

Through hole copper plating on printed circuit board activated with a conducting layer of polyaniline

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This study is based on development of a simple method to deposit copper on printed circuit boards (PCB) to facilitate through hole copper plating. A PCB is usually a plastic material consists of glass fiber and has no electric conductivity. There are single, double and multi layered PCBs with copper tracks. When the number of components becomes too much for a single sided board, double sided and multi layered boards are used. In these types of boards, electrical connections between the copper tracks of different layers are made by copper plating the inner walls of the holes. As the through hole plated boards commercially manufactured demands high cost, this study is focused on developing an efficient and simple method.

The method includes pre-treatment, activation and electroplating steps. In the activation step, the non-conducting PCB material is made electrically conductive by employing the conductive form of Polyaniline (PANI), in order to carry out an electroplating. The hydroxyl groups on the PCB surface are used to covalently attach aniline molecules which initiate the formation of a PANI layer, which ultimately results in a considerable amount of conductivity, sufficient for an electroplating. The PANI coated PCB's are subjected to copper electroplating by placing it as the cathode. The method is optimized by varying both electroplating conditions and activation conditions to obtain a better copper deposition. The selected electroplating conditions are electrolyte concentration, electroplating time and applied voltage. The activation conditions are varied by synthesizing PANI on PCB in different methods and the resistance of PCB was recorded.

The conductivity of PANI on PCB greatly influences the copper deposition. Varying only the electroplating conditions led only to a poor deposition whereas improvements in activation steps resulted in a good deposition. A smooth better deposition is obtained with improved conductivity and increased thickness of PANI even under moderate electroplating conditions. Good abrasion resistance and better adhesion of copper to the PCB is achieved in this method.