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APPENDICES

Appendix A The effect of temperature and catalyst concentration on epoxidized natural rubber-g-poly lactide

Table A1 The wave number of the functional group of copolymer

Wave number (cm^{-1})	Functional group
1740	Carbonyl (C=O)
896	C=C bending in $\text{R}_2\text{C}=\text{CHR}$
1655	C=C stretching in $\text{R}_2\text{C}=\text{CHR}$
1090-1190	Ether group (C-O-C)
3400	Hydroxyl group (-OH)

Appendix B Polylactide compounding for injection molding product**Table B1** The wave number of the functional group of copolymer

Wave number (cm⁻¹)	Functional group
1740	Carbonyl (C=O)
896	C=C bending in R ₂ C=CHR
1655	C=C stretching in R ₂ C=CHR
1090-1190	Ether group (C-O-C)
3400	Hydroxyl group (-OH)

Table B2 The weight loss of biodegradation values of copolymer in week 1 to week 3

Sample (wt%)	Catalyst concentration (wt%)	Weight (g)			Week1 (g)			%weight	Week2 (g)			%weight	Week 3 (g)			%weight	Week 4 (g)		
								lose (%)				lose (%)				lose (%)			
NR(5)-g-PLA(95)	0.1	1.057	1.013	0.990	1.048	1.007	0.981	0.75	0.999	0.957	0.936	5.32	0.890	0.856	0.836	15.13	0.821	0.791	0.761
	0.2	0.991	0.987	1.035	0.966	0.963	1.010	2.36	0.913	0.909	0.951	7.57	0.811	0.810	0.848	17.18	0.743	0.745	0.745
	0.3	1.074	1.027	1.039	1.034	0.990	0.995	3.84	0.962	0.918	0.929	10.52	0.860	0.822	0.835	19.75	0.795	0.781	0.781
NR(10)-g-PLA(90)	0.1	1.012	0.987	0.990	1.011	0.986	0.989	0.11	0.979	0.946	0.939	3.75	0.893	0.870	0.875	10.54	0.816	0.798	0.798
	0.2	1.004	1.000	0.987	1.000	0.999	0.988	0.14	0.941	0.975	0.945	3.91	0.874	0.896	0.866	10.65	0.790	0.785	0.785
	0.3	0.950	1.006	0.960	0.946	1.002	0.960	0.24	0.904	0.959	0.916	4.12	0.828	0.882	0.840	11.01	0.753	0.794	0.794
NR(15)-g-PLA(85)	0.1	0.936	0.961	0.946	0.936	0.960	0.945	0.06	0.902	0.923	0.912	3.03	0.838	0.862	0.863	7.91	0.768	0.782	0.782
	0.2	1.005	0.979	0.983	1.004	0.977	0.981	0.09	0.962	0.936	0.952	3.28	0.906	0.867	0.881	8.84	0.823	0.809	0.809
	0.3	0.959	0.960	0.981	0.957	0.960	0.980	0.10	0.917	0.919	0.941	3.53	0.848	0.849	0.875	9.31	0.763	0.773	0.773
NR(20)-g-PLA(80)	0.1	0.966	0.966	0.969	0.966	0.966	0.968	0.03	0.941	0.942	0.944	1.96	0.870	0.870	0.873	7.68	0.815	0.811	0.811
	0.2	0.947	0.958	0.953	0.946	0.957	0.952	0.04	0.912	0.916	0.920	2.90	0.849	0.859	0.854	7.89	0.794	0.803	0.803
	0.3	0.968	0.944	0.980	0.968	0.943	0.979	0.05	0.927	0.904	0.947	3.01	0.860	0.840	0.869	8.61	0.801	0.781	0.781
Pure PLA	-	0.870	0.864	0.916	0.857	0.850	0.903	1.33	0.799	0.768	0.825	8.57	0.683	0.661	0.706	20.02	0.634	0.614	0.614

Table B3 The weight loss of biodegradation values of copolymer in week 4 to week 8

