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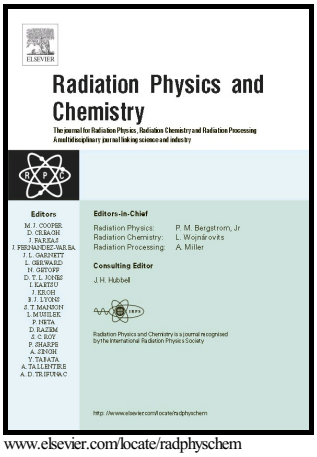

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8 MeV electron beam induced modifications in the thermal, structural and electrical properties of nanophase CeO_2 for potential electronics applications

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Abstract: The effect of 8 MeV electron beam irradiation on the thermal, structural and electrical properties of CeO_2 nanoparticles synthesized by chemical precipitation route was investigated. The dose dependent effect of electron irradiation was studied using various characterization techniques such as, thermogravimetric and differential thermal analyses, X-ray diffraction, Fourier transformed infrared spectroscopy and impedance spectroscopy. Systematic investigation based on the results of structural studies confirm that electron beam irradiation inducesdefects and particle size variation on CeO_2 nanoparticles, which in turn results improvements inAC conductivity, dielectric constant and loss tangent. Structural modifications and high value of dielectric constant for CeO_2 nanoparticles due to electron beam irradiation make it as a promising material for the fabrication of gate dielectric in metal oxide semiconductor devices.

Keywords: CeO_2 nanoparticles; electron beam irradiation; structural studies; electrical studies