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Triggering Incipient Ferroelectricity in Calcium Copper Titanate ($CaCu_3Ti_4O_{12}$) ceramics through partial B-site substitution with Te^{4+} ion. NABADYUTI BARMAN, student, K.B.R VARMA, Retired — Double perovskite structured dielectric ceramic $CaCu_3Ti_{4-x}Te_xO_{12}$ (CCTTO) (x = 0, 0.05, 0.1, 0.15, 0.2) was fabricated from the powder obtained by conventional solid state synthetic route. The room temperature XRD patterns for the x =0, 0.05, 0.075 modified samples were confirmed to possess a single phase with cubic space group *Im3* by Rietveld refinement. But, the Rietveld refinement performed on XRD patterns recorded for the compositions corresponding to x = 0.1, 0.15, 0.2 shows the coexistence of the cubic phase (space group *Im3*; a = 7.4065Å) and tetragonal phase (space group *I4/mcm*; a = 7.369 Å and c = 6.967 Å). The dielectric properties of these ceramics were studied over a wide frequency (40Hz–2MHz) and temperature range (30-400K). The Te^{4+} doped samples (CCTTO) exhibited dielectric permittivity (?$_r$) value of ˜23-33X10^3 which is more than twice that of undoped CCTO (˜11x10^3) at 1kHz. A decreasing trend in dielectric permittivity with increasing temperature, a signature of incipient ferroelectricity, was observed for all the samples. Barrett's formula was invoked to rationalize the dielectric permittivity variation as a function of temperature. The incipient ferroelectric behavior is correlated with soft phonon mode observed in temperature dependent Raman Spectroscopic studies. .

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