REFERENCES

Alexandre, M., and Dubois, P. (2000) Polymer-layered silicate nanocomposites: preparation, properties and uses of a new class of materials. Materials Science and Engineering, 28, 1-63.

Alla Y. Furman, Margarita Kharshan, Christophe J Chandler Cortec Corporation. (2004) Performance and testing of vapor phase corrosion inhibitors. Paper 04418

Altin, O., Özbelge, Ö., and Dogu, T. (1999) Effect of pH in an aqueous medium on the sreface area, pore size distribution, density, and porosity of montmorillonite. Journal of Colloid and Interface Science, 217, 19-27.

Arau´jo, E.M., Me´lo, T.J.A., Santana ,L.N.L., Neves ,G.A., Ferreira ,H.C.,Lira , H.L., Carvalho ,L.H., A'vila Jr., M.M., Pontes ,M.K.G., and Arau´jo, I.S. (2004) The influence of organo-bentonite clay on the processing and mechanical properties of nylon 6 and polystyrene composites. Materials Science and Engineering B, 112, 175–178.

Bax, B., Mussig, J., (2008) Impact and tensile properties of PLA/Cordenka and PLA/flax composites. Composites Science and Technology , 68, 1601-1607.

Benjelloun, M., Cool, P., Linssen, T., and Vansant, E.F. (2001) Acidic porous clay heterostructures: study of their cationic exchange capacity. Micropor. Mesopor. Mater., 49 ,83-94.

Crainic, N., and Marques, A.T. (2002). Nano-composite: a state of the art review. Key Engineering Materials, 230-232, 656-666.

Da-quan Zhang, Zhong-xun An, Qing-yi Pan, Li-xin Gao, Guo-ding Zhou. (2006) Volatile corrosion inhibitor film formation on carbon steel surface and its inhibition effect on the atmospheric corrosion of carbon steel. Applied Surface Science 253 1343–1348.

Danumah, C., Bousmina, M., and Kaliaguine, S. (2003) Novel polymer nano-composites from templated mesostructured inorganic materials . Macromolecules ,36, 8208-8209.

Ding, C., Jia, D., He, H., Guo, B., Hong, H. (2005) How organo-montmorillonite truly affects the structure and properties of polypropylene. Polymer Testing, 24, 94–100.

Drumright, R.E., Gruber, P.R., and Henton, D.E. (2000) Polylactic acid technology. Advanced Materials, 12, 1841-1846.

Galarneau, A., Barodawalla, A., and Pinnavaia, T.J. (1995) Porous clay hetero-structures formed by gallery-templated synthesis. Nature, 374, 529-531.

Galgali, G., Ramesh, C., and Lek, A. (2001) A rheological study on the kinetics of hybrid formation in polypropylene nanocomposites. Macromolecules, 34, 852-858.

Garlotta, D. (2001) A literature review of poly(lactic acid). Journal of Polymers and Environment, 9, 63-84.

Graeme Wright. Chemistry Department, University of Auckland

Gu, S.Y., Ren , J., Dong, B. (2007) Melt rheology of polylactide/montmorillonite nanocomposites. Journal of Polymer Science Part B:Polymer Physics., 45, 3189-3196 .

Hang-Rong Chen, Jian-Lin Shi, Wen-Hua Zhang, Mei-Ling Ruan, Dong Sheng Yan. (2001) Preparation and characterization of manganese oxide confined within ordered porous zirconium oxide channels. Microporous and Mesoporous Materials, 47,173-178.

Henton, D.E., Gruber, P., Lunt, J., Randall, J. (2005) Polylactic acid technology. Natural fibres biopolymers and biocomposites. Boca Raton: CRC Press

Hong, R.Y., Pan, T.T., Han, Y.P., Zhang, S.Z., Li, H.Z., and Ding , J. (2007) Graft Polymerization Synthesis and Application of Magnetic Fe_3O_4/Polyacrylic Acid Composite Nanoparticles. Journal of Applied Polymer Science, 106, 1439-1447.

Hummel, R.E. (2004) Understanding Materials Science.. Electrical Properties of Materials. 185-222.

Ishii, R., Nakatsuji, M., and Ooi, K. (2005) Preparation of highly porous silica nanocomposites from clay mineral: a new approach using pillaring method combined with selective leaching. Micropor. Mesopor. Mater., 79 ,111-119.

Kawasumi, M., Hasegawa, N., Kato, M., Usuki, A., and Okade, A. (1997) Preparation and mechanical properties of polypropylene-clay hybrids. Macromolecules, 30, 6333-6338.

Keki, S., Bodnar, I., Borda, J., Deak, G., and Zsuga, M. (2001) Melt Polycondensation of D,L-Lactic Acid: MALDI-TOF MS Investigation of the Ring-Chain Equilibrium.. J. Phys. Chem. B, 14, 2833 -2836.

Kikkawa, Y., Fujita, M., Abe, H., and Doi, Y. (2004) Effect of Water on the Surface Molecular Mobility of Poly(lactide) Thin Films: An Atomic Force Microscopy Study. Biomacromolecules, 5, 1187-1193.

Kloprogge, J.T. (1998) Synthesis of smectite and porous pillared clay catalyst: a review. Journal of Porous Materials, 5, 5-41.

K. L. Vasanth. (1997) Vapor phase corrosion inhibitors for navy applications. National Association of Corrosion Engineers, 179, 1-9

Kruijf, N.D., Beest, M.V., Rijk, R., Sipilainen-Malm, T., Losada, P.P. and Meulenaer, B.D. (2002) Active and intelligent packaging: applications and regulatory aspects. Food Additives and Contaminants, 19, 144-162.

Kim, S.I., Aida, T., and N, H. (2005) Binary adsorption of very low concentration ethylene and water vapor on mordenites and desorption by microwave heating. Separation Purification Technology, 45, 174-182.

Lertwimolnum, W., and Vergnes, B. (2005) Influence of compatibilizer and processing conditions on the dispersion of nanoclay in a polypropylene matrix. Polymer, 46, 3462-3471.

Liu, Z.L., Liu, Y.J., Yao, K.L., Ding, Z.H., Tao, J., and Wang, X. (2002) Synthesis and Magnetic Properties of Fe_3O_4 Nanoparticles. Journal of Materials Synthesis and Processing, 10 , 83-87.

L.R.M. Estevao, R.S.V. Nascimento (2001) Modifications in the volatilization rate of VCI by means of host-guest system. Corrosion Science, 43., 1133-1153.

Pluta , M., Galeski, A., Alexandre, M., Paul, M.A., and Dubois, P. (2002) Polylactide/montmorillonite nanocomposites and microcomposites prepared by melt blending: Structure and some physical properties. Journal of Applied Polymer Science, 86, 1497-1506.

P. Saravanan, S. Alam, L. D. KandpalL, G. N. Mathur (2002) Effect of substitution of Mn ion on magnetic properties of Fe_3O_4 nanocrystallites. Journal of Applied materials Science Letters, 21, 1135-1137.

Maiti, P., Yamada, K., Okamoto, M., Ueda, K., and Okamoto, K. (2002) New Polylactide/Layered Silicate Nanocomposites: Role of Organoclays. Chem. Mater. 14 , 4654 -4661.

Manias, E., Touny, A., Wu, L., Strawhecker, K., Lu, B., and Chung ,T.C. (2001) Polypropylene/montmorillonite nanocomposites: review of the synthetic routes and materials properties. Chem. Mater, 13, 3516-3523.

Meerod, S., Benchawan, T., and Rutanakornpituk, M.. Water Dispersible Magnetite Nanoparticles Stabilized with Poly (ethylene glycol) methyl ether-b-poly (-caprolactone) Copolymers and its Drug-released Behavior. 33[rd] Congress on Science and Technology of Thailand.

Meneghetti, P., and Qutubuddin, S. (2006) Synthesis, thermal properties and application of polymer-clay nanocomposites. Themochimica Acta, *In Press.*

Mercier, L., and Pinnavaia, T.J. (1998) A functionalized posous clay heterostructures for Hg^{2+} heavy metal ion trapping. Micropor. Mesopor. Mater, 20, 101-106.

Morlat, S., Mailhot, B., Gonzalez, D., and Gardette, J.L. (2004) Photo-oxidation of polypropylene/montmorillonite nanocomposites 1: influence of nanoclay and compatibilizing agent. Chem. Mater, 16, 377-383.

