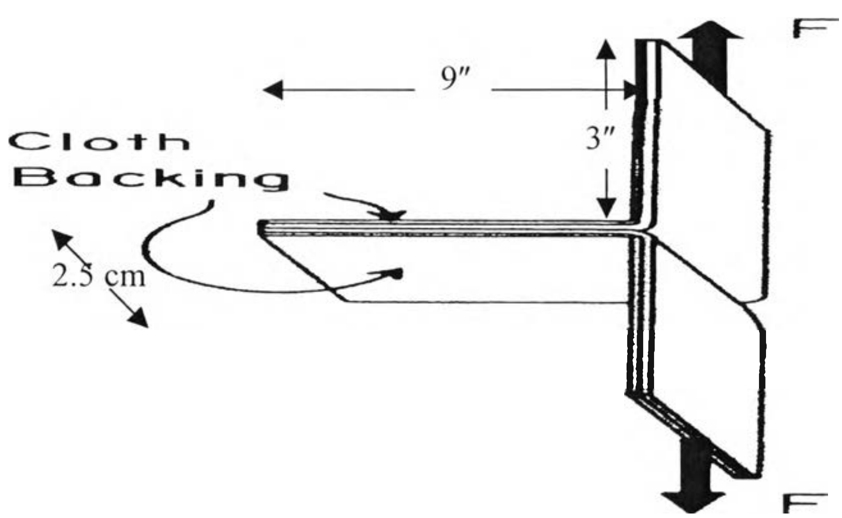

Figure B1 T-peel test

Calculation of work of separation (W_a),

$$W_a = 2F$$

where F is the force required to separate two pieces of sample apart per unit width.

Example of calculation

If the force required to separate two pieces of sample apart is 1.63 N, so

$$F = 1.63/25$$
$$= 0.065 \text{ N/mm}$$

and

$$W_a = 2*0.065$$
$$= 0.130\text{N/mm} \times 1000$$
$$= 130 \text{ J/m}^2$$

Table B1 The data of force of vulcanized rubber sheet before aging.

Material	Force (N)								
	1	2	3	4	5	6	7	Average	SD
NR	4.42	4.04	4.21	4.73	4.50	4.73	4.45	4.44	0.26
CPD	1.56	1.67	1.57	1.95	1.64	1.61	1.42	1.63	0.16
CSE5	0.91	1.12	1.02	0.99	1.07	1.04	0.96	1.02	0.003
CSE10	0.04	0.04	0.05	0.05	-	-	-	0.04	0.004
CSE15	0	0	0	0	-	-	-	0	0
CSE20	0	0	0	0	-	-	-	0	0

Table B2 The data of force of vulcanized rubber sheet after aging.

Material	Force (N)				
	1	2	3	Average	SD
CPD	2.88	2.95	3.20	3.01	0.26
CSE5	2.10	2.64	2.45	2.40	0.23
CSE10	0.44	0.35	0.67	0.49	0.16
CSE15	0	0	0	0	0
CSE20	0	0	0	0	0

Table B3 The data of force of vulcanized rubber film before aging.

Material	Force (N)				
	1	2	3	Average	SD
CPD	2.33	2.52	2.16	2.34	0.18
CSE5	1.02	1.13	1.24	1.13	0.11

Table B4 The data of force of vulcanized rubber film after aging.

Material	Force (N)					
	1	2	3	4	Average	SD
CPD	2.85	2.29	1.99	2.25	2.35	0.04
CSE5	1.12	1.06	1.22	1.15	1.14	0.01

APPENDIX C

Tensile Tests

Table C1 The data of tensile strength of vulcanized rubber sheet before aging.

Material	Tensile strength (N/mm^2)					
	1	2	3	4	Average	SD
CPD	31.15	30.02	30.93	-	30.70	0.60
CSE5	29.95	28.98	28.22	30.87	29.50	1.15
CSE10	25.91	28.52	27.61	-	27.35	1.32
CSE15	22.17	25.41	23.50	-	23.69	1.63
CSE20	11.86	10.45	10.08	-	11.21	1.13

Table C2 The data of tensile strength of vulcanized rubber sheet after aging.

