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Dielectric relaxation and optical propeties in ferroelectric bis(methylammonium) tetrachloro zincate single crystal

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ABSTRACT

Bis (Methylammonium) tetrachlorozincate [MAC-Zn] is a well-known ferroelectric crystal. The crystal was synthesized by slow evaporation technique at room temperature. The grown crystal when subjected to single crystal X – Ray diffraction reveals that it belongs to monoclinic system. Dielectric properties, impedance spectroscopy and optical properties were analyzed. The variation of dielectric constant, dielectric loss, real and imaginary part of dielectric modulus were explored at different temperatures and frequencies. The yielded crystal exhibits Debye – type relaxation behavior and Correlation Barrier Hopping (CBH) conduction mechanism. The Debye phonon frequency and Debye temperature were calculated using dielectric studies. The resistance of the MAC-Zn crystal was determined using impedance spectroscopy. The theoretical calculation of optical transmittance, reflectance, refractive index, electrical conductivity, optical conductivity, electrical susceptibility and optical polarizability were calculated using optical studies and the results were discussed elaborately.

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