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Title: Preparation and Characterization of Stereocomplex thin film interfacial toughness enhancement by Silane agent

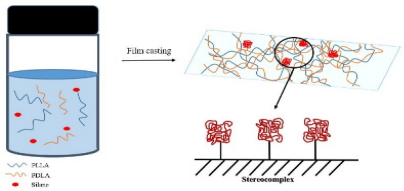
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Keywords: Polylactide, Stereocomplex, alkoxysilane, Mechanical property, renewable material, nanoscience

I. Abstract

Poly (lactide) (PLA) has received extensive attention because of biodegradability, and renewable material. However, PLA has thermal limitation and brittleness. To more enhance thermal property and mechanical property, mechanical property and thermal property were achieved by stereocomplexation and adding silane agent. Adding a low amount of silane agent (1-5wt %) can improve mechanical property. Silane agent with functional end group formed a rubbery silane PLA core shell gel through condensation and grafting.



II. Materials and Experimental

Materials

D-lactide/ L-lactide monomer, Tin (II) 2-ethylhexanoate 1-dodecanol,(3Aminopropyl)triethoxysliane(APTES),3(triethoxysilyl)propylisocyanate(ICPTES),Trimethoxymethylsliane(MTMS), Stannous Octoate were obtained from Sigma. Chloroform (> 99.5%) was obtained from Daejung chemical.

Experimental

PLLA/PDLA (1:1) were dissolved in chloroform. A amount of silane agent (1%-5%) was added to PLLA/PDLA and stirring under 400rpm overnight to allow the completion of the reaction at room temperature. Blending solutions of PLLA/PDLA and Silane agent are stirred by using ultra sonic for 1h to improve dispersion of silane hybrid gel.

Composition	Stress (MPa)	Modulus (GPa)	Elongation (%)
PLLA/PDLA	55.68 ± 4.33	20.73	16.46 ± 4
ICPTES 1%	57.54 ± 4.19	19.25	38.71 ± 5
ICPTES2.5%	49.55 ± 2.97	18.76	89.18 ± 4
APTES 2.5%	55.69 ± 3.22	20.29	33.08 ± 4
MTMS 2.5%	52.09 ± 4.10	18.85	38.64 ± 6

Table.1 Mechanical Properties of Stereocomplex/Silane

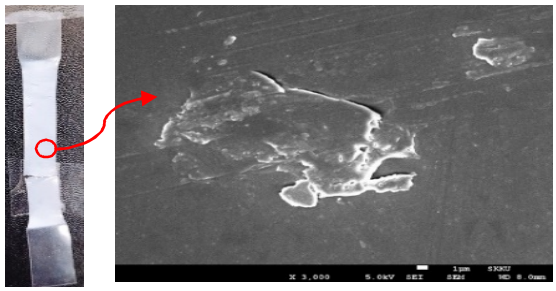


Figure2. Formation of Stereocomplex/Silane rubber

IV. Conclusion

We confirmed that the gel improves the mechanical properties without loss of modulus and stress. We can confirm that the resulting exhibit increased strain a break 16.46% to 92.94% while maintaining other mechanical properties such as stress and modulus.

V. Reference

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VI. Biography

Jieun Jeong who is presenting author finished her undergraduate course from Gachon University and studied Master course from Sungkyunkwan University.

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