

Opto-Electronic Study of the Silicon Nitride Doped Cerium Thin Films Deposed by Evaporation

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Abstract : Rare earth-doped luminescent materials (Ce, Eu, Yb, Tb, etc.) are now widely used in flat-screen displays, fluorescent lamps, and photovoltaic solar cells. They exhibit several fine emission bands in a spectral range from near UV to infrared when added to inorganic materials. This study chose cerium oxide (CeO₂) because of its exceptional intrinsic properties, energy levels, and ease of implementation of doped layer synthesis. In this study, thin films were obtained by the evaporation deposition technique of cerium oxide (CeO₂) on silicon Nitride (SiN_x) layers and then annealing under nitrogen N₂. The characterization of these films was carried out by different techniques, scanning electron microscopy (SEM) to visualize morphological properties and (EDS) was used to determine the elemental composition of individual dots, optical analysis characterization of thin films was studied by a spectrophotometer in reflectance mode to determine different energies gap of the nanostructured layers and to adjust these values for the photovoltaic application.

Keywords : thin films, photovoltaic, rare earth, evaporation

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