

RESULTS OF METALLURGICAL STUDIES ON AN ELECTROPLATED COPPER STRUCTURE

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[Purpose]

To study the metallurgical property of electroplated copper structures and its impact on the RF high-power operation.

[Samples]

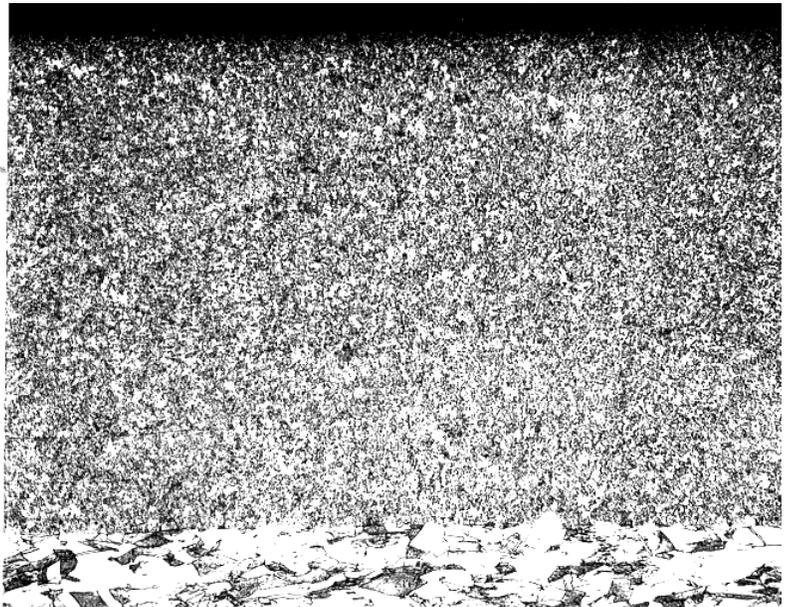
Joshua Song from APS of Argonne National Lab visited SLAC in the early March. He gave us a scratched muffin-tin structure fabricated by LIGA+ electroplating. The muffin-tin structure was plated on top of an OFE copper slab.

[Procedures]

The studies were performed by Chris Pearson of klystron department. The sample was cleaned first, then cut into three pieces. Optical micrographs of the interface between electroplated layer and the OFE copper slab were taken. Then the structure was put in the hydrogen furnace for heat treatment. After the heat treatment optical micrographs were taken for regions of interest. All those photo pictures were scanned into computer files in the TIFF format which can be incorporated in MS Word for both Mac and PC platforms. Please come see me if you need them for writing.

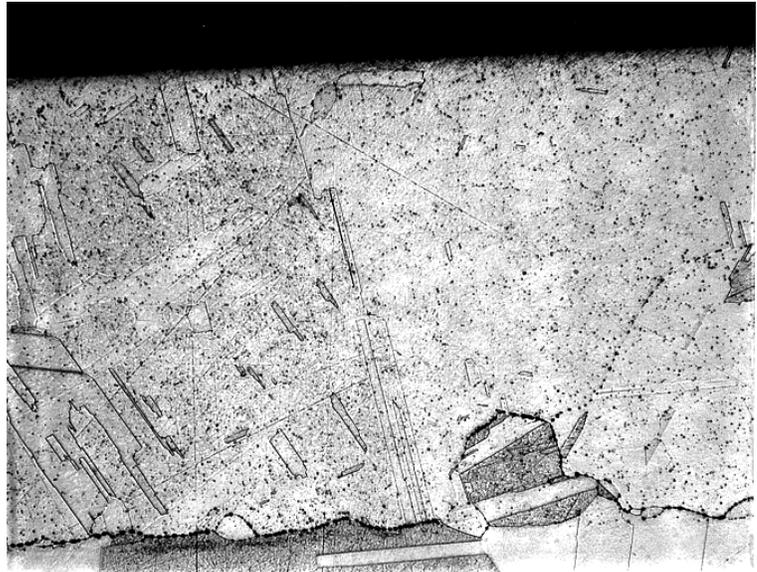
🍏 Prior to the heat treatment

- scan203.tif= interface between the plated copper and the OFE copper, before the heat treatment. Magnification 100X.



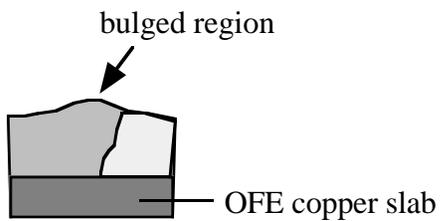
🍏 After the heat treatment

- scan202.tif= interface between the plated copper and the OFE copper, after the heat treatment. The top layer is the air, the middle is the plated copper, and the bottom is the OFE copper slab. Magnification 100X.



Some bulged regions were observed after the heat treatment.

- scan204.tif= the interface between the bulged region and the OFE copper, after the heat treatment. Magnification 100X.



- scan205.tif= the interface between the normal plated copper and the bulged region, after the heat treatment. The top layer is the air, the middle is the bulged and normal plated copper, and the bottom is the OFE slab. Magnification 100X.

