

Title: Study of silane treatment on poly-lactic acid(PLA)/sepiolite nanocomposite thin films

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Abstract: Poly-lactic acid (PLA) nanocomposite film was prepared with untreated and silane treated sepiolite through solution casting method. Sepiolite is found to be promising nano inorganic filler used to prepare biodegradable PLA nanocomposite films. The effect of sepiolite loading on the thermal, mechanical, gas permeability, and water vapor permeability (WVP) properties of the films was investigated. X-ray diffraction analysis revealed the crystallinity index and well dispersed sepiolite in PLA/sepiolite thin films. By modifying sepiolite, depending on the nanoclay content, the mechanical properties of films were enhanced. PLA/sepiolite films exhibited improved gas barrier and WVP properties compared to neat PLA. The scanning electron microscope results demonstrated that there is a good interface interaction between sepiolite and PLA. The surface treatment of sepiolite increased the adhesion of the PLA matrix to the sepiolite nanoclay which yielded better mechanical properties of the films as compared to pure PLA. It was observed after 1.5% wt sepiolite, nano-filler tended to agglomerate, therefore mechanical and barrier properties of films decreased.