Accepted Manuscript

Fabrication of three-dimensional electrical patterns by swollen-off process: An evolution of the lift-off process

Mariam S. Mansouri, Boo Hyun An, Hamda Al Shibli, Hamad Al Yassi, Tawaddod Saif Alkindi, Ji Sung Lee, Young Keun Kim, Jong Eun Ryu, Daniel S. Choi

PII: S1567-1739(18)30156-1

DOI: 10.1016/j.cap.2018.06.001

Reference: CAP 4767

To appear in: Current Applied Physics

Received Date: 14 March 2018

Revised Date: 23 May 2018

Accepted Date: 1 June 2018

Please cite this article as: M.S. Mansouri, B.H. An, H. Al Shibli, H. Al Yassi, T.S. Alkindi, J.S. Lee, Y.K. Kim, J.E. Ryu, D.S. Choi, Fabrication of three-dimensional electrical patterns by swollen-off process: An evolution of the lift-off process, *Current Applied Physics* (2018), doi: 10.1016/j.cap.2018.06.001.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Fabrication of three-dimensional electrical patterns by swollenoff process: an evolution of the lift-off process

Mariam S. Mansouri^a, Boo Hyun An^a, Hamda Al Shibli^a, Hamad Al Yassi^a, Tawaddod Saif Alkindi^a, Ji Sung Lee^a, Young Keun Kim^b, Jong Eun Ryu^c, Daniel S Choi^{a,*}

^aDepartment of Mechanical and Materials Engineering, Khalifa University of Science and Technology, Abu Dhabi, PO Box 127788, UAE

^bDepartment of Materials Science and Engineering, Korea University, Seoul 02842, Korea ^cDepartment of Mechanical and Aerospace Engineering, North Carolina State University, Raleigh, IN 27695 USA

*Corresponding Author: Daniel Choi (daniel.choi@ku.ac.ae)

Abstract. We present a novel process to fabricate three-dimensional (3D) metallic patterns from 3D printed polymeric structures utilizing different hygroscopic swelling behavior of two different polymeric materials. 3D patterns are printed with two different polymers as cube shape. The surface of the 3D printed polymeric structures is plated with nickel by an electroless plating method. The nickel patterns on the surface of the 3D printed cube shape structure are formed by removing sacrificial layers using the difference in the rate of hygroscopic swelling between two printing polymer materials. The hygroscopic behavior on the interfaced structure was modeled with COMSOL Multiphysics. The surface and electrical properties of the fabricated three-dimensional patterns were analyzed and characterized.

Keywords: swollen-off, 3D printing, hygroscopic swelling, selective metallization

Download English Version:

https://daneshyari.com/en/article/11008821

Download Persian Version:

https://daneshyari.com/article/11008821

Daneshyari.com