Nakatsuji, M., Ishii, R., Wang, M.Z., and Ooi, K. (2004) Preparation of porous clay minerals with organic–inorganic hybrid pillars using solvent-extraction route. Journal of Colloid and Interface Science , 2721 , 58–166.

Newalkar, B.L., Choudary, N.V., Turaga, U.T., Vijayalakshmi, R.P., Kumar, P., Komarneni, S., and Bhat, T.S.G. (2003) Adsorption of light hydrocarbons on HMS type mesoporous silica. Micropor. Mesopor. Mater, 65, 267-276.

Niel Pieterse [a], Walter W. Focke [a,*], Eino Vuorinen b, Ilona Ra'cz [c] . (2006) Estimating the gas permeability of commercial volatile corrosion inhibitors at elevated temperatures with thermo-gravimetry. Corrosion Science, 48, 1986–1995

Oriakhi, C., (1998) Nano sandwiches. Chemistry in Britain, 34, 59-62.

Paz, H.M., Guillard, V., Reynes, M., and Gontard, N. (2005) Ethylene permeability of wheat gluten film as a function of temperature and relative humidity. Journal of Membrane Science, 253, 108-115.

Peter, C.L., Wang, Z., Thomas, J.P. (1999) Polymer-layered silicate nanocomposites : an Overview. Applied Clay Science, 15, 11-29.

Petersen, K., Nielsen, P.V., Bertelsen, G., Lawther, M., Olsen, M.B., Nilsson, N.H., and Mortensen, G. (1999) Potential of biobased materials for food packaging. Trends in Food Science and Technology, 10, 52-68.

Pichowicz, M., and Mokaya, R. (2001) Porous clay heterostructures with enhanced acidity obtained from acid-activated clays. Chemcomm Communication, 2100–2101.

Pinto, M.L., Pires, J., Carvalho, A.P., Carvalho, M.B., and Bordado, J.C. (2005) Characterization of adsorbent materials supported on polyurethane foams by nitrogen and toluene adsorption. Micropor. Mesopor. Mater., 80, 253-262.

Pinto, M.L., Pires, J., Carvalho, A.P., Carvalho, M.B., and Bordado, J.C. (2006) Synthesis and regeneration of polyurethane/adsorbent composites and their characterization by adsorption methods. Micropor. Mesopor. Mater., 89, 260-269.

Pires, J., Araujo, A.C., Carvalho, A.P., Pinto, M.L., Gonzalez-Calbet, J.M., and Ramirez-Castellanos, J. (2004) Porous materials from clays by the gallery template approach: synthesis, characterization and adsorption properties. Micropor. Mesopor. Mater., 73 ,175-180.

Polverejan, M., Pauly, T.R., and Pinnavaia, T.J. (2000) Acidic porous clay heterostructures (PCH): intragallery assembly of mesoporous silica in synthetic saponite clay. Chem. Mater., 12, 2698-2704.

Polverejan, M., Liu, Y. and Pinnavaia, T.J. (2002) Aluminated derivatives of porous clay heterostructures (PCH) assembled from synthetic saponite clay: properties as supermicroporous to small mesoporous acid catalysts. Chem. Mater., 14, 2283-2288.

P. Saravanan, S. Alam, L. D. Kandpal, G. N. Mathur. (2002) Effect of substitution of Mn ion on magnetic properties of Fe_3O_4 nanocrystallites. Materials Science, 21, 1135-1137

Quang, T.N., Donald, G.B. (2006) Preparation of Polymer–Clay Nanocomposites and Their Properties. Advances in Polymer Technology, 25 , 270-285.

Raghava Reddy, K., Lee, K.P., Gopalan, A.I., and Showkat, A.M. (2007) Synthesis and properties of magnetite / poly (aniline-co-8-amino-2-naphthalenesulfonicacid) (SPAN) nanocomposites. Polymers For Advanced Technologies , 18 ,38-43.

Rhim, J.W., Hong, S.I., Ha, C.S. (2008) Tensile, water vapor barrier and antimicrobial properties of PLA/nanoclay composite films. Food Science and Technology.

Sayari, A. and, Hamoudi, S. (2001) Periodic mesoporous silica-based organic-inorganic nanocomposite materials. Chem. Mater., 13, 3151-3168.

