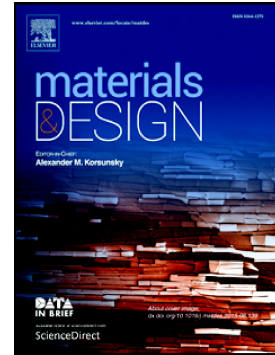


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Ultraviolet-light-driven charge carriers tunability mechanism in graphene

Muhammad Zahir Iqbal,^{a,*} Salma Siddique,^b Abbas Khan,^a Dongchul Sung,^c Jonghwa Eom,^c
Suklyun Hong^c

^a Faculty of Engineering Sciences, GIK Institute of Engineering Sciences and Technology, Topi 23640, Khyber Pakhtunkhwa, Pakistan.

^b Institute of Industrial Biotechnology, GC University Lahore, 54000, Pakistan.

^c Department of Physics and Graphene Research Institute, Sejong University, Seoul 143-747, Korea.

*Email: zahir.upc@gmail.com

Abstract

Tuning the charge carrier concentrations of graphene is a fundamental feature to obtain highly efficient electronic and optoelectronic devices. We investigate the carrier density modulation in graphene by exposure of ultraviolet (UV) light in O₂ and N₂ atmosphere. The upshift in charge neutrality point of graphene field-effect transistor is observed by UV irradiation with O₂ environment which attributes to the enhancement in hole concentration, while carrier modulation of graphene reverses to pristine state in N₂ environment under UV irradiation. Furthermore, we are able to interpret the absorption or dissociation mechanism of oxygen atoms on graphene and their recombination with nitrogen atoms to the formation of NO or NO₂ molecules, using density

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