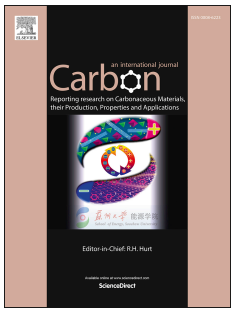
Accepted Manuscript



Temperature dependent compressive behavior of graphene mediated three-dimensional cellular assembly

Rituparna Ghosh, Siva K. Reddy, S. Sridhar, Abha Misra

PII: S0008-6223(15)30307-9

DOI: 10.1016/j.carbon.2015.09.089

Reference: CARBON 10359

To appear in: *Carbon*

Received Date: 12 July 2015

Revised Date: 21 August 2015

Accepted Date: 23 September 2015

Please cite this article as: R. Ghosh, S.K. Reddy, S. Sridhar, A. Misra, Temperature dependent compressive behavior of graphene mediated three-dimensional cellular assembly, *Carbon* (2015), doi: 10.1016/j.carbon.2015.09.089.

Temperature dependent compressive behavior of graphene mediated three-dimensional cellular assembly

Rituparna Ghosh, Siva K. Reddy, Sridhar S., Abha Misra*

Department of Instrumentation and Applied Physics, Indian Institute of Science, Bangalore, Karnataka, Indian 560012

Mechanical behavior of three-dimensional cellular assembly of graphene foam (GF) presented temperature dependent characteristics evaluated at both low temperature and room temperature conditions. Cellular structure of GF comprised of polydimethyl siloxane polymer as a flexible supporting material demonstrated a 94% enhancement in the storage modulus as compared to polymer foam alone. Evaluation of frequency dependence revealed an increase in both storage modulus and tan delta with the increase in frequency. Moreover, strain rate independent highly reversible compressibility is measured up to several cycles of compression for larger strains. It is elucidated that the interaction between graphene and polymer plays a crucial role in thermo-mechanical stability of the cellular structure.

Keywords: Graphene, Dynamical mechanical analysis, Compression, Polymer

* Corresponding author. Tel.: +91-80-2293-3198. E-mail: abha.misra1@gmail.com (Abha Misra)