

## **Mixing optimization of Sn-Cu-Si<sub>3</sub>N<sub>4</sub> via powder metallurgy route for composite solder fabrication**

### **Abstract**

The aim of this study was to optimize the mixing process of a composite solder fabricated via powder metallurgy route, before details study were conducted in the next stage. Powder of Sn, Cu and Si<sub>3</sub>N<sub>4</sub> were carefully weighted, mixed and blended in a mechanical alloying machine. The speed of rotation for the jar was kept constant while the time of mixing was varied. Si<sub>3</sub>N<sub>4</sub> were added to the Sn-0.7Cu solder as reinforcement. Upon completion of mixing process, the mixed powders were later compacted into a thin disc. The compacted samples were then sintered in a horizontal tube furnace. Microstructural examinations by using SEM were conducted in order to analyze the distribution of Cu and Si<sub>3</sub>N<sub>4</sub> particles. With the assistance of ImageJ software, average particle distributions were calculated. Results showed that the best particle distributions were achieved when the mixed powder were blended for 6 hours.

**Keywords;** Composite, Lead-Free Solder, Powder Metallurgy, Silicon Nitride, Sn-0.7Cu