عنوان مقاله:

Numerical and Experimental Study of Synthesized Lead-Free SAC۲۵۷-۲.۵Bisolder

محل انتشار:

دومین کنفرانس بین المللی کاربرد مواد و ساخت پیشرفته در صنایع (سال: 1401)

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خلاصه مقاله:

Because of lead's high toxicity, being environmentally hazardous, and health issues, lead-tin solders arerarely being used these days, and have been overtaken by the lead-free solders. Owing to its favorablemechanical and physical properties, SAC۲۵۷ has become one of the most widely used lead-free solder alloysin the world. The physical and mechanical properties of SAC۲۵۷ with Cu substrate were investigatedexperimentally, and the alloy's mechanical behavior under the tensile-shear test was simulated using thefinite element method with the ABAQUS software package. The microstructure consists of primary β-Snwith uniformly distributed bismuth throughout the matrix and secondary eutectic intermetallic phases suchas dendritic Cu۳Sn in the interface and needle type Ag۳Sn in the matrix. As a result of the fluxless solderingprocess, some porosities were unavoidably observed in the microstructure. Because of the formation ofintermetallic components in the interface, the microhardness of the substrate was slightly increased near theinterface. The finite element model agrees well with the experimental test, with an average error of ۳%. Andalso two possible locations where might the fracture in real-time test occurs were obtained; one inside thesolder joint and the other one in the adjacent region of the solder joint.

کلمات کلیدی:

SAC۲۵۷, Lead-free solder, Tensile-shear, Abaqus, Physical and mechanical properties

لینک ثابت مقاله در پایگاه سیویلیکا: