

# Accepted Manuscript

Direct Laser Writing for Creating Porous Graphitic Structures and Their Use for Flexible and Highly Sensitive Sensor and Sensor Arrays

Sida Luo, Phong Tran Hoang, Tao Liu



PII: S0008-6223(15)30294-3

DOI: [10.1016/j.carbon.2015.09.076](https://doi.org/10.1016/j.carbon.2015.09.076)

Reference: CARBON 10346

To appear in: *Carbon*

Received Date: 12 May 2015

Revised Date: 13 August 2015

Accepted Date: 19 September 2015

Please cite this article as: S. Luo, P.T. Hoang, T. Liu Direct Laser Writing for Creating Porous Graphitic Structures and Their Use for Flexible and Highly Sensitive Sensor and Sensor Arrays, *Carbon* (2015), doi: 10.1016/j.carbon.2015.09.076.

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.

**Direct Laser Writing for Creating Porous Graphitic Structures and Their Use for  
Flexible and Highly Sensitive Sensor and Sensor Arrays**

Sida Luo, Phong Tran Hoang, Tao Liu \*

High-Performance Materials Institute

Florida State University

2005 Levy Ave., Tallahassee, FL 32310, United States

**Abstract**

One-step direct laser writing (DLW) method has been applied to fabricate flexible and conductive graphitic porous patterns or arrays from polyimide. With assistance of electron microscopy, Raman and energy dispersive spectroscopy, X-ray scattering, and the coupled electrical and mechanical test, a systematic processing-structure-property relationship study was performed to investigate the effect of laser power and scanning speed on the piezoresistive performance of the DLW generated graphitic sensor or sensor arrays. Within the range of processing conditions being studied, the sensor gauge factor showed an exponential dependence on the ratio of the laser power to the scanning speed. This finding allowed for the achievement of a high gauge factor of  $\sim 112$ . Lastly, the versatility of the one-step DLW generated graphitic sensors were demonstrated in different sensing applications, which include strain mapping of the high-performance polymeric composites, flexible and wearable sensor for gesture registration and man-machine interactions.

\* Corresponding author. Tel: 850 410-6606. E-mail: liutao@eng.fsu.edu (Tao Liu)

Download English Version:

<https://daneshyari.com/en/article/7851149>

Download Persian Version:

<https://daneshyari.com/article/7851149>

[Daneshyari.com](https://daneshyari.com)