

Accepted Manuscript

Effects of different graphene dopants on double antireflection coatings/graphene/n-silicon heterojunction solar cells

Laura Lancellotti, Eugenia Bobeico, Anna Castaldo, Paola Delli Veneri, Emanuele Lago, Nicola Lisi



PII: S0040-6090(17)30854-4
DOI: doi:[10.1016/j.tsf.2017.11.018](https://doi.org/10.1016/j.tsf.2017.11.018)
Reference: TSF 36350
To appear in: *Thin Solid Films*
Received date: 11 July 2017
Revised date: 16 October 2017
Accepted date: 12 November 2017

Please cite this article as: Laura Lancellotti, Eugenia Bobeico, Anna Castaldo, Paola Delli Veneri, Emanuele Lago, Nicola Lisi , Effects of different graphene dopants on double antireflection coatings/graphene/n-silicon heterojunction solar cells. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Tsf(2017), doi:[10.1016/j.tsf.2017.11.018](https://doi.org/10.1016/j.tsf.2017.11.018)

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.

Effects of different graphene dopants on double antireflection coatings/graphene/n-silicon heterojunction solar cells

Laura Lancellotti¹, Eugenia Bobeico¹, Anna Castaldo¹, Paola Delli Veneri¹, Emanuele Lago³ and Nicola Lisi²

⁽¹⁾ENEA, Portici Research Center, P.le E. Fermi 1, 80055 Portici, Naples, Italy

⁽²⁾ENEA, Casaccia Research Center, Via Anguillarese 301, 00123 Rome, Italy

⁽³⁾Istituto Italiano di Tecnologia, Graphene Labs, Via Morego, 30, 16163 Genova, Italy

Corresponding author: Laura Lancellotti, Phone: +39 081 7723245, Fax: +39 081 7723244, e-mail: laura.lancellotti@enea.it

Abstract. In the present work we have tested the effects of two of the most used graphene chemical dopants, nitric acid (HNO_3) and thionyl chloride (SOCl_2), on multilayer graphene/n-silicon (G/n-Si) Schottky barrier solar cell completed with a double antireflection coating (DARC). The DARC has been realized with a MgF_2/ZnS thermal deposition on graphene. In both cases the graphene doping process performed before DARC deposition increases the graphene conductivity and the work function, leading to cells with larger open circuit voltage and higher efficiency. After DARC layer realization a second acid exposure is necessary to compensate a partial de-doping effect and restore graphene doping. However the electrical characterization shows that the DARC/G/n-Si finite solar cell behaves differently with the two dopants. It is noteworthy that the presence of DARC does not prevent a further re-doping with HNO_3 , allowing the fabrication of cells with 8,5% efficiency which is not the case with SOCl_2 : this effect was explained by different chemical interactions between graphene, the deposited DARC and the two doping substances.

Keywords: graphene, solar cells, Schottky junction, antireflection coating

Download English Version:

<https://daneshyari.com/en/article/8033098>

Download Persian Version:

<https://daneshyari.com/article/8033098>

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