

Microstructural Evaluation of Low and No-Ag, Bi-Containing Pb-Free Solders

Authors: Eva Kosiba, Polina Snugovsky, Doug Perovic

Company: Celestica Inc. and University of Toronto

Date Published: 5/19/2015 **Conference:** ICSR (Soldering and Reliability)

Abstract: This paper describes the solidification characteristics of solder joints formed using three different Low (or no) Ag, Bi-containing Pb-free alloys. It considers the effects of Cu dissolution, undercooling and IMC formation on the bulk solder. The formation of interfacial IMCs is also evaluated with both Cu-Sn and Cu-Ni-Sn systems being considered. This work also investigates the impact of Bi on both the bulk solder and the interfacial IMC. Of the three solders being evaluated, two have a near-eutectic composition in a quaternary system, while a third has a composition along the eutectic valley of a ternary compound. The properties and microstructures of each are compared to SAC305. This study includes the evaluation of solder joints formed on QFPs, and therefore primarily made up of the alloy under study as well as solder joints formed using BGAs having a solder ball composition of SAC305; therefore the combined solder joint is made up of the alloy under study mixed with SAC305. This work considers the solidification which occurs in a typical assembly reflow process and is therefore representative of "as manufactured" product.

Key Words:

low melt solder, bi, solidification

Full article can be found:

https://www.smta.org/knowledge/proceedings_abstract.cfm?PROC_ID=4387