P-2-03

Preparation and Characterization of Epoxy/Imide Resins for EMC

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Polyimide (PI) is one of important engineering plastics, and generally it has special properties such as low dielectric constant, low thermal expansion coefficient, excellent chemical resistance and mechanical strength. Due to those properties, PI has been interested in many research fields mainly electric materials. Epoxy resin has good physical and mechanical properties. It has used in extensive industrial applications, in particular, in the field of electric device insulation.
In this study, we attempted to enhance thermal stability of epoxy molding compound (EMC) and to improve mechanical property of that by using synthesized toughener containing imide group for diode insulator, vehicle electric component.. This study was primarily focused on synthesizing of modified imide. The modified imide, DIDa, was synthesized from the reaction of trimellitic anhydride (TMA) and methylene dianiline (MDA), or oxy-dianiline (ODA) in NMP solvent. The synthesized DIDa was mixed with Epoxy resin (YD-128) and curing accelerator.
From the results of DSC, EA, 1H-NMR and FT-IR, we confirmed that DIDa was synthesized. The curing behavior of Epoxy/Imide resin was investigated from real-time FT-IR equipped with heating chamber and controller. Through real-time FT-IR spectra, we confirmed that Epoxy/Imide resin was cured, and peak of epoxide group, 920 cm-1, was reduced as increasing curing time. From the TGA results, thermal stability of Epoxy/Imide resin was increased with increasing imide contents, and also mechanical properties were measured by UTM.

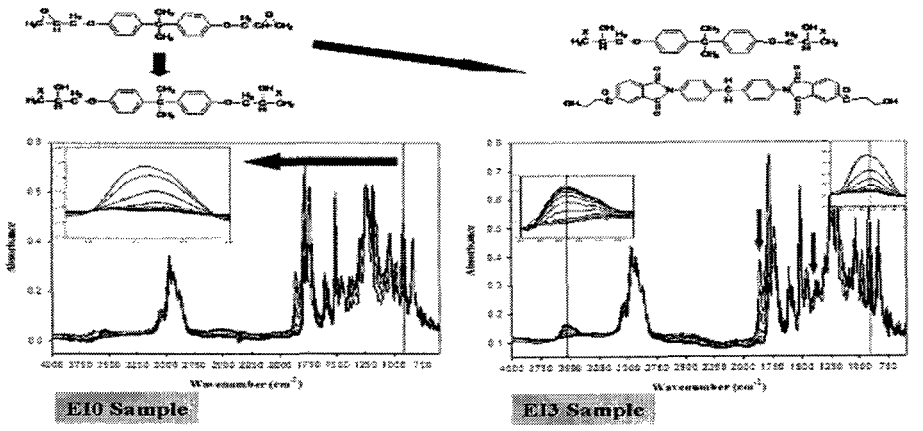

Figure 1. Curing Behavior of Real-Time FT-IR; EI0 sample: without Imide group, EI3: within Imide group of 3 wt%.

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