Material	Tensile strength (N/mm^2)						
	1	2	3	4	5	Average	SD
CPD	28.77	32.54	31.70	31.84	31.45	31.26	1.45
CSE5	21.48	18.01	19.86	18.26	18.45	19.21	1.46
CSE10	6.53	9.84	6.59	5.12	-	7.02	2.00
CSE15	5.90	6.17	5.60	4.79	5.67	5.56	0.57
CSE20	5.67	6.98	6.15	5.50	-	6.08	0.66

Table C3 The data of tensile strength of vulcanized rubber film before aging.

Material	Tensile strength (N/mm^2)				
	1	2	3	Average	SD
CPD	22.84	21.89	22.61	22.37	0.67
CSE5	21.66	21.62	24.20	22.49	1.83

Table C4 The data of tensile strength of vulcanized rubber film after aging.

Material	Tensile strength (N/mm^2)							
	1	2	3	4	5	6	Average	SD
CPD	22.55	21.88	22.51	24.53	20.49	23.35	22.48	1.83
CSE5	20.77	22.62	23.12	23.50	23.52	23.78	22.89	1.11

Table C5 The data of elongation at break of vulcanized rubber sheet before aging.

Material	Elongation at break (%)					
	1	2	3	4	Average	SD
CPD	1044	1028	1048	1040	1042	9.21
CSE5	1084	1017	1030	1028	1040	30.29
CSE10	991	996.8	1009	-	990	9.10
CSE15	1021	1001	958.4	-	994	32.01
CSE20	840	800	812	880	833	35.53

Table C6 The data of elongation at break of vulcanized rubber sheet after aging.

Material	Elongation at break (%)						
	1	2	3	4	5	Average	SD
CPD	1044	1044	1076	1044	1008	1043	24.07
CSE5	988	972	972	968	976	975	7.69
CSE10	968	972	976	980	-	974	5.16
CSE15	956	964	948	940	976	957	16.12
CSE20	800	796	828	816	-	810	14.79

Table C7 The data of elongation at break of vulcanized rubber film before aging.

Material	Elongation at break (%)				
	1	2	3	Average	SD
CPD	961	974	965	968	9.19
CSE5	963	940	962	955	12.73

Table C8 The data of elongation at break of vulcanized rubber film after aging.

Material	Elongation at break (%)								
	1	2	3	4	5	6	7	Average	SD
CPD	936	956	952	988	948	984	956	960	19.04
CSE5	916	896	980	976	944	936	-	941	32.95

APPENDIX D

TG Thermograms of Vulcanized Rubber Sheets

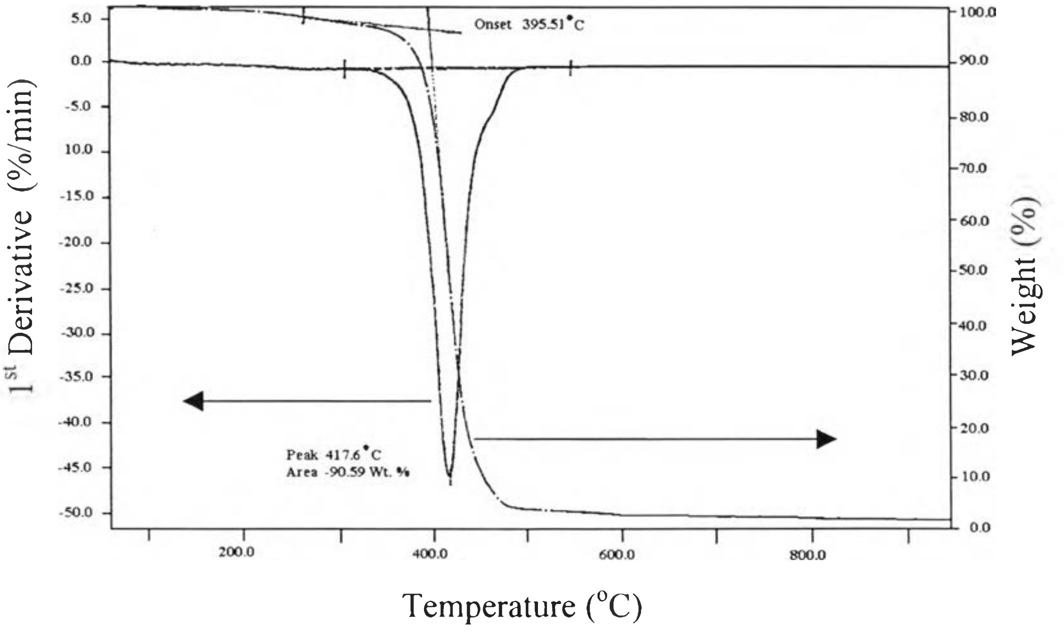

Figure D1 TG thermogram of unaged rubber sheet without PDMS.