Sinha Ray, S., and Okamoto, M. (2003) Polymer/layered silicate nanocomposites: a review from preparation to processing. Prog. Polym. Sci., 28, 1539-1641.

Sinha Ray, S., Yamada, K., Okamoto, M., and Ueda, K. Polylactide-Layered Silicate Nanocomposite: A Novel Biodegradable Material. Nano Letters., 2, 1093 -1096.

Solarski, S., Mahjoubi, F., Ferreira, A., Devaux, E., Bachelet, P., Bourbigot, S., Delobel, R., Coszach, P., Murariu, M., Ferreira, D., Alexandre, M., Degee, P., and Dubois, P. (2007) (Plasticized) Polylactide/clay nanocomposite textile: thermal, mechanical, shrinkage and fire properties . Journal of Materials Science, 42, 5105-5117.

Thaijaroen, W., (2000) Preparation and mechanical properties of NR/clay nanocomposite. Master Thesis, The Petroleum and Petrochemical College, Chulalongkorn University, Bangkok, Thailand.

Ton-That, M.T., Perrin-Sarazin, F., Cole, K.C., Bureau, M.N., and Denault, J. (2004) Polyolefin nanocomposites: formation and development. Polymer Engineering and Science, 44, 1212-1219.

U. Rammelt *, S. Koehler, G. Reinhard (2009) Use of vapour phase corrosion inhibitors in packages for protecting mild steel against corrosion. Corrosion Science, 51 , 921–925.

Vermeiren, L., Devlieghere, F., Beest, M., Kruijf, N., and Debevere, J. (1999) Developments in the active packaging of foods. Trends in Food & Technology, 10, 77-86.

Weber, C.J., Haugaard, V., Festersen, R., and Bertelsen, G. (2002) Production and application of biobased packaging materials for the food industry. Food Additives and Contaminants, 19, 172-177.

Wei, L., Tang, T., and Huang, B. (2004) Novel acidic porous clay heterostructure with highly ordered organic–inorganic hybrid structure: one-pot synthesis of mesoporous organosilica in the galleries of clay. Microporous and Mesoporous Materials, 67 ,175–179.

Wijn, H.P.J., (2001) Magnetic Properties of Metals. Landoltn Bornstein, NewSeries III/19.32 .

Zhu, H.Y., Ding, Z., Lu, C.Q., and Lu, G.Q. (2002) Molecular engineered porous clays g surfactantssin. Applied Clay Science, 20, 165-175.

APPENDICES

Appendix A Monmorillonite Clay, PK-810

Table A1 Typical chemical analysis of montmorillonite

Element	Percentage
SiO_2	71.89
Al_2O_3	14.32
Na_2O	5.09
K_2O	0.15
MgO	5.60
CaO	0.13
Fe_2O_3	2.75
TiO_2	0.07
ToTal	100

Table A2 Physical analysis of montmorillonite

Physical properties	
pH	10.43
Specific gravity (g/cm^3)	~2
Average particle size (μm)	1.17
CEC (meq/100 g)	102

Appendix B Types of Adsorption Isotherm and Hysteresis Loop

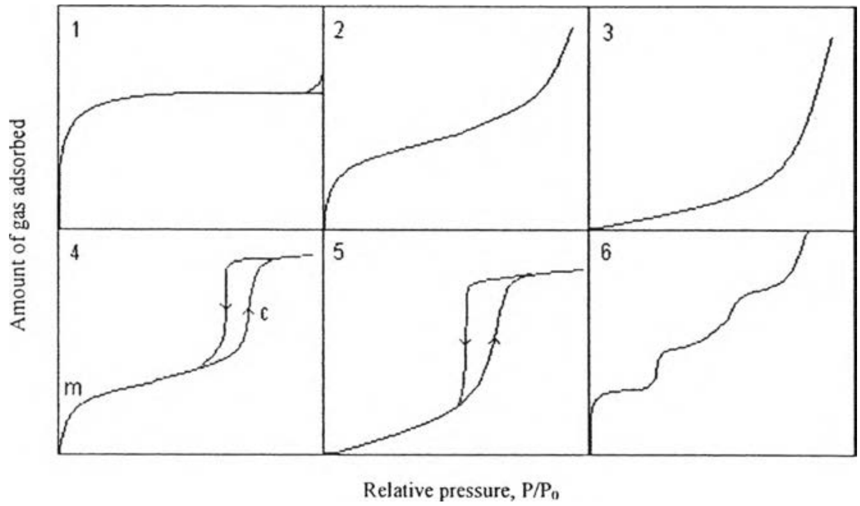

Figure B1 Types of adsorption isotherm according to BDDT classification.

