

# EFFECT OF INORGANIC FILLER ON RHEOLOGICAL PROPERTIES AND MORPHOLOGY OF POLYLACTIC ACID(PLA)/LOW-DENSITY POLYETHYLENE(LDPE) BLENDS

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## ABSTRACT

Among the biodegradable polymers, polylactic acid (PLA) is considered a promising material to solve the environmental pollution caused by plastic waste. However, PLA has weak mechanical properties such as brittleness and poor processability. For this reason, some researchers have tried polymer blend with materials that can compensate for the weaknesses of PLA[1]. In this study, low density polyethylene (LDPE), which shows strain hardening behavior in elongational viscosity, was used as the dispersed phase to overcome the disadvantage of PLA. To improve compatibility between PLA and LDPE, we added three different inorganic fillers, hydrophilic fumed silica, hydrophobic fumed silica and hydrophilic organoclay as compatibilizer. To evaluate the compatibilizer effect of various fillers, linear viscoelastic properties from small amplitude oscillatory shear (SAOS) test and nonlinear viscoelastic properties from elongational test are measured. In addition, we investigated morphology obtained by transmission electron microscopy (TEM) and scanning electron microscope (SEM) to check the location of filler and droplet size of dispersed phase. And we have studied the relation between rheological properties and morphology in PLA/LDPE blend systems.

## REFERENCES

1. Lee, S.K., Kim, M.G., Song, H. Y., Hyun, K. Characterization of the effect of clay on morphological evaluations of PLA/biodegradable polymer blends by FT-rheology. *Macromolecules*, **52**, 7904-7919., 2019. <https://doi.org/10.1021/acs.macromol.9b00800>.