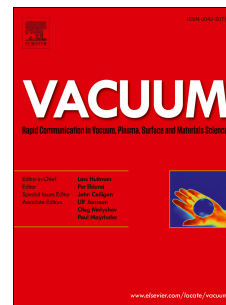


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Enhancing solar cell efficiency with plasmonic behavior of double metal nanoparticle system

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Abstract:

The use of special arrangement of silver nanoparticle (Ag Np) arrays is presented in order to enhance light trapping capability of the thin film solar cells due to their ability to couple incident sunlight into localized modes. The spatial distribution of the nanoparticles in the matrix and their relative position are the important factors governing the performance of device. Double nanoparticle system (DNS) over the silicon substrate, which is not a commonly studied system, is explored and the performance (absorption enhancement) was compared with periodically arranged single Ag Nps system. Finite difference time domain (FDTD) simulation has been performed to investigate the effect of silver nanoparticle array patterning on the absorption of solar radiation. The presence of DNS was found responsible for increased coupling of photons into plasmonic modes, and consequently increased absorption of photons into the substrate over a broad range of the solar spectrum.

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