

# Influence of Bath Temperature on Electroless Ni-B Film Deposition on PCB for High Power LED Packaging

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High power light-emitting diodes (LEDs) are widely used in many device applications due to its ability to operate at high power and produce high luminance. However, releasing the heat accumulated in the device during operating time is a serious problem that needs to be resolved to ensure high optical efficiency. Ceramic or Aluminium base metal printed circuit boards are generally used as integral parts of communication and power devices due to its outstanding thermal dissipation capabilities as heat sink or heat spreader. We investigated the characterisation of electroless plating of Ni-B film according to plating bath temperature, ranging from 50°C to 75°C on Ag paste/anodised Al (Al<sub>2</sub>O<sub>3</sub>)/Al substrate to be used in metal PCB for high power LED packing systems. X-ray diffraction (XRD), Field-Emission Scanning Electron Microscopy (FE-SEM) and X-ray Photoelectron Spectroscopy (XPS) were used in the film analysis. By XRD result, the structure of the as deposited Ni-B film was amorphous irrespective of bath temperature. The activation energy of electroless Ni-B plating was 59.78 kJ/mol at the temperature region of 50~75°C. In addition, the Ni-B film grew selectively on the patterned Ag paste surface.

**Keywords:** Ceramic/metal PCB, Electroless nickel plating, Selectivity, Power LED, Amorphous, Activation energy