Fotovoltaic Cells of Graphene Nanowires in Distributed Bragg Reflector

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ABSTRACT

The combination of a distributed Bragg reflector (DBR) in rectangular or triangular form has been used in photovoltaic cell designs, which are capable of improving the capture of light over the solar spectrum from 400 to 1100 nm, this has increased efficiency up to 20% for Si cells of 2.5 µm in light incident on the TE polarization, it being possible to increase the optical absorption efficiency to 22.1% and 23.52% for the case of 5 µm and 7.5 µm solar cells for incident light TM [1]. Peter Bermel et al. [3] state that most photovoltaic (solar) cells are made of crystalline silicon (c-Si), which has an indirect band gap. This gives rise to poor absorption of one-third of the usable solar photons [3]. Therefore, our proposal is to use two layers of anti-reflection coating in 1D photonic crystal. SiO2 and Graphene along with another silver coating that will also be used as rear reflector.

Through Computer Simulation Technology (CST) software we design solar cells as greater light absorption compared to conventional designs. The graphene nanowires absorbed the light incident on the SiO_2 grid without letting out the part that would possibly reflect, transforming it into electricity.

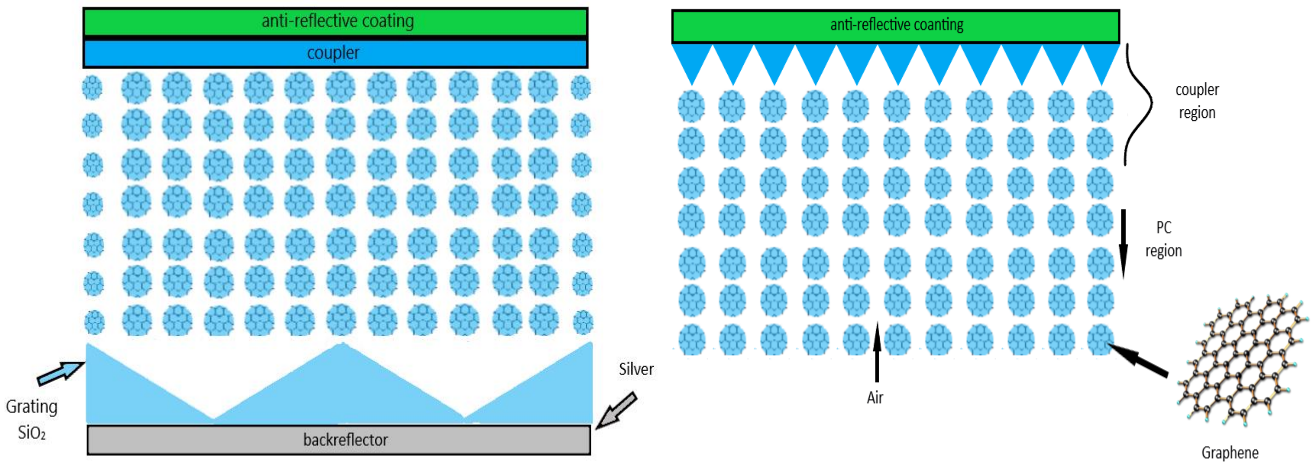

Fig. 1. Schematic for Distributed Bragg reflector (DBR) in Photovoltaic Cells of Graphene.

Regardless of the errors, we believe the Distributed Bragg Reflector (DBR) combination can achieve an excellent percentage of light absorption compared to current technology. We are working with different methods to design light capture structures and apply spectrum division systems.

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