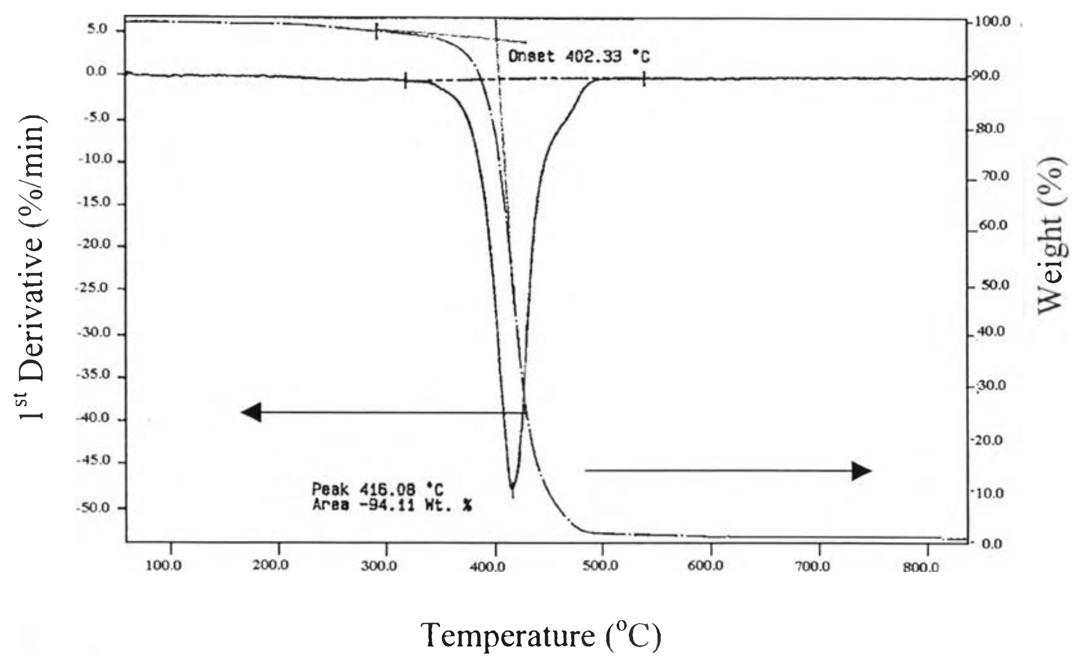

Figure D2 TG thermogram of aged rubber sheet with PDMS of 5 phr.

