

## Particle Dust Layer Density and the Optical Wavelength Absorption Relationship in Photovoltaic Module

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**Abstract :** This work allows highlight the effect of dust on the absorption of the optical spectrum on the photovoltaic module, the effect of the particles dust presence on the photovoltaic modules have been a microscopic scale studied with COMSOL Multi-physic software simulation. In this paper, we have supposed the dust layer as a diffraction network repetitive optical structure characterized by the spacing between particle which represented by 'd' and the simulated structure (air-dust particle-glass). In this study we can observe the relationship between the wavelength and the particle spacing, the simulation shows us that the maximum wavelength transmission value corresponding,  $\lambda_0 = 400\text{nm}$ , which represent the spacing value between the particles dust,  $d = 400\text{ nm}$ . In fact, we can observe that while increase dust layer density the wavelength transmission value decrease, there is a relationship between the density and wavelength value which can be absorbed in a dusty photovoltaic panel.

**Keywords :** dust effect, photovoltaic module, spectral absorption, wavelength transmission

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