

Effect of Relative Humidity on Corrosion Behavior of SN-0.7Cu Solder under Polyvinyl Chloride Fire Smoke Atmosphere

Authors : Qian Li, Shouxiang Lu

Abstract : With the rapid increase in electric power use, wire and cable fire occur more and more frequent. The fire smoke has a corrosive effect on the solders, which seriously affects the function of electronic equipment. In this research, the effect of environment relative humidity on corrosion behavior of Sn-0.7Cu solder has been researched under $140 \text{ g}\cdot\text{m}^{-3}$ polyvinyl chloride (PVC) fire smoke atmosphere. The mass loss of Sn-0.7Cu solder increased with the relative humidity. Furthermore, the microstructures and corrosion mechanism were analyzed by using SEM, EDS, XRD, and XPS. The result shows that $\text{Sn}_{21}\text{Cl}_{16}(\text{OH})_{14}\text{O}_6$ is the main corrosion products and the corrosion process is an electrochemical reaction. The present work could provide guidance to the risk assessment for electronic equipment rescue after a fire.

Keywords : corrosion, fire smoke, relative humidity, Sn-0.7Cu solder

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