



Studies on growth, optical, electrical and dielectric properties of Strontium and Calcium mixed cadmium oxalate crystals

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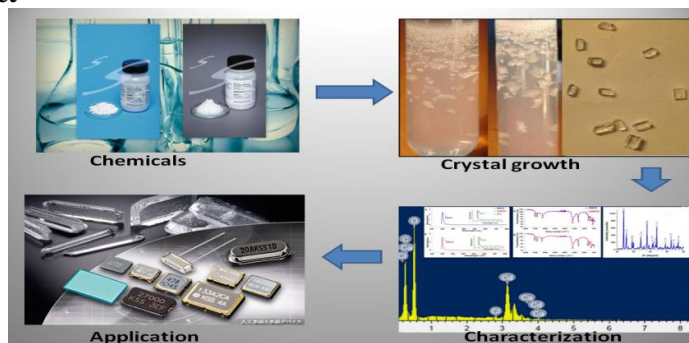
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ABSTRACT

Calcium mixed (CAMCO) