CupraEtch™ DE – The new and “green” differential etch process for SAP manufacturing

Berlin, November 2012. One of the key manufacturing processes for enabling the construction of IC-substrates with semi-additive processes (SAP) and modified semi-additive processes (MSAP) is the so-called differential etch process. It leads to different etch rates on electroless and electroplated copper and is used for the circuitization of copper tracks in the IC-packaging industry.

Atotech’s new product, Cupra Etch™ DE, is based on iron sulfate etch. In this way, it differentiates itself from all known differential etch processes in the industry, which are based on sulfuric acid and hydrogen peroxide.

CupraEtch™ DE’s iron sulfate etch runs in parallel with a regeneration unit. Offering a unique ferric sulfate system, it effectively removes the seed layer of electroless copper. Meanwhile, the regeneration unit plates out the copper for recycling use. This leads to an elimination of undercuts, a reduced amount of waste water and thereby to reduced costs of ownership.

Advantages of CupraEtch™ DE

CupraEtch™ DE has many advantages over commonly used differential etch processes. The main advantages are:

- It’s superb etching capability effectively removes electroless copper seeds, while minimizing the occurrence of track undercuts
- It retains the contour of the finest conductors without undercuts at the foot
- The undercut-free circuitry enhances the reliability of IC-substrates
“This green differential etch process is environmentally friendlier than the commonly used differential etch process,” states Dr. Rami Haidar, Global Product Manager for Surface Treatment Technology at Atotech Deutschland GmbH in Berlin, Germany. “Its regeneration unit, which plates out the etched copper and regenerates the ferric component in the chemistry, reduces the amount of waste water generated from the differential etch process. This also leads to reduced costs of ownership.”

The differential etch process with CupraEtch™ DE

CupraEtch™ DE eliminates the draw-backs associated with the typical peroxide based etchants, such as:

- No feed and bleed operation is needed. Instead, it offers the possibility to regenerate solutions in bypass equipment. A considerable amount of chemical waste and the need for high waste treatment is therewith eliminated.
- CupraEtch™ DE does not etch three-dimensionally. Peroxide etchants etch three-dimensionally, causing undercuts of conductor tracks of several micrometers and affecting the mechanical stability of the track and its electrical properties.

Figure 1 and 2 show a comparison between cross section pictures of tracks after the differential etch process. In Figure 1, tracks were treated with a differential etch process based on sulfuric peroxide. Undercuts are clearly visible. Figure 2, however, does not show any undercuts on the conductor side walls: It has been treated with CupraEtch™ DE, the differential etch finisher.
Figure 1. Undercut found on sulfuric peroxide based differential etch treated sample

Figure 2. No visible undercut found on CupraEtch™ DE treated sample

For additional information, please contact Yvonne Fütterer, Marketing Specialist Electronics, at: +49 (0)30 349 85 – 978 or Yvonne.Fuetterer@atotech.com

About Atotech
With annual sales of €893 million, Atotech is one of the world's leading manufacturers of processes and equipment for the printed circuit board (PCB) industry and the decorative and functional electroplating industry. Committed to sustainability, Atotech develops technologies that minimize waste and reduce environmental impact. Atotech, a division of the Total Group, is headquartered in Berlin, Germany and employs about 3,800 people in over 40 countries.