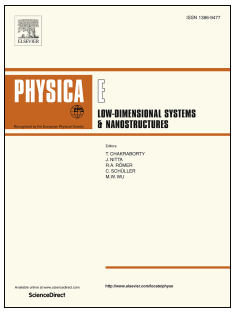
Accepted Manuscript



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PII: S1386-9477(18)30123-1

DOI: 10.1016/j.physe.2018.06.013

Reference: PHYSE 13184

To appear in: *Physica E: Low-dimensional Systems and Nanostructures*

Received Date: 23 January 2018

Revised Date: 22 April 2018

Accepted Date: 14 June 2018

Please cite this article as: A. Omidvar, M.R. RashidianVaziri, B. Jaleh, Enhancing the nonlinear optical properties of graphene oxide by repairing with palladium nanoparticles, *Physica E: Low-dimensional Systems and Nanostructures* (2018), doi: 10.1016/j.physe.2018.06.013.

Enhancing the nonlinear optical properties of graphene oxide by repairing with palladium nanoparticles

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'Declarations of interest: none'

Abstract

In this paper, enhancement of the nonlinear optical properties of graphene oxide by repairing with palladium nanoparticles is reported. Graphene oxide, palladium nanoparticles, and their nanocomposite are prepared by chemical methods. Structural and optical properties of all the synthesized samples have been investigated. It is shown that palladium nanoparticles repair the graphene oxide sheet by reducing the number of oxygen functional defects and simultaneously increasing the number of sp^2 carbon atoms and delocalized π-electrons. Employing the Z-scan technique for measuring the nonlinear optical properties of the samples, it is shown that Pd nanoparticles can considerably enhance the nonlinear refractive index and absorption coefficient of graphene oxide. Enhanced nonlinear optical properties of graphene oxide can open up exciting prospects for its application in different fields. The used nonlocal Z-scan theory for interpreting the nonlinear measurement data indicates that Mie scattering from the spherical nanoparticles dominates their nonlocal optical response.

Keywords: graphene oxide; Pd nanoparticles; nonlinear optics; Z-scan technique

PACS: 78.67.Wj; 78.67.Bf; 87.64.kv