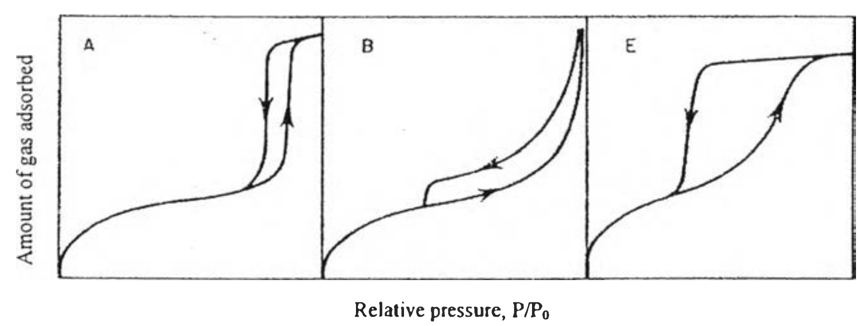

Figure B2 Types of hysteresis loop according to De Boer classification.

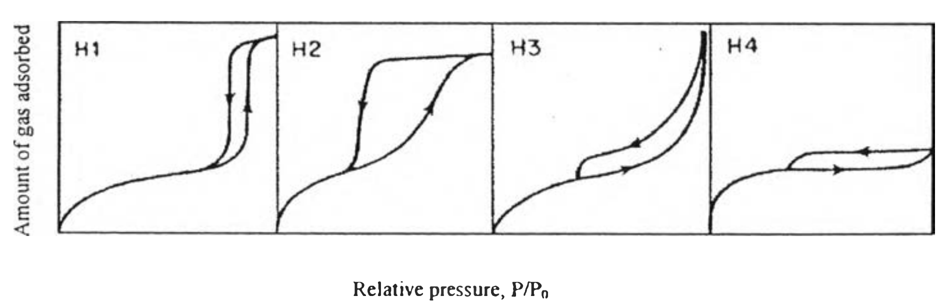

Figure B3 Types of hysteresis loop according to IUPAC classification.

Appendix C Data of Mechanical Properties of PLA nanocomposites with various VCI contents

Table C1 Young's modulus (MPa) of PLA nanocomposites with various VCI contents

Sample	1	2	3	4	5	AV.	SD.
PLA	2562.48	2758.76	2565.58	2699.05	2623.57	2641.89	85.72
PLA/5%wt PEG	1862.53	1837.50	1742.11	1690.12	1625.19	1751.49	99.42
PLA/5%wt PEG/1%wt PCH	1908.67	2021.97	2118.45	1998.68	1950.58	1999.67	79.53
PLA/5%wt PEG/1%wt Magnetic PCH	1976.52	2064.14	2053.42	1897.17	2027.60	2003.77	68.53
PLA/5%wt PEG/1%wt Magnetic PCH-20%wt VCI	2159.70	2013.80	2181.65	2191.34	2027.37	2114.77	77.70
PLA/5%wt PEG/1%wt Magnetic PCH-40%wt VCI	1839.64	1811.25	1962.55	1988.73	1977.29	1915.89	83.69

Sample	1	2	3	4	5	AV.	SD.
PLA/5%wt PEG/1%wt Magnetic PCH-60%wt VCI	1853.51	1921.90	1882.51	1744.03	2005.02	1881.39	95.62
PLA/5%wt PEG/1%wt Magnetic PCH-80%wt VCI	1731.62	1637.92	1808.51	1855.76	1732.15	1753.19	83.33