Sample (wt%)	Catalyst concentration (wt%)	Weight (g)			Week 5 (g)			%weight lose (%)	Week 6 (g)			%weight lose (%)	Week 7 (g)			%weight lose (%)	Week 8 (g)	
NR(5)-g-PLA(95)	0.1	1.057	1.013	0.990	0.786	0.752	0.721	25.36	0.758	0.722	0.681	28.45	0.732	0.704	0.669	30.22	0.720	0.699
	0.2	0.991	0.987	1.035	0.713	0.699	0.746	27.08	0.680	0.674	0.723	29.61	0.669	0.658	0.712	30.82	0.657	0.637
	0.3	1.074	1.027	1.039	0.771	0.762	0.731	27.76	0.742	0.712	0.725	30.48	0.724	0.700	0.705	32.05	0.710	0.696
NR(10)-g-PLA(90)	0.1	1.012	0.987	0.990	0.781	0.759	0.762	20.65	0.760	0.740	0.743	22.40	0.738	0.730	0.730	23.75	0.726	0.725
	0.2	1.004	1.000	0.987	0.763	0.758	0.753	21.52	0.743	0.740	0.731	23.31	0.723	0.721	0.719	24.86	0.712	0.711
	0.3	0.950	1.006	0.960	0.718	0.756	0.708	22.03	0.702	0.721	0.708	23.55	0.685	0.708	0.699	24.72	0.670	0.697
NR(15)-g-PLA(85)	0.1	0.936	0.961	0.946	0.739	0.759	0.750	16.88	0.717	0.734	0.727	18.83	0.709	0.714	0.710	20.13	0.698	0.716
	0.2	1.005	0.979	0.983	0.788	0.753	0.764	18.74	0.764	0.735	0.747	20.39	0.740	0.718	0.732	21.97	0.724	0.700
	0.3	0.959	0.960	0.981	0.714	0.726	0.769	19.60	0.694	0.705	0.740	21.56	0.672	0.679	0.719	23.50	0.665	0.673
NR(20)-g-PLA(80)	0.1	0.966	0.966	0.969	0.782	0.780	0.784	14.79	0.761	0.761	0.762	16.47	0.748	0.746	0.749	17.54	0.735	0.736
	0.2	0.947	0.958	0.953	0.754	0.773	0.767	15.00	0.732	0.748	0.744	16.87	0.717	0.721	0.721	18.62	0.704	0.712
	0.3	0.968	0.944	0.980	0.773	0.752	0.779	15.66	0.751	0.731	0.758	17.38	0.739	0.710	0.733	18.91	0.715	0.706
Pure PLA	-	0.870	0.864	0.916	0.595	0.578	0.624	28.43	0.572	0.549	0.600	30.96	0.561	0.533	0.590	32.21	0.550	0.516

Table B4 Melt flow index values of copolymer

Sample (wt%)	Catalyst concentration (wt%)	MFI		
ENR(5)-g-PLA(95)	0.1	3.42	3.42	3.40
	0.2	2.83	2.93	2.87
	0.3	3.17	3.21	3.19
ENR(10)-g-PLA(90)	0.1	3.08	3.10	3.11
	0.2	2.01	2.03	2.11
	0.3	2.34	2.32	2.36
ENR(15)-g-PLA(85)	0.1	2.91	2.92	2.92
	0.2	1.25	1.25	1.26
	0.3	2.43	2.43	2.44
ENR(20)-g-PLA(80)	0.1	1.66	1.66	1.66
	0.2	0.93	0.93	0.94
	0.3	1.36	1.36	1.36

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Presentations:

1. Pairote, P.; and Magaraphan, R. (2012, December 11-15) The effect of temperature and catalyst content on polylactide-g-epoxidized natural rubber at the Polymer Processing Society 28th Annual Meeting, Pattaya, Thailand.
2. Pairote, P.; and Magaraphan, R. (2013, April 23) Polylactide compounding for injection molding product at the 4th Research Symposium on Petrochemical and Materials Technology and the 19th PPC Symposium on Petroleum, Petrochemicals, and Polymers, Bangkok, Thailand.
3. Pairote, P.; and Magaraphan, R. (2013, May 21-24) Preparation and characterization of polylactide and epoxidized natural rubber compounding at the 3rd International Symposium Frontiers in Polymer Science, Sitges, Spain.