Rheological and morphological effect of clay nanoparticles within Poly(lactic acid)/elastomer blend

안정현, 홍정숙, 안경현†
서울대학교
(ahnnet@snu.ac.kr†)

Poly(lactic acid) (PLA), an aliphatic polyester chemically synthesized from bio-derived monomers is biodegradable, but it is brittle. In this research, elastomers, natural rubber and thermoplastic polyurethane were designed to play a role as a second polymer to toughen PLA. Depending on the composition of the binary blend and interfacial bonding between two polymers, blend morphology changes along with different mechanical properties like tensile strength and elongation at break point. For additional toughening effect, plate-like clay particles are introduced. Natural clay and organically modified clay particles lead to different rheological behavior along with tensile properties. Linear viscoelasticity was measured to detect the difference in blend structure and particle network within the blend. Tensile properties were obtained from uniaxial tensile test under room temperature condition. Differential scanning calorimetry, scanning and transmission electron microscope were additionally conducted to see their thermal behavior and to directly detect the blend morphology and clay localization within the blend.