

## **Research Advances of Composite Solder Material Fabricated via Powder Metallurgy Route**

### **Abstract**

Researches and studies on composite solder have been done by many researchers in an effort to develop viable lead-free solders which can replace the conventional lead-based solders as lead is considered as toxic. Solder materials developed by composite approach showed improvement in their properties and importantly it improved their service performance when compared with solder materials developed by other methods. This paper reviews the solder properties of various types of composite lead-free solder that were fabricated via powder metallurgy route. The fabrication processes of the composite solder material by using powder metallurgy route which involved mixing the powder homogeneously, compaction of the mixed powder and sintering the green body were discussed in detail. The types of reinforcements used in order to enhance its properties and the roles of the reinforcement used were also discussed in detail. Properties of a desirable composite solder and the effects of the reinforcement addition to the composite solder microstructure, changes in its wettability and improvement of its mechanical properties were later discussed in this paper. In conclusion, by reviewing various research advances in composite solder material, a solder material with high solder joint reliability at elevated temperature have yet to be found. Thus, a novel composite solder material with higher solder joint reliability at room and elevated temperature was proposed.

**Keywords:** Composite, Lead-Free Solder, Powder Metallurgy