

# Electrical reliability of different alloying content on copper alloy fillers in electrically conductive adhesives

## Abstract

The thermal stability and electrical reliability of electrically conductive adhesives (ECAs) filled with Cu fillers alloying with different amount of Ag and Mg (0.2-1.5 at.%), respectively, were studied by comparing their electrical resistivity under high temperature exposure at 125 and 85 °C/85% RH for 1,000 h. Results showed that the Cu-Ag filled ECAs were superior to Cu-Mg filled ECAs in terms of thermal stability during aging under high temperature exposure and high humidity condition. A final resistivity on the order of  $10^{-4}$  Ω.cm could be maintained for Cu-Ag filled ECAs after aging at 125 °C for 1,000 h. Cu-Mg filled ECAs showed relatively high electrical resistivity compared to Cu-Ag filled ECAs. Resistivity of Cu-Mg filled ECAs increased rapidly over time during high temperature exposure at 125 °C except for Cu-0.5 at.% Mg filled ECA which was thermally stable after 400 h of aging. The ECAs in this study could withstand high temperature exposure at 125 °C better than aging under a combination of elevated temperature and high humidity at 85 °C/85% RH.