Corrosion investigation of material combinations in a mobile phone dome-key pad system -
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Mobile phone dome-key pad system is the device that connects the phone keys to the printed circuit board (PCB). The material combination for a typical dome-key pad system is Ag/AISI 202 steel for the dome and Au/Ni/Cu for the key pad. Under humid conditions dome-key pad system is susceptible to multiple corrosion problems. In this paper, the corrosion susceptibility of dome (Ag/AISI 202 steel) and key pad system (Au/Ni/Cu) is investigated with an aim to understand the corrosion performance of such multi-material combinations in chloride containing environment. Investigation includes microstructural studies, polarization measurements using microelectrochemical technique, salt spray testing, and corrosion morphology analysis. The immersion Au layer on pads showed pores, and rolled bonded silver layer on dome had cracks and kinks. The difference in electrochemical behaviour of the metallic layers together with imperfections in the top layer results in severe pitting due to galvanic coupling. However, corrosion performance of the pads was much worse than domes. The results are applicable to a broad spectrum of PCB parts where similar material combinations are employed, especially Au/Ni/Cu.

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