




# Effects of tin particles addition on structural and mechanical properties of eutectic Sn–58Bi solder joint

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## ABSTRACT

Due to the inherent environmental and health toxicities associated with lead, the use of environmental friendly lead-free solder materials has become an unavoidable trend in the electronic packaging industry. Sn-58Bi alloy is gaining attention for its good material properties such as low melting point, reliability and high tensile strength. The presence of the bismuth-rich phase increases the brittleness of Sn-58Bi alloy. The purpose of this study is to suppress the brittleness of Sn-58Bi alloy by the addition of different wt% (0, 10, 20, 30) of Sn powder. The powder metallurgy method was used to prepare the samples. Scanning electron microscopy and energy-dispersive X-ray analysis were done to study the structural properties and a tensile test was done by a universal tensile machine to study the mechanical properties. The results reveal that the Sn particles partially dissolved in the Sn-58Bi solder matrix. The dissolution of Sn particles significantly improved the mechanical strength by 30%, suppressed the brittleness and improved the strain value by 1.3 times.

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