

A Study on the Change of Tackiness and Properties of Polyolefin Elastomer (Poe) Film by the Addition of Silica

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Abstract

Polyolefin elastomer (POE) is a type of thermoplastic elastomer (TPE) obtained by copolymerization of ethylene and α -olefin by metallocene catalysts. The molecular structure of POE is mostly composed of hard segments, but some amorphous areas exist, so it has excellent processing characteristics of thermoplastic, as well as flexibility and elastic recovery. Using these properties, it is mainly used in automobiles, cables, and flexible packaging films. However, when a POE film having a thickness of 30 μm or less is manufactured, the surface tackiness is high, causing process problems such as sticking phenomena (blocking) between film layers. Therefore, in this study, silica (SiO_2) was added as an anti-blocking agent to control the surface tackiness of the POE film, and changes in thermal and mechanical properties were observed accordingly. After compounding the POE resin with silica powder, a film was manufactured at a constant temperature and pressure using a hot press machine. Glass transition temperature (T_g) and thermal conductivity of the film were analyzed through DSC and laser flash, and the surface tackiness was evaluated through probe tack test. Additionally, morphology was observed through SEM-EDS analysis, and mechanical properties were measured using UTM. Through the results, the effects of silica on the surface tackiness and properties of the POE film were considered.

Keywords: anti-blocking agent, POE film, silica powder, thermal and mechanical properties, thermoplastic elastomer