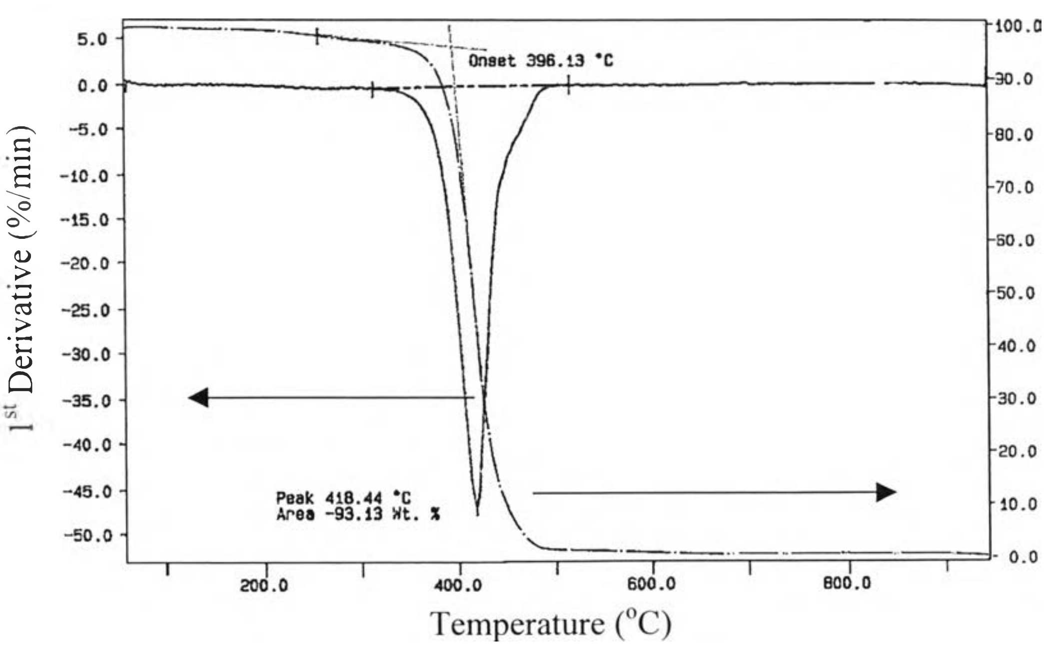

Figure D3 TG thermogram of unagd rubber film without PDMS.

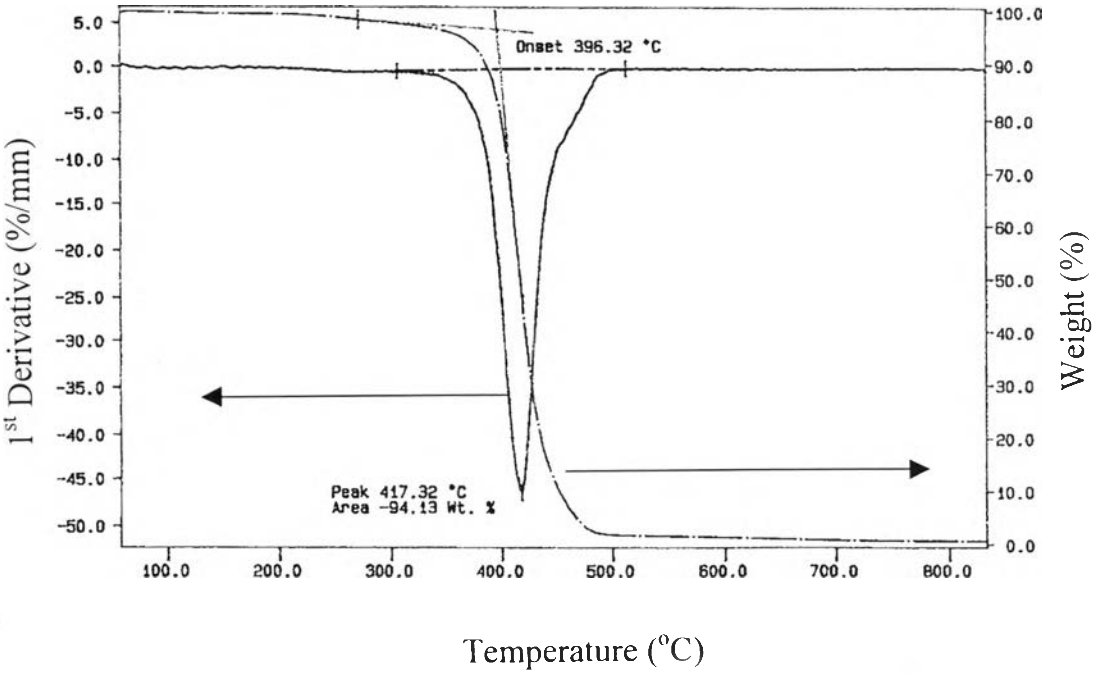

Figure D4 TG thermogram of aged rubber film with PDMS of 5 phr.

CURRICULUM VITAE

Name:	Wipawee Pattanakul
Date of Birth:	18^{th} of December, 1973
Nationality:	Thai
University Education:	
1991-1994	Bachelor degree of Science in Chemistry Prince of Songkhla University, Hatyai, Songkla, Thailand 90110
Work Experience:	
1995-1996	Position: Quality Control Supervisor Company name: Songkhla Canning Public Company Limited
1996	Position: Scientist Company name: Rubber Research Institute of Thailand