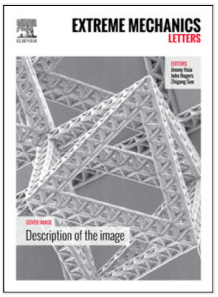
Accepted Manuscript



Triaxial compressive strain in bilayer graphene enabled by nitride stressor layer

Solomon Mikael, Jung-Hun Seo, Dong-Wook Park, Munho Kim, Hongyi Mi, Alireza Javadi, Shaoqin Gong, Zhenqiang Ma

PII: S2352-4316(16)30140-7
DOI: http://dx.doi.org/10.1016/j.eml.2016.09.002
Reference: EML 212

To appear in: *Extreme Mechanics Letters*

Received date: 18 June 2016
Revised date: 29 August 2016
Accepted date: 6 September 2016

Please cite this article as: S. Mikael, J.-H. Seo, D.-W. Park, M. Kim, H. Mi, A. Javadi, S. Gong, Z. Ma, Triaxial compressive strain in bilayer graphene enabled by nitride stressor layer, *Extreme Mechanics Letters* (2016), http://dx.doi.org/10.1016/j.eml.2016.09.002

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.

ACCEPTED MANUSCRIPT

Triaxial Compressive Strain in Bilayer Graphene Enabled by Nitride Stressor Layer

Solomon Mikael[1,†], Jung-Hun Seo[1,a),†], Dong-Wook Park[1,†], Munho Kim[1], Hongyi Mi[1], Alireza Javadi[2], Shaoqin Gong[2], Zhenqiang Ma[1,*]

[1]Department of Electrical and Computer Engineering, University of Wisconsin–Madison, Madison, WI 53706, USA

[2]Department of Biomedical Engineering, Wisconsin Institute for Discovery, and Materials Science Program, University of Wisconsin–Madison, Madison, WI 53706, USA

[a)]Current address: Department of Materials Design and Innovation, University at Buffalo, The State University of New York, Buffalo, NY 14260, USA

[†] These authors contributed equally to this work.

[*]Correspondence should be addressed to Zhenqiang Ma (mazq@engr.wisc.edu)

Keywords: Triaxial compressive strain; Strained Graphene; Nitride Stressor Layer; Raman Spectroscopy

Abstract

A technique that can be used to viably create triaxially strained bilayer graphene on any desirable location by simple patterning was developed. Unlike the conventional graphene strain engineering methods, the photolithographically defined spoke patterns and compressive strained Si_3N_4 layer deposited by plasma-enhanced chemical vapor deposition (PECVD) system enable the creation of locally confined triaxial strained bilayer graphene at the desire location by forming a unique tristar shaped wrinkle. The tristar shaped wrinkle was investigated with high resolution micro-Raman spectroscopy and atomic force microscopy (AFM) analyses, and confirmed that 0.38% of maximum triaxial compressive strain was created. Mechanical simulation was used to verify the strain distribution and confirm the strain value which was calculated from the Raman spectroscopy and AFM profile. The technique presented here not only provides a practical route to the creation of strained graphene at desired locations but also offers the potential of the creation of multiaxial strain

Download English Version:

https://daneshyari.com/en/article/5014526

Download Persian Version:

https://daneshyari.com/article/5014526

Daneshyari.com