Palladium-free Surface Metallization of Polycarbonate Substrate by Inkjet-printing Technology

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Due to the requirements of smart phone, tablet, personal computer and notebook that network (WiFi,3G …) transfer speeds are much faster, the process of antennal design have to make more research and development. The first step of a traditional process is to mix metal catalysts with Polycarbonate (PC) substrate, the second step is to use laser for patterning, which the buried catalysts are exposed after the laser ablation process. If the exposed catalysts are uneven or insufficient, subsequent electroless copper plating will have some issues. Moreover, the laser tool is very expensive, it leads to a high cost process. This study will replace the traditional process with a direct inkjet printing process for cost saving.

In this study, we used inkjet printing technology to make patterns that we want. The patterns were directly defined by an inkjet printing tool.[1] The printed patterns could catch metal ions from an aqueous solution. Subsequently, metal ions were reduced by a reducing agent as catalysts for the following electroless copper deposition. After the copper electroless deposition, copper electroplating was employed to increase the copper thickness to a desired value. Lastly, we followed up the copper deposition with a nickel electroless deposition to protect the copper film from oxidation.

The environment-friendly Palladium-free surface activation technics can be applied not only for PC but also for Polycarbonate / Acrylonitrile Butadiene Styrene (PC/ABS), Polycarbonate / Glass Fiber (PC/GF) surfaces.

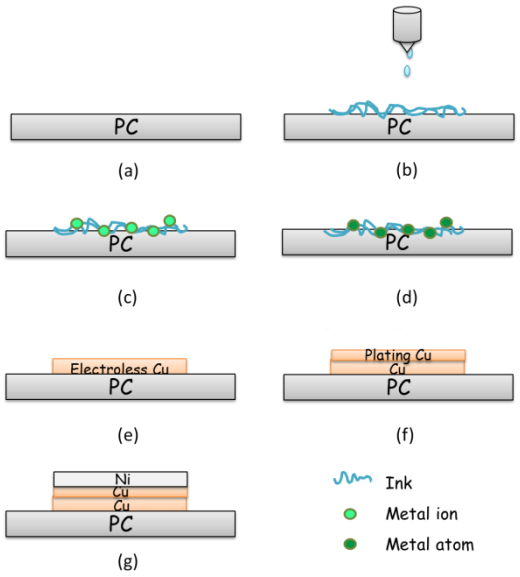

Figure 1. Schematic illustration of the metallization process of PC. (a) PC substrate (b) surface patterning (modification), (c) ion exchange, (d) reduction, (e) electroless copper deposition, (f) copper electroplating, (g) electroless nickel deposition.

References

1. Y. C. Liao and Z. K. Kao, ACS Applied Materials & Interfaces, 2012, **4**, 5109.