

## **Electroless plating of moisture-curable polyurethane undercoating films**

### **Abstract**

The compatibility of using moisture-curable polyurethane (MCPU) system as a thin undercoating layer with electroless plating process was evaluated. The characteristics of the MCPU before and after chemical etching treatment were analyzed using atomic force microscope (AFM), scanning electrode microscope (SEM), contact-angle measurements, and (Fourier-Transform Infrared) FTIR spectroscopy. We found that surface morphology and roughness of the MCPU is affected by curing period and etching times. A proper combination of curing period and etching times are critical for obtaining a fully metallized surface. All MCPU samples that were etched for 15 min show poor plating performance due to surface damage caused by mild etching treatment. A standard pull-off testing method (ASTM 4541) was used to evaluate the adhesion strength of nickel–MCPU. Only samples that were postcured for 4 days show influence of surface roughness on adhesion strength. On average, samples that were postcured for 7 days before electroless plating showed better adhesion of nickel–MCPU compared with samples that were postcured for 2 or 4 days. The results show that MCPU system can be used as a thin undercoating layer for electroless plating. It also offers smooth metal–polymer interface and therefore has the potential to be exploited for use in many electroless plating applications including in the decorative such as ornaments and display items and also in electronic industries.