Table C2 Tensile strength (MPa) of PLA nanocomposites with various VCI contents

Sample	1	2	3	4	5	AV.	SD.
PLA	8.54	8.01	10.11	10.96	8.96	9.32	1.20
PLA/5%wt PEG	10.81	9.72	10.75	9.18	9.22	9.93	0.80
PLA/5%wt PEG/1%wt PCH	7.75	8.56	9.70	7.19	7.83	8.21	0.97
PLA/5%wt PEG/1%wt Magnetic PCH	9.65	9.14	8.70	8.75	9.55	9.16	0.44
PLA/5%wt PEG/1%wt Magnetic PCH-20%wt VCI	9.07	9.30	8.75	8.88	8.62	8.93	0.24
PLA/5%wt PEG/1%wt Magnetic PCH-40%wt VCI	7.73	8.54	8.93	8.71	8.98	8.58	0.50
PLA/5%wt PEG/1%wt Magnetic PCH-60%wt VCI	7.52	7.39	8.73	8.77	9.15	8.31	0.80
PLA/5%wt PEG/1%wt Magnetic PCH-80%wt VCI	7.77	8.38	7.90	7.48	8.21	7.95	0.36

Table C3 Elongation at break (%) of PLA nanocomposites with various VCI contents

Sample	1	2	3	4	5	AV.	SD.
PLA	3.52	3.26	3.51	3.19	3.42	3.38	0.15
PLA/5%wt PEG	4.18	5.04	4.61	4.40	4.41	4.53	0.32
PLA/5%wt PEG/1%wt PCH	4.50	4.93	5.03	4.23	5.15	4.77	0.39
PLA/5%wt PEG/1%wt Magnetic PCH	4.72	4.14	4.76	4.26	3.99	4.37	0.34
PLA/5%wt PEG/1%wt Magnetic PCH-20%wt VCI	3.96	4.14	4.47	4.37	4.45	4.28	0.20
PLA/5%wt PEG/1%wt Magnetic PCH-40%wt VCI	4.41	3.98	4.25	3.96	4.30	4.18	0.20
PLA/5%wt PEG/1%wt Magnetic PCH-60%wt VCI	3.88	4.26	4.00	3.93	4.32	4.08	0.20
PLA/5%wt PEG/1%wt Magnetic PCH-80%wt VCI	3.67	3.75	3.95	4.30	4.37	3.99	0.30

Appendix D Data of Mechanical Properties of PLA nanocomposites with various Magnetic PCH-40%wt VCI contents

Table D1 Young's modulus (MPa) of PLA nanocomposites (5% PEG) with various Magnetic PCH-40%wt VCI contents

Sample	1	2	3	4	5	AV.	SD.
1%	1839.6	1811.2	1962.5	1988.7	1977.2	1915.8	83.6
2%	1822.7	1909.6	1876.2	1839.3	1972.2	1884.0	53.3
3%	1939.2	1894.2	1912.2	1778.6	1799.2	1864.7	71.3
4%	1729.5	1873.8	1902.4	1801.4	1686.5	1798.7	91.9
5%	1721.8	1697.4	1646.2	1620.6	1728.9	1683.0	47.6

Table D2 Tensile strength (MPa) of PLA nanocomposites (5% PEG) with various Magnetic PCH-40%wt VCI contents

Sample	1	2	3	4	5	AV.	SD.
1% wt Magnetic PCH-40% VCI	7.73	8.54	8.93	8.71	8.98	8.58	0.50
2% wt Magnetic PCH-40% VCI	7.53	7.94	6.95	7.43	7.02	7.37	0.36
3% wt Magnetic PCH-40% VCI	7.63	7.55	6.94	7.49	6.57	7.24	0.46
4% wt Magnetic PCH-40% VCI	6.66	7.03	6.37	7.81	6.41	6.86	0.59
5% wt Magnetic PCH-40% VCI	5.51	6.10	5.64	6.51	6.18	5.99	0.41

Table D3 Elongation at break (%) of PLA nanocomposites with various Magnetic PCH-40%wt VCI contents

Sample	1	2	3	4	5	AV.	SD.
1% wt Magnetic PCH-40% VCI	4.41	3.98	4.25	3.96	4.30	4.18	0.20
2% wt Magnetic PCH-40% VCI	3.45	3.64	3.71	3.46	3.25	3.50	0.16
3% wt Magnetic PCH-40% VCI	3.36	3.11	3.11	2.94	3.58	3.22	0.25
4% wt Magnetic PCH-40% VCI	2.87	2.37	2.78	3.25	3.23	2.90	0.36
5% wt Magnetic PCH-40% VCI	2.04	3.05	3.04	2.02	2.05	2.44	0.55

Appendix E Oxygen Gas Permeability (cc/m^2.d) of PLA nanocomposites

Table E1 Oxygen Gas Permeability Constant (cc/m^2.d) of PLA nanocomposites

Sample	1st Sample	2nd Sample	AV.
PLA	112.0	95.1	103.5
PLA/5%wt PEG	101.0	84.7	92.7
PLA/5%wt PEG/1%wt PCH	95.7	84.3	90.0
PLA/5%wt PEG/1%wt Magnetic PCH	90.2	88.5	89.4
PLA/5%wt PEG/1%wt Magnetic PCH-40%wt VCI	85.9	88.9	87.4
PLA/5%wt PEG/2%wt Magnetic PCH-40%wt VCI	87.1	81.4	84.2
PLA/5%wt PEG/3%wt Magnetic PCH-40%wt VCI	87.9	80.4	84.2
PLA/5%wt PEG/4%wt Magnetic PCH-40%wt VCI	88.9	72.9	80.9
PLA/5%wt PEG/5%wt Magnetic PCH-40%wt VCI	78.8	68.9	73.8

Appendix F Moisture Permeability (g/m^2.d) of PLA nanocomposites

Table F1 Moisture Permeability Constant (g/m^2.d) of PLA nanocomposites

Sample	1st Sample	2nd Sample	AV.
PLA	56.22	68.55	62.4
PLA/5%wt PEG	51.30	51.3	51.3
PLA/5%wt PEG/1%wt PCH	48.07	47.98	48.0
PLA/5%wt PEG/1%wt Magnetic PCH	45.98	44.98	45.5
PLA/5%wt PEG/1%wt Magnetic PCH-40%wt VCI	40.99	43.02	42.0
PLA/5%wt PEG/2%wt Magnetic PCH-40%wt VCI	40.84	40.77	40.8
PLA/5%wt PEG/3%wt Magnetic PCH-40%wt VCI	39.29	36.10	37.7
PLA/5%wt PEG/4%wt Magnetic PCH-40%wt VCI	38.05	35.48	36.8
PLA/5%wt PEG/5%wt Magnetic PCH-40%wt VCI	31.68	34.28	33.0

Appendix G Data of Mechanical Properties of blown film PLA/5%wt PEG/1%wt Magnetic PCH-40%wt VCI

Table G1 Mechanical Properties of blown film PLA/5%wt PEG/1%wt Magnetic PCH-40%wt VCI by Blow Film Molding

Sample	young's modulus (MPa)	Tensile strength (MPa)	Elongation at break (%)
1	8750.47	30.90	5.62
2	8750.95	30.47	4.51
3	8691.11	30.28	5.40
4	8882.71	31.38	4.69
5	8905.08	30.32	4.26
Average	8796.06	30.67	4.89
SD	92.90	0.42	0.58

Blow Film Molding Condition

- Temperature : 70, 140, 140, 140 and 145°C from hopper to die, respectively
- Screw speed : 40 rpm

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1. Jindapech, A; Manuspiya, H; and Magaraphan, R. (2010, March 21-25) Effect of Manganese ion on Magnetic Properties of Iron Oxide modified Porous Clay Heterostructures (PCH). Proceedings of 239th American Chemical Society Spring 2010 National Meeting & Exposition, San Francisco, California, United State of America.
2. Jindapech, A; Manuspiya, H; and Magaraphan, R. (2010, April 22) Induced Magnetic Properties to Surface-Modified Mesoporous Clay Hetrostructure for Anti-corrosion Packaging. Proceedings of the 16th PPC Symposium on Petroleum, Petrochems, and Polymers, Bangkok, Thailand.

Presentations:

1. Jindapech, A; Manuspiya, H; and Magaraphan, R. (2010, March 21-25) Effect of Manganese ion on Magnetic Properties of Iron Oxide modified Porous Clay Heterostructures (PCH). Paper presented at the 239th American Chemical Society Spring 2010 National Meeting & Exposition, San Francisco, California, United State of America.
2. Jindapech, A; Manuspiya, H; and Magaraphan, R. (2010, April 22) Induced Magnetic Properties to Surface-Modified Mesoporous Clay Hetrostructure for Anti-corrosion Packaging. Paper presented at the 16th PPC Symposium on Petroleum, Petrochems, and Polymers, Bangkok, Thailand.