

Properties of linear poly(lactic acid)/polyethylene glycol blends

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Source: POLYMER ENGINEERING AND SCIENCE **Volume:** 52 **Issue:** 1 **Pages:** 108-116 **DOI:** 10.1002/pen.22052 **Published:** JAN 2012

Abstract: Poly(lactic acid) (PLA) has great potentials to be processed into films for packaging applications. However, film production is difficult to carry out due to the brittleness and low melt strength of PLA. In this investigation, linear PLA (L-PLA) was plasticized with poly(ethylene glycol) (PEG) having MW of 1000 g mol⁻¹ in various PEG concentrations (0, 5, 10, 15, and 20 wt%). In relation to plasticizer content, the impact resistance and crystallinity of L-PLA was increased, whereas a decrease in glass transition temperature and lower stiffness was observed. Nevertheless, the phase separation has been found in samples which contained PEG greater than 10 wt%. The dynamic and shear rheological studies showed that the plasticized PLA possessed lower viscosity and more pronounced elastic properties than that of pure PLA. Both storage and loss moduli decreased with PEG loading at all frequencies while storage modulus exhibited weak frequency dependence with increasing PEG content. POLYM. ENG. SCI., 2012. (C) 2011 Society of Plastics Engineers

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