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Analysis of photovoltaic behavior of Si-based junctions containing novel graphene oxide/nickel(II) phthalocyanine composite films

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Abstract

In this work, we have synthesized modified nickel(II) phthalocyanine containing graphene oxide. Our emphasis is given to understand the effect of doping on the photophysical behavior of semiconducting graphene oxide/nickel(II) phthalocyanine composite films by using I-V and C-V spectroscopy. Al-p-Si/GO: NiPc/Au structures have rectifying behavior with a high rectification ratio of $6.99 \times 10(4) \pm 10$ V. Photophysical properties of the device are found to be improved for graphene oxide particles due to extra electron incorporation for n-type doping (GO dopant) to modified nickel(II) phthalocyanine which favors the electron and hole transfer processes. It is seen that the incorporation of graphene oxide nanoparticles into nickel(II) phthalocyanine accelerates the electron transfer process from GO nanoparticles to nickel(II) phthalocyanine. In contrast, before GO doping in nickel(II) phthalocyanine, hole transfer process occurs. (c) 2016 Elsevier B.V. All rights reserved.

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