

Development of Conductive Polymer Nano-Composite (carbon black/SU-8) Micromachining by X-ray Lithography

Fareed Dawan^{1,2}, Yoonyoung Jin¹, V. Singh¹, Y. Desta¹, J. Goettert¹, S. Ibekwe²

1) Center for Advanced Microstructures and Devices
6980 Jefferson Hwy., Baton Rouge, LA 70806

2) Department of Mechanical Engineering
Southern University and A& M College
324 PBS Pinchback Hall, Baton Rouge, LA 70813

Polymer nano-composites (PNCs) have, in the past decade, emerged as a new class of materials due to new and often much improved mechanical, thermal, electrical and optical properties as compared to macro- and micro-composites. Recently, PNC technology has been moved quickly from the mechanical enhancement of the neat resin to multi-functional applications such as conductive PNC, microstructures, sensors and actuators. This research is focused on a conductive PNC that consists of carbon black (CB) and Su-8. As a reinforcement or filler, CB is used to induce or improve the electrical conductivity of polymers. The polymer matrix, SU-8, is known to exhibit good properties in the development of HARMS in MEMS. The result will discuss the synthesis and electrical properties of the CB/SU-8 PNC. Additionally, the feasibility of X-ray lithographic micromachining of the PNC, a novel process in the composite area, will also be introduced. The ability to produce X-ray sensitive PNCs is a key step towards the realization of PNC applications in MEMS fabrication.