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The Effect of Ni on the Microstructure and Behaviour of the Sn-Cu Eutectic Lead-free Solder

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While the Ni-stabilized Sn-0.7Cu alloy is now well established as a viable lead-free solder in large scale commercial printed circuit board assembly the effect of Ni is not yet fully understood. It is likely that the effect is related to the preferential incorporation of the Ni into the crystal structure of the Cu_6Sn_5 intermetallic but this effect needs to be further quantified and related to the observed behaviour in production soldering. In this paper the results of DSC and microstructural analysis are reported and the possible connection with the performance of the solder proposed. These results suggest that the Ni influences the nucleation and growth of the intermetallic with consequential impacts on solder flow and joint appearance.