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## Atmospheric corrosion factors of printed circuit boards in a dry-heat desert environment: salty dust and diurnal temperature difference

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**Abstract:** The climate in Turpan is perennial drought with little rainfall, which usually results in the corrosion of metals. This weak corrosion can cause the paralysis of electronic components in service conditions. To study the corrosion mechanism associated with copper-clad plate (PCB-Cu) in a dry-heat desert environment, Turpan (China) was elected as an outdoor exposure site. The morphologies of the PCB-Cu and the composition of the corrosion products were analyzed. In addition, the corrosion behavior of PCB-Cu in a simulated indoor environment was also investigated. The results showed that the corrosion morphology was halo-shaped in the initial corrosion stage, which was attributed to water condensation on dust due to the large diurnal temperature difference of the environment.

**Keywords:** Copper-clad plate; Atmospheric corrosion; Raman spectroscopy; Corrosion mechanism

### 1. Introduction

Printed circuit boards (PCBs) are widely used in various electronic applications; however, they are prone to corrosion in their service environments [1–3]. Many factors influence the corrosion of PCBs, including temperature, optical radiation, relative humidity (RH) and the presence of atmospheric contaminants [4, 5]. In China, Turpan city has a unique atmospheric environment [6, 7]. The climate in Turpan is typical of a dry, continental desert climate that

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