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APPENDICES

Appendix A Thermal Behavior of Clay Mineral

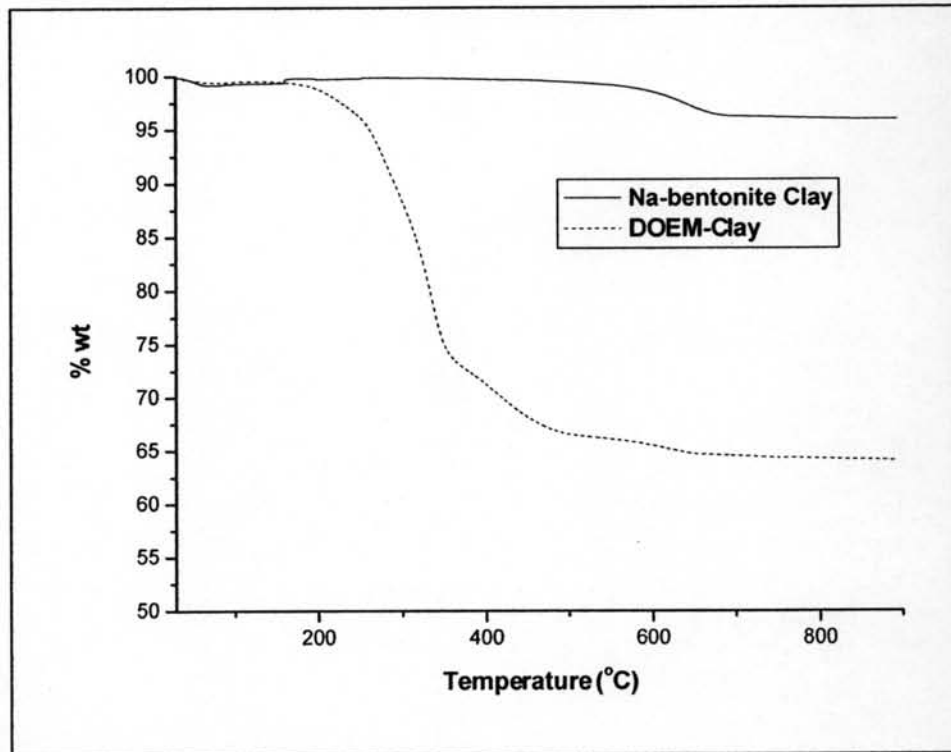


Figure A1 TG curves of Na-bentonite and organomodified bentonite.

Appendix B Data of Mechanical Properties of PP/Organomodified Bentonite Nanocomposite Films

Table B1 Young's modulus (MPa) of PP/organomodified bentonite nanocomposite films

Sample	1	2	3	4	5	6	7	Av.	SD
PP	769	1051	954	965	762	777	936	888	116
PP/Surlyn	714	899	721	914	944	833	968	856	103
PP/1%Clay	999	1020	962	822	806	880	844	903	86
PP/3%Clay	1396	1315	1315	925	1129	1243	864	1170	205
PP/5%Clay	3675	3536	3679	3585	2585	2851	2012	3132	657
PP/7%Clay	2263	2358	3181	3042	3717	3168	2701	3347	993

Table B2 Tensile strength (MPa) of PP/organomodified bentonite nanocomposite films

Sample	1	2	3	4	5	6	7	Av.	SD
PP	26	29	34	26	29	23	29	28	3
PP/Surlyn	23	26	25	23	25	21	28	24	2
PP/1%Clay	27	24	24	23	28	26	24	25	2
PP/3%Clay	29	28	27	29	23	26	26	24	7
PP/5%Clay	17	18	16	16	18	23	16	18	2
PP/7%Clay	17	17	17	18	14	15	17	16	1

Table B3 Elongation at break (%) of PP/organomodified bentonite nanocomposite films

Sample	1	2	3	4	5	6	7	Av.	SD
PP	640	651	728	596	636	574	624	636	49
PP/Surllyn	633	550	590	594	615	546	608	591	33
PP/1%Clay	613	510	487	468	598	689	529	556	80
PP/3%Clay	567	517	537	628	524	552	611	534	43
PP/5%Clay	427	423	433	311	400	464	387	407	48
PP/7%Clay	322	352	341	380	379	281	337	342	34

**Appendix C Data of Mechanical Properties of ATH/PP/Organomodified
Bentonite Nanocomposite Films**

Table C1 Young's modulus (MPa) of ATH/PP/organomodified bentonite nanocomposite films

Sample	1	2	3	4	5	6	7	Av.	SD
PP	769	1051	954	965	762	777	936	888	116
PP/3%Clay	1396	1315	1315	925	1129	1243	864	1170	205
PP/5%ATH	515	535	477	522	512	479	471	502	25
PP/10%ATH	809	742	785	738	830	688	750	763	48
PP/15%ATH	847	1023	918	874	984	1050	1112	973	97

Table C2 Tensile strength (MPa) of ATH/PP/organomodified bentonite nanocomposite films

Sample	1	2	3	4	5	6	7	Av.	SD
PP	26	29	34	26	29	23	29	28	3
PP/3%Clay	29	28	27	29	23	26	26	24	7
PP/5%ATH	19	18	17	19	16	18	17	18	0.8
PP/10%ATH	25	18	27	21	28	25	22	24	3
PP/15%ATH	18	23	23	17	23	23	19	21	3

Table C3 Elongation at break (%) of ATH/PP/organomodified bentonite nanocomposites films

Sample	1	2	3	4	5	6	7	Av.	SD
PP	640	651	728	596	636	574	624	636	49
PP/3%Clay	567	517	537	628	524	552	611	534	43
PP/5%ATH	756	649	936	948	687	711	748	776	118
PP/10%ATH	548	525	653	540	685	616	596	595	60
PP/15%ATH	447	581	512	574	552	546	471	526	51

**Appendix D Data of Mechanical Properties of AlAc/PP/Organomodified
Bentonite Nanocomposite Films**

Table D1 Young's modulus (MPa) of AlAc/PP/organomodified bentonite nanocomposites films

Sample	1	2	3	4	5	6	7	Av.	SD
PP	769	1051	954	965	762	777	936	888	116
PP/3%Clay	1396	1315	1315	925	1129	1243	864	1170	205
PP/5%AlAc	663	624	708	723	634	781	730	695	56
PP/10%AlAc	684	731	788	744	685	779	733	735	40
PP/15%AlAc	741	922	854	889	852	844	831	848	56

Table D2 Tensile strength (MPa) of AlAc/PP/organomodified bentonite nanocomposite films

Sample	1	2	3	4	5	6	7	Av.	SD
PP	26	29	34	26	29	23	29	28	3
PP/3%Clay	29	28	27	29	23	26	26	24	7
PP/5%AlAc	21	20	21	19	24	18	22	21	2
PP/10%AlAc	31	17	20	21	20	29	21	23	5
PP/15%AlAc	19	26	22	22	22	24	29	23	3

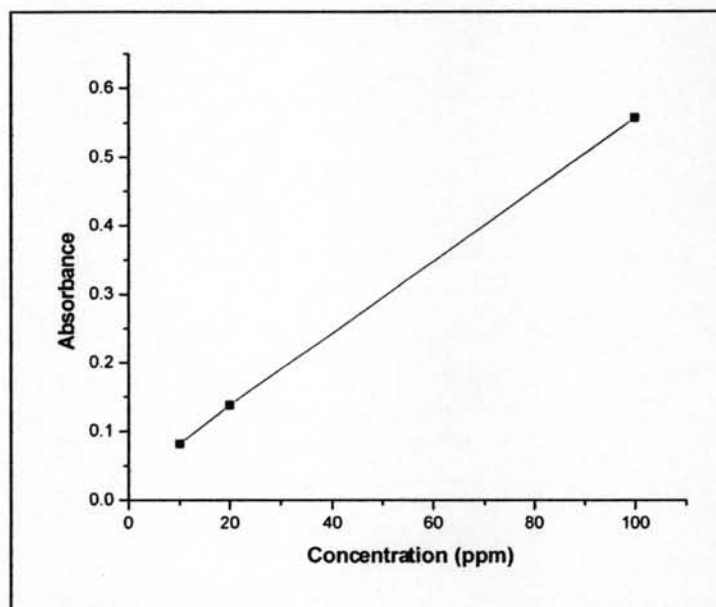
Table D3 Elongation at break (%) of AlAc/PP/organomodified bentonite nanocomposites films

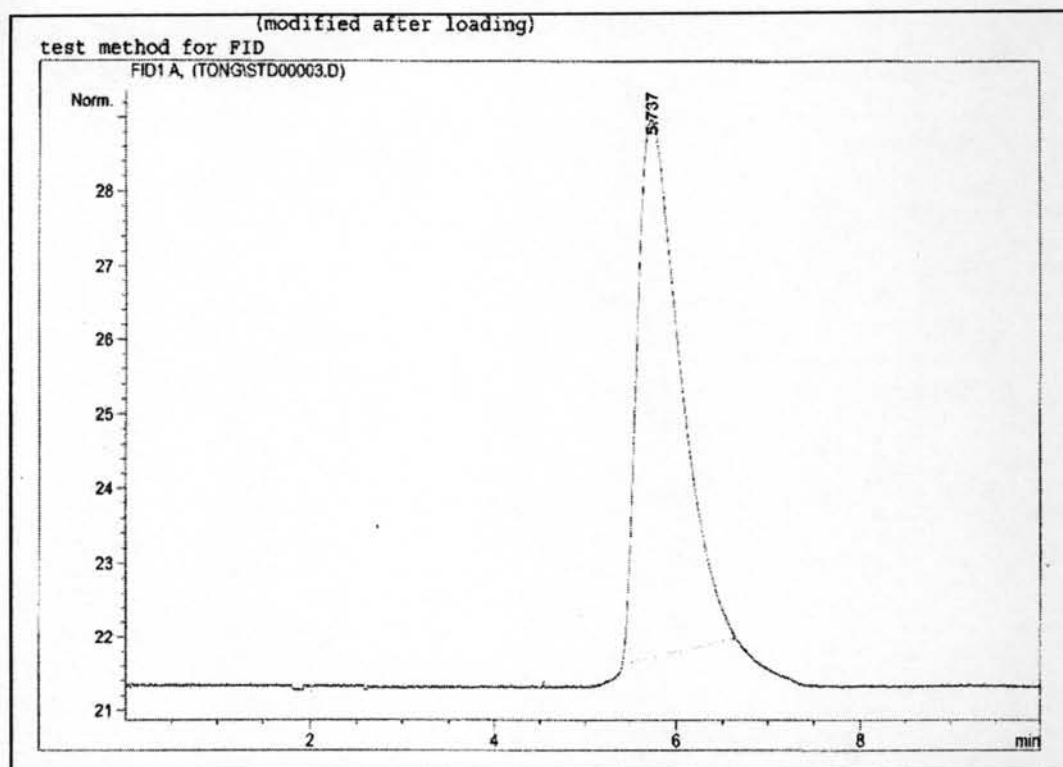
Sample	1	2	3	4	5	6	7	Av.	SD
PP	640	651	728	596	636	574	624	636	49
PP/3%Clay	567	517	537	628	524	552	611	534	43
PP/5%AlAc	609	622	664	586	688	625	568	623	42
PP/10%AlAc	740	492	588	621	605	678	604	618	77
PP/15%AlAc	519	598	525	550	566	562	633	565	40

Appendix E Gas Permeability Constant (ml(STP)m².day.atm)

Table E1 Gas Permeability Constant (ml(STP)m².day.atm) of Ethylene Scavenger
PP/Organomodified bentonite Nanocomposite Films

Sample	1	2	Av.
PP	648.26	621.40	634.83
PP/Surlyn	622.02	623.48	622.75
PP/6%Surlyn/1%Clay	601.17	557.61	579.39
PP/6%Surlyn/3%Clay	619.61	517.89	568.75
PP/6%Surlyn/5%Clay	578.46	543.17	560.82
PP/6%Surlyn/7%Clay	578.46	543.17	560.82
PP-3-5%ATH	677.27	807.01	742.14
PP-3-10%ATH	687.55	665.51	676.53
PP-3-15%ATH	639.04	674.86	656.95
PP-3-5%AlAc	713.39	750.95	732.17
PP-3-10%AlAc	669.72	761.70	715.71
PP-3-15%AlAc	701.42	620.95	661.19

Appendix F Calibration Curve of Aluminum from AAS

Appendix G Ethylene Gas Chromatogram from Gas Chromatography

The retention time of ethylene gas is about 5.7 min.

Appendix H Bentonite Clay, Max-Gel® GRADE SAC

Table H1 Typical chemical analysis of bentonite on dry basis at 105°C

Element	Percentage
SiO ₂	65-70
Al ₂ O ₃	13-17
Fe ₂ O ₃	1.0-2.0
Na ₂ O	1.5-2.5
LOI	10-12
MgO	2.0-3.0
CaO	1.5-2.5
K ₂ O	0.4-0.8
TiO ₂	0.2-0.3

Table H2 Physical properties of bentonite

Physical properties	
Moisture content, %	8-12
5% suspension, pH	9.5-11.0
Swelling index, ml per 2 g of clay	15
Viscosity dial reading at 600 rpm	12-20
Dry particle size (pass 200 meshes), %	80 min
Wet particle size (pass 325 meshes),	98 min
Specific gravity	2.3-2.4
CEC, meq/100g of clay	50

CURRICULUM VITAE

Name: Ms. Yukhanthorn Varothai

Date of Birth: September 17, 1983

Nationality: Thai

University Education:

2001-2005 Bachelor Degree of Science in Industrial Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai, Thailand

Working Experience:

2004 Position: Student trainee, production

Company name: Aromatics Thailand (Public), Co., Ltd.