

Intermetallic Corrosion Analysis Using Image-Pro® Premier

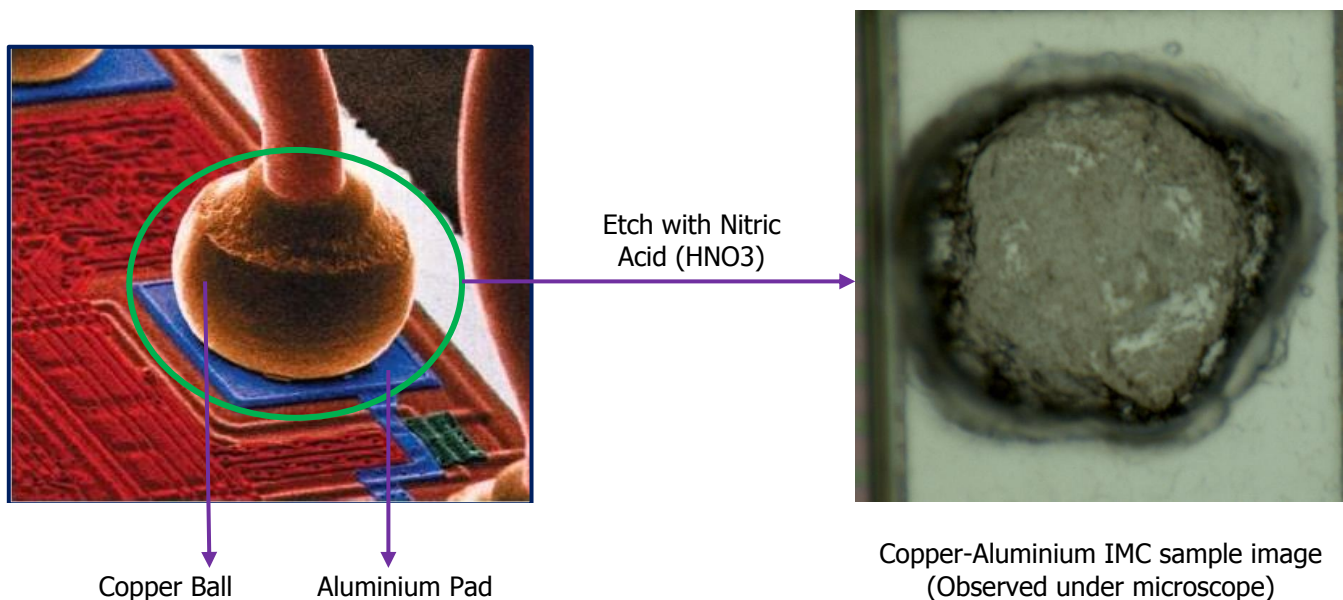
Semiconductors – Components manufacturing and Microelectronics Packaging

Introduction

Copper (Cu) wire bonding is a technique which is feasible and cost effective comparing to Gold (Au) wire bonding. In recent years, Cu wire bonding is widely been used for electrical applications especially in Semiconductors - components manufacturing, microelectronics packaging etc. Cu wire bonding with Aluminium (Al) alloys is inclined to corrosion. Electrochemistry of intermetallic compound (IMC) particles plays a significant role in finding the corrosion in Al alloys. This analysis is conducted mainly in Semiconductor industry which is manufacturing electronic components or packaging microelectronics.

Experimental Setup

A Copper-Aluminium sample is prepared through chemical etching for the intermetallic measurement. The prepared sample is observed under microscope to identify the amount of intermetallic growth and formation. Digital images of the sample would be acquired while observing under the microscope. The acquired images are analyzed to measure the IMC Area using Image-Pro Premier software from Media Cybernetics.

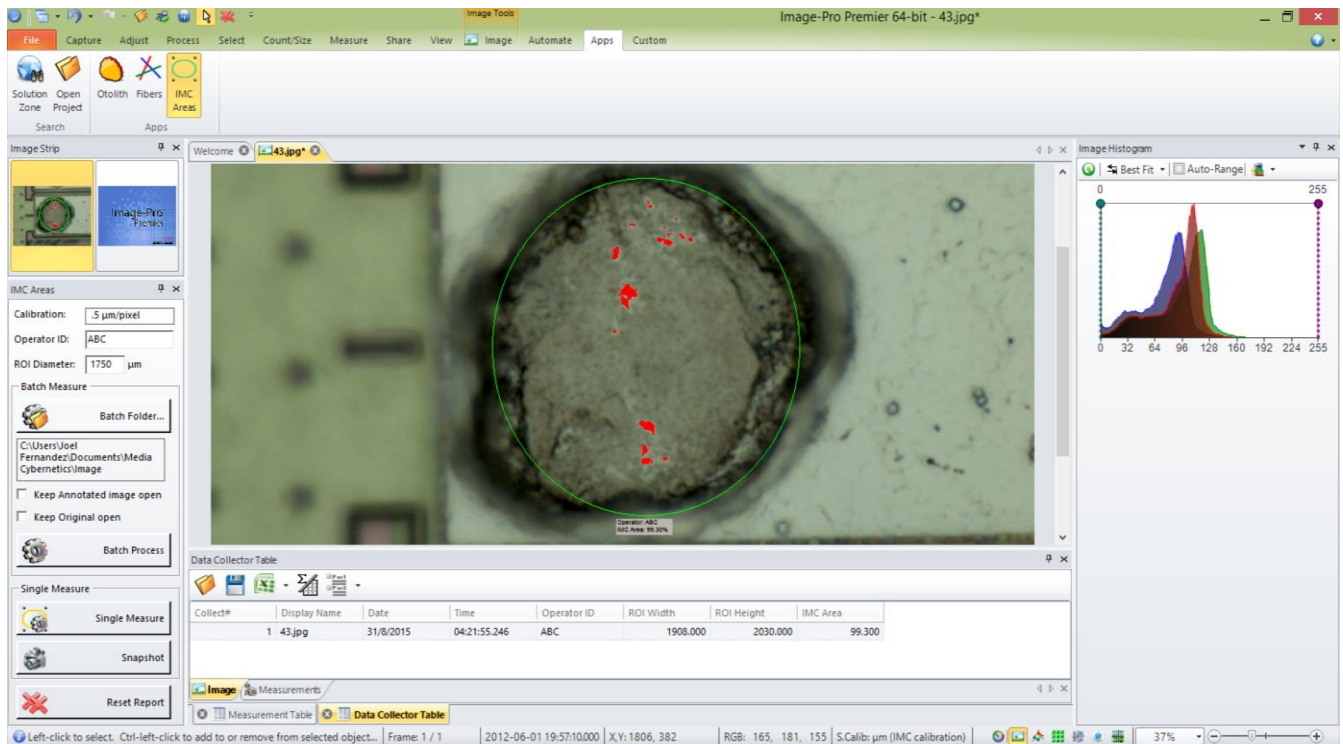


Methods

Chemical Etching is the common technique that is seen widely for the sample preparation. The sample preparation process is completed through different procedures depending on the electronic application of the component. One of the key factors was found to be etching temperature and different combination of Nitric Acid molar concentration.

Summary

Image-Pro Premier software assisted the analysis of digital images of this experiment. Image-Pro Premier software plays a very important role in measuring the IMC Area.



The user will be prompted to do segmentation thresholds referencing the Aluminium pad and to make a Region of Interest (ROI) selection over the contact point. This will report the percentage of the IMC Area within the ROI.

References

Below listed are our big customers who are using Image-Pro software worldwide for the IMC Area measurement.

- ASE Group
- STATS ChipPAC Ltd
- ASEN Semiconductors Co., Ltd.
- NXP Semiconductors
- UTAC Group
- Intel Corporation
- Amkor Technology
- ANST, China Resources Micro-Assembly Technology Co., Ltd.
- Leshan-Phoenix Semiconductor Co., Ltd.
- Jiangsu Changjiang Electronics Technology Co., Ltd.