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Growth, Optical, Electrical, Dielectric Properties and V-I Characteristics of Cobalt mixed Cadmium Oxalate Crystal

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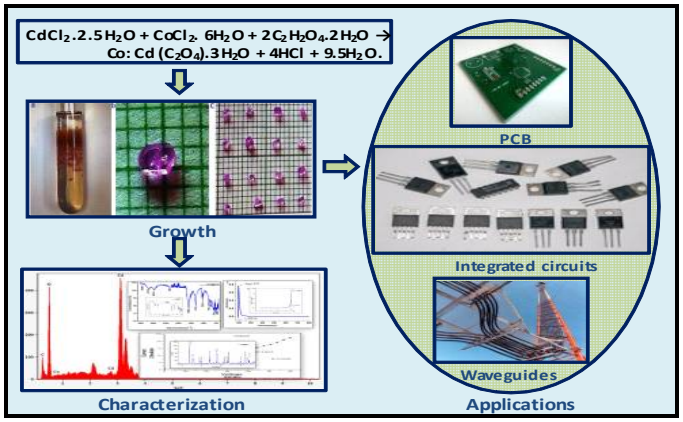
ABSTRACT

Cobalt mixed Cadmium oxalate crystal (COMCO) was grown by gel diffusion reaction method. Optimum condition for crystal growth was established by varying gel parameters and chemical composition of reactants. Occupation of Co^{2+} ions in the vacancies of parental Cd^{2+}ions caused the change in morphology of intrinsic Cadmium oxalate crystal (ICO). This resulted in the formation of pink colored, hard and transparent COMCO crystals. Elemental analysis using energy dispersive X-ray spectroscopy (EDX) confirmed the presence of Cd^{2+} and Co^{2+} ions in the lattice of COMCO crystal. Thermo-gravimetric analysis (TGA) of the crystal elucidated the thermal stability up to 950°C. Fourier transform infrared (FT-IR) spectral studies identified water of crystallization, carboxyl and metal–oxygen bonding. Powder X-ray diffraction (P-XRD) studies showed well defined peaks for different 2θ values and established high crystalline nature of COMCO crystal. UV-Visible spectroscopic studies measured the band gap energy of the crystal. Electrical conductivity measurements showed moderate conductivity in COMCO crystal. Dielectric studies of the mixed crystal measured capacitance and ϵ_r. V-I characteristics emphasized linear variation and analyzed leakage resistance of COMCO crystal.

Graphical Abstract



Keywords: Mixed crystal, spectra, optical, conductivity, dielectric, characteristics