Short Communication

Investigation of Electrochemical Migration of Tin and Tin-Based Lead-Free Solder Alloys under Chloride-Containing Thin Electrolyte Layers

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The electrochemical migration behaviors of pure tin and tin-based lead-free solder alloys under thin electrolyte layers containing chloride ions were investigated. Impacts of the applied bias voltage and thickness of electrolyte layer on the electrochemical migration processes were studied in detail. Results showed that the mean time to failure first increased and then decreased with increasing electrolyte-layer thickness. The maximum value of failure time was presented at a 200- μm -thickness. The higher bias voltage was applied, the faster rate of dendrite growth was. The migration element of tin-based lead-free solder alloys was tin and the formed dendrites displayed tree- and feather-like structures. Mechanisms relevant have been proposed to explain the electrochemical migration behaviors of tin and tin based solder alloys.

Keywords: Solder alloy; Corrosion; Electrochemical migration; dendrite

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