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Effect of Different Epoxy Materials During LED Wire Bonding Encapsulation Process Using CFD Approach

Abstract

There are several issues concerning high-power LED applications that affect the functionality and reliability of the LED. The most common problem that occurred in LEDs during the encapsulation process is wire deformation which can affect the life expectancy of the LED. The aim of this present study is to analyze the influence of different epoxy materials during the LED encapsulation process. In this study, ANSYS Fluent is utilized to simulate the volume of the epoxy materials being dispensed onto the LED by utilizing the volume of fluid (VOF) strategy. The simulation is conducted by varying the types of epoxy materials (ERL-4221, EMC, and D.E.R.-331). An experimental test was conducted to validate the final structure of the epoxy materials obtained from the simulation setup. The final form of the EMC and ERL-4221 resembled a hemisphere, consistent with the experimental finding. However, D.E.R.-331 is an exception since its final construction was not perfectly hemispherical.

Keywords

Computational fluid dynamics; Encapsulation process; Epoxy; Wire bonding