Effect of Thiourea on the Nanocrystalline-Copper Coating Prepared by Jet Electrodeposition

Hui Fan^{1*}, Sainan Cao², Yangpei Zhao³, Shankui Wang¹

¹ School of Mechanical and Electrical Engineering, Jiangsu Normal University, Xuzhou, 221116, China;

² Jiangsu Key Laboratory of 3D Printing Equipment and Application Technology, Nantong Institute of Technology, Nantong, 226002, China;

³ Jiang su Jiangzhu Institute, Xuzhou, 221116, China

*E-mail: xzfanhui@163.com

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Jet electrodeposition with the aid of thiourea was proposed in this paper to improve the deposition quality of copper coatings. The effects of the content in the electrolyte on the coating microstructures, morphologies and mechanical performances were examined. The results show that a dense nanocrystalline copper coating is fabricated with 10 mg/L thiourea addition. The average crystal size attains 29 nm. The preferred crystal orientation varies from (111) to (220) as the thiourea content in the electrolyte rises to 10 mg/L from 5 mg/L. The microhardness increases by 81%, and the tensile strength increases by 51%, using current density 400 A/dm² and at the thiourea concentration 10 mg/L.

Keywords: thiourea; jet electrodeposition; coating microstructures; properties

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