

e-Cu:Check System

Monitoring of electroless copper electrolytes for LPKF-LDS[®] technology

Monitoring of electroless copper electrolytes used for plating LPKF-LDS[®] substrates is currently done by electroless plating of laser activated test samples for typically 30 min. After plating the thickness of the deposited copper layer is measured by x-ray fluorescence analysis. Due to the long exposure time in the electrolyte there is no quick response when the electrolyte is very reactive, therefore in the worst case the whole plating batch as well as the electrolyte is lost. Hence a new principle for quick detection of the activity of copper electrolytes used for the LPKF-LDS[®] technology has been developed.

Therefore special measuring probes with electrode structures and a laser activated sensor area were fabricated. For monitoring the electrolyte activity the probe is plugged in a special probe holder (1). Then the holder is dipped into the electrolyte. The dipping time is detected automatically by continuously measuring the impedance between the electrodes of the probe. In the electrolyte copper is deposited on the activated area between the electrodes. When first electrically conductive paths are formed a strong phase shift between current and voltage is detected. The time spread between dipping time and phase shift was identified as the rate of electrolyte activity. This value is given by the e-Cu:Check system (2). After measuring the used probe was replaced by a new one so that further measurements could be done. After a new make-up of the electrolyte the activity is low and has to be conditioned for plating of laser activated MID substrates. In (3) it is shown the „time to phase shift“ during conditioning the electrolyte. This value is continuously decreasing corresponding to an increasing electrolyte activity. The activity remains constant when the conditioning procedure is finished.


Application

- Determination of the activity of electroless copper electrolytes for LPKF-LDS technology
- Process optimization by short measuring time
- Quick detection of too reactive electrolytes


Features

- Dust and water proof housing (IP54) for measuring system and computer
- External touch panel for interaction
- Measuring probes and holder
- Software

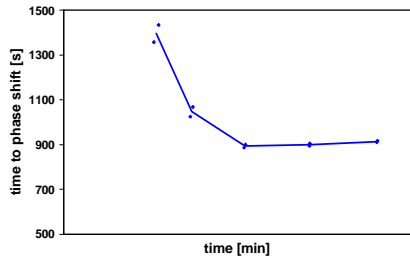
1: Putting the measuring probe in the holder



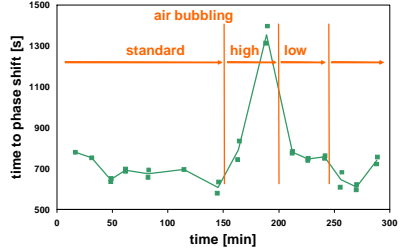
2: Measuring system with dust and water proof housing and touch panel



3: Electrolyte activity during conditioning



4: Influence of air bubbling on electrolyte activity



The electrolyte activity during plating can be varied strongly by changing the flow rate of air bubbling. Decreasing electrolyte activity at intensified air bubbling corresponds to an increasing "time to phase shift" (4). After subsequently reducing of air bubbling the electrolyte activity is increasing again.

Due to the fast response time of the new measuring principle quick interaction is achieved during production. Hence electrolyte activity can be adapted by control of air bubbling or

the plating charge can be taken out from the plating bath early enough.

The monitoring system was also extensively tested in production. It was shown that the system works very reliable.