

Accepted Manuscript

Structural effect of Ni-Cu catalysts for graphene growth by pulsed laser deposition

A.M. Abd Elhamid, A.M. Aboufotouh, M.A. Hafez, I.M. Azzouz



PII: S0040-6090(18)30156-1
DOI: [doi:10.1016/j.tsf.2018.03.013](https://doi.org/10.1016/j.tsf.2018.03.013)
Reference: TSF 36517
To appear in: *Thin Solid Films*
Received date: 2 October 2017
Revised date: 5 February 2018
Accepted date: 5 March 2018

Please cite this article as: A.M. Abd Elhamid, A.M. Aboufotouh, M.A. Hafez, I.M. Azzouz , Structural effect of Ni-Cu catalysts for graphene growth by pulsed laser deposition. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Tsf(2017), doi:[10.1016/j.tsf.2018.03.013](https://doi.org/10.1016/j.tsf.2018.03.013)

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.

Structural effect of Ni-Cu catalysts for graphene growth by pulsed laser deposition

A.M. Abd Elhamid ^{a,b,*}, A.M. Aboufotouh ^c, M.A. Hafez ^a, I.M. Azzouz ^a

^a Department of Laser Sciences and Interactions, National Institute of Laser Enhanced Sciences, Cairo University, El-Giza 12613, Egypt.

^b Nanotechnology Lab., Electronics Research Institute (ERI), Cairo, Egypt.

^c Department of Physics, Faculty of Science, Cairo University, El-Giza 12613, Egypt.

Abstract

Pulsed laser deposition was applied to grow few-layers graphene from highly oriented pyrolytic graphite target on different types of nickel (Ni)-copper (Cu) substrates. The substrates were prepared with two different structures; alloy and composite with different concentration ratios of Ni-Cu bi-metals. X ray diffraction and side view field emission scanning electron microscopy were utilized to analyze and verify the two structures. The catalytic effect of both substrates on graphene growth was studied at different growth temperatures using Raman spectroscopy. The experimental findings yielded unexpected catalytic effect discrepancies of composite than alloy substrates. The composite substrates proved excellent growth ability for unique 2-dimensional (2D) graphene layers over wide range of temperatures, while highly defected graphene was grown on alloy substrates with an appropriate Ni to Cu ratio. Structure of the composite substrates could impose a specific interaction on their surface that enhance the formation of 2D layers. The results suggest a class of highly efficient metallic catalyst for few-layer graphene growth via two steps segregation process and open fundamental insights in understanding graphene growth on complex substrates.

* E-mail: phy.abdomohamed@gmail.com, A.M.AbdElhamid@ERI.sci.eg (A.M. Abd Elhamid)

Download English Version:

<https://daneshyari.com/en/article/8032698>

Download Persian Version:

<https://daneshyari.com/article/8032698>

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