

Influence of post-curing and coupling agents on polyurethane based copper filled electrically conductive adhesives

Abstract

Effects of post curing and silane coupling agents with different functional groups such as epoxy, isocyanate and ureide on the electrical and mechanical properties of copper (Cu) filled electrically conductive adhesives (ECAs) were studied. Micron-sized Cu particles were used as conductive fillers and polyurethane resin was applied as the adhesive material. Significant differences could be observed on the as cured electrical resistivity and shear strength of the Cu filled ECAs joints prepared with different silane coupling agents. Silane coupling agents functionalized with epoxy groups yielded the lowest electrical resistivity and highest shear strength among the ECAs in this study. Besides, effect of post-curing at 170 C for 1 h on the ECAs was also investigated. Results showed that ECAs after post-curing exhibited enhanced electrical conductivity and shear strength compared to the as cured ECAs.

Keywords

Adhesive materials; Conductive fillers; Electrical and mechanical properties; Electrical conductivity