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

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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 g·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 $Sn_{21}Cl_{16}(OH)_{14}O_6$ 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.

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

Conference Title : ICFSST 2019 : International Conference on Fire Safety Science and Technology

Conference Location : London, United Kingdom

Conference Dates : September 25-26, 2019