

## Enhancement in the Absorption Efficiency of GaAs/InAs Nanowire Solar Cells through a Decrease in Light Reflection

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**Abstract :** In this paper, the effect of the Barium fluoride (BaF<sub>2</sub>) layer on the absorption efficiency of GaAs/InAs nanowire solar cells was investigated using the finite difference time domain (FDTD) method. By inserting the BaF<sub>2</sub> as antireflection with the dominant size of 10 nm to fill the space between the shells of wires on the Si (111) substrate. The absorption is significantly improved due to the strong reabsorption of light reflected at the shells and compared with the reference cells. The present simulation leads to a higher absorption efficiency (Q<sub>abs</sub>) and reaches a value of 97%, and the external quantum efficiencies (EQEs) above 92% are observed. The current density (J<sub>sc</sub>) increases by 0.22 mA/cm<sup>2</sup> and the open-circuit voltage (V<sub>oc</sub>) is enhanced by 0.11 mV.

**Keywords :** nanowire solar cells, absorption efficiency, photovoltaic, band structures, ftd simulation

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