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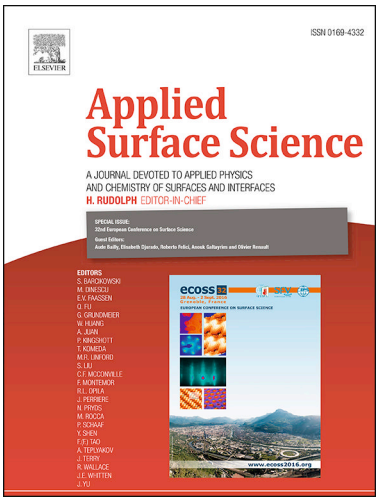

Full Length Article

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Tijana Tomašević-Ilić, Đorđe Jovanović, Igor Popov, Rajveer Fandan, Jorge Pedrós, Marko Spasenović, Radoš Gajić

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Reducing sheet resistance of self-assembled transparent graphene films by defect patching and doping with UV/ozone treatment

Tijana Tomašević-Ilić[1*], Đorđe Jovanović[1], Igor Popov[1, 2], Rajveer Fandan[3], Jorge Pedrós[3], Marko Spasenović[1], Radoš Gajić[1]

[1]Graphene Laboratory (GLAB) of the Center for Solid State Physics and New Materials, Institute of Physics, University of Belgrade, Pregrevica 118, 11080 Belgrade, Serbia

[2]Institute for Multidisciplinary Research, University of Belgrade, Kneza Višeslava 1, 11030 Belgrade, Serbia

[3]Departamento de Ingeniería Electrónica and Instituto de Sistemas Optoelectrónicos y Microtecnología, Universidad Politécnica de Madrid, Madrid 28040, Spain

*E-mail: ttijana@ipb.ac.rs

Abstract

Liquid phase exfoliation followed by Langmuir-Blodgett self-assembly (LBSA) is a promising method for scalable production of thin graphene films for transparent conductor applications. However, monolayer assembly into thin films often induces a high density of defects, resulting in a large sheet resistance that hinders practical use. We introduce UV/ozone as a novel photochemical treatment that reduces sheet resistance of LBSA graphene threefold, while preserving the high optical transparency. The effect of such treatment on our films is opposite to the effect it has on mechanically exfoliated or CVD films, where UV/ozone creates additional defects in the graphene plane, increasing sheet resistance. Raman scattering shows that exposure to UV/ozone reduces the defect density in LBSA graphene, where edges are the dominant defect type. FTIR spectroscopy indicates binding of oxygen to the graphene lattice during exposure to