Decomposition studies of no-clean solder flux systems in connection with corrosion reliability of electronics - DTU Orbit (05/12/2018)

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One of the predominant factors for accelerated corrosion in electronics is the intrinsic contamination on Printed Circuit Board Assemblies (PCBAs) originating from the soldering process used for component mounting. However, the amount, distribution, and morphology of flux residue vary considerably with specific soldering process and parameters, while most important factors are the flux chemistry and its decomposition characteristics. Active parts of the flux residue can cause increased water absorption due to their hygroscopic nature and in solution they will increase leakage current and corrosion such as electrochemical migration resulting in intermittent or permanent failures. This paper summarizes the investigations on decomposition of some typical no-clean flux systems (WOA based) which are used today for the electronic manufacturing. The change in flux chemistry was studied as a function of temperature (simulating the manufacturing process) using Differential Scanning Calorimetry (DSC), Ion Chromatography (IC), Fourier Transform Infrared Spectroscopy (FT-IR), and an aggressivity test method using a patented gel method. Effect of flux residue on the corrosion reliability was investigated by exposing the contaminated PCBA parts to varying humidity and measuring the resulting leakage current. Results revealed a significant influence of flux chemistry including the amount of WOAs, while aggressiveness of the residue seems to vary with content and type of WOAs, and their nature of decomposition.

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