

Transient Liquid Phase Bonding Technology of Bi-Ni System for High-Temperature Electronics

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Abstract

A novel transient liquid phase bonding (TLPB) was developed in Bi-Ni system as a reliable lead-free solder alternative. Homogenous bond was produced via isothermal solidification at reflow temperature that has higher working temperature. The bonding layer was prepared through i) sputtering deposition and ii) powder metallurgy technique. Mechanical properties were investigated by testing bonded samples under shear stress. Scanning electron microscopy and energy dispersive X-ray spectrometer were employed to characterize the detailed microstructure within the bonding area. It was shown that two intermetallic phases, Bi_3Ni and BiNi , along with the remaining Bi, are responsible for the properties of TLPB.