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USING THE DIELECTRIC CONSTANT OF COMBINED DRUDE AND LORENTZ TO MODEL THE OPTICAL PROPERTIES OF SnO2: F FOR SOLAR ENERGY APPLICATIONS

Optical coatings have a variety of applications some of which include: -: transparent heat mirrors, antireflection coatings, architectural coatings, photo-thermal converters, photovoltaic converters and photo- catalysis. SnO2: F films are widely used for solar cell applications as the front electrode as well as other applications such as electrochromics and displays. Optical design of these and other applications need the knowledge of optical constants. In this study we used the dielectric constant of a combined Drude and Lorentz to model the optical behavior of SnO2: F. To do this, we used the fitting parameters from existing literature. From the model we got n and k values which we inserted into Fresnel R and T calculator and computed R and T spectra using Fresnel's equations. The effect of the thickness-dependence and carrier concentration of SnO2: F on parameters such as refractive index (n), extinction coefficient (k), real part and imaginary part are also studied. We plotted n, k, T and R for different values of plasma frequency, and damping parameter, .

Keywords

Optical constants, damping parameter, thin film and Drude-Lorentz model.

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