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## Growth and Impedance analysis of pure TGAc and dye doped TGAc crystals- enhaced dielectric permittivity for energy storage devices

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### Abstract

Herein, we delineate the enhancement of the dielectric properties of an anionic dye doped triglycine acetate crystal for the first time. Single crystals of pure triglycine acetate (TGAc) and reactive orange 16 (RO16) dye-doped (0.01, 0.03 mol%) triglycine acetate were synthesized with an intention to enhance the strengths of pure TGAc crystal using slow evaporation process. The crystalline structure and phase purity of the grown crystals were analyzed using Powder XRD studies. The frequency dependence of real and imaginary part of dielectric constant, loss tangent, real and imaginary part of impedance, electrical modulus and ac electrical conductivity have been investigated. The dielectric constant and dielectric loss for the grown crystals, have been found to decrease with increasing frequency. The decrease in permittivity and dielectric loss with an increase in applied field frequency is as per Maxwell–Wagner theory. The Cole–Cole plot implies that the mechanism of conduction is mainly due to bulk resistance. The enhanced dielectric constant of the doped crystals confirms the appropriateness of the developed crystals for energy storage capacitor applications.

### Keywords:

Dye doped crystal, Dielectric properties, Electrical conducctivity

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