

Effect of isothermal aging 2000 hours on intermetallics formed between Ni-Pd-Au with Sn-4Ag-0.5Cu solders

ABSTRACT

The present study investigated the effect of isothermal aging up to 2000 hours on the intermetallics formed between Sn-4Ag-0.5Cu lead free solder on electroless nickel electroless palladium immersion gold surface finish (Ni-Pd-Au). For all parameters, aging have an effect of changing the intermetallic morphology to coarser and dense structure. The intermetallic compound formed for the interconnection of the lead free solder changes with increased aging time from (Cu,Ni)₆Sn₅ compound to (Ni,Cu)₃Sn₄. At the end of the 2000 hours aging time, it changes to Ni₃Sn₄. This is the effect of Cu element availability during the intermetallics growth process. Starting from as reflow process, (Pd, Ni)Sn₄ intermetallics formed near the interface of the solder joint. The formation of the (Pd, Ni)Sn₄ intermetallics act like a diffusion barrier to slow down the growth of interface intermetallics. Lastly, Au element was detected in the Pd-Sn based intermetallic after aging more than 1000 hours.

Keyword: Lead free solders; Isothermal aging; Au/Pd/ Ni; Sn-4Ag-0.5Cu; Interfacial reaction