Electrochemical Controlled Synthesis of Au/Ni Nano-arrays and its Sintering with Ag NPs Paste

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doi: 10.20964/2020.08.80

Received: 8 March 2019 / Accepted: 18 June 2020 / Published: 10 July 2020

The microstructure gap between the nanopaste and the conventional pad led to the high practical connection temperature. In this paper, we focused on the preparation of the different microstructure Ni nanocone arrays and their sintering behaviors. The electrochemical behavior of ethylenediamine hydrochloride (EDH) on the Ni deposition was studied. The SEM, XRD, linear polarization and impedance spectroscopy analysis results showed that EDH could facilitate the oriented growth of nickel and decrease the polarization of electrodeposition. Different Ni nanocone arrays were prepared by tuning the EDH concentration, current density and solution temperature. The pads coated with Ni/Au nanocone arrays were connected with Ag NPs paste. The shear test result showed that the surface array microstructure played a significant role in enhancing the joint strength. When the nanocone bottom diameter was 150 nm, the joint hold the best shear strength.

Keywords: Ni nanocone arrays, Ethylenediamine hydrochloride, Ag NPs, Sinter, Shear strength

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