

Colossal Dielectric Permittivity in (A³⁺,Nb⁵⁺) doped TiO₂; A³⁺ = Cr³⁺ and Sc³⁺

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(Cr,Nb)TiO₂ (CN-T) and (Sc,Nb)TiO₂ (SN-T) ceramics were prepared via a solid state reaction process. A single phase of rutile TiO₂ was confirmed by X-ray diffraction (XRD). Dielectric properties were investigated over frequency range from 40Hz to 10MHz and temperature range from -70C to 220C. The ceramics showed high permittivities (>1000) with low dielectric losses and frequency-stablity. The behaviors of colossal permittivity can be explained by electron-pinned defect-dipoles, interfacial polarization and polaron hopping polarization.

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