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Editor:
Dr Ahmad Saddam Ph.D
Country Director Global Illuminators Iraq

Global Illuminators, 18, Jalan Kenanga SD 9/7 Bandar Sri Damansara, 52200 Kuala Lumpur Malaysia
Contact: (+60) 362755388
E-mail: info@globalilluminators.com

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Use of a Porous Layer of Doped Silicon as Antireflection Coating for Solar Cell

K.K. Dikhanbayev[1]*, S.M. Manakov[2], B.G. Topanov[3]

Al-Farabi Kazakh National University, 71 Al-Farabi av., Almaty, 050040, Kazakhstan

Abstract

Among the materials promising for creating solar cells with high performance parameters takes significant place monocrystalline silicon. Of particular interest is the development of solar cells, in which the antireflection surface is a developed structure of the porous type. In this paper we investigate the possibility of using porous structures as antireflection surfaces for solar cells. Were carried out to create a thermal diffusion p-n-junctions structure silicon solar cells and to investigate the behavior of the dark reverse saturation current I_0, on the applied voltage, depending on the dopant oxide removal without it. Also in this paper we consider the possibility of raising short-circuit current of the solar cell by optimizing the doping level and the reduction of dark current saturation p-n-junction. In this connection, the behavior were investigated reverse dark saturation current I_0 of the applied voltage, depending dopant oxide removal without it. Oxidized porous silicon is the best optical "window" and the anti-reflective coating with a reflectivity lower than 5% in the visible range from 300 to 1100 nm for a silicon solar cell. The reflection spectrum has a minimum in the visible region at a wavelength of 600 nm. The depth of the diffusion experiment p-n- transition by two methods: the method of staining p-n- transition and on the instructions of the diffusion regime. Showed that phosphosilicate glass coating substantially reduce the diode reverse saturation current of the solar cell structure with a porous silicon as a result it is possible to increase the voltage and current of a short-circuit voltage.

Keywords— Silicon Solar Cells, Porous Silicon, Thermal Diffusion, Etching

*All correspondence related to this article should be directed to Al-Farabi Kazakh National University, 71 Al-Farabi av., Almaty, 050040, Kazakhstan
Email: dkadyrjan@mail.ru

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