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Developments in the Understanding of the Ni-modified Sn-Cu Eutectic as the Basis for a Reliable Lead-free Solder

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As the move to lead-free soldering gathers pace the Ni-modified Sn-Cu eutectic has maintained a very strong position in the global electronics industry as the major alternative and complement to alloys based on the Sn-Ag-Cu system. In wave soldering the number of machines running the alloy in commercial production has increased to over 700 and the use of the alloy in the hot air solder levelling process for the application of a solderable lead-free finish for printed circuit boards is also growing. An unanticipated development has been its increasing use in reflow where peak temperatures in the range 245-255°C can be tolerated. As the same time the limitations of the unmodified Sn-Ag-Cu system as a basis for lead-free solders have become apparent. Fundamental research is starting to elucidate the mechanism by which the Ni addition affects the behaviour of Sn-0.7Cu as a practical solder. In this paper the current understanding of the effect of Ni on the Sn-Cu eutectic system will be reported and the implications for its performance as a lead-free solder discussed.