

## Improved Dielectric Properties of $\text{CaCu}_3\text{Ti}_4\text{O}_{12}$ by Calcination at Different Temperatures

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**Abstract :** Calcium copper titanate (CCTO) was synthesized via the sol-gel auto-combustion method. The precursor was calcined at 800°C and 1000°C for 6 hours providing brown-coloured powders, which were pelletized and sintered at 1000°C for 12 hrs to determine their dielectric behaviour in the frequency range (100Hz-10MHz) at room temperature. The dielectric constant ( $\epsilon_r$ ) and loss tangent ( $\tan\delta$ ) has been found to be  $\sim 6153$  and 0.5 for 800°C and  $\sim 5504$  and 0.2 for 1000°C respectively, at frequency 1kHz. Microstructure study revealed maximum grain growth occurs in sample calcined at 800°C, responsible for its high dielectric constant. Phase identification of  $\text{CaCu}_3\text{Ti}_4\text{O}_{12}$  has been carried out through X-ray diffraction. It can be used in various electronic applications as it shows large  $\epsilon_r$  and low  $\tan\delta$  values over a wide frequency spectrum, including energy storage devices, microwave shielding, and sensors.

**Keywords :** calcium copper titanate, dielectric behaviour, microstructure, X-ray diffraction

**Conference Title :** ICP 2024 : International Conference on Physics

**Conference Location :** Melbourne, Australia

**Conference Dates :** February 01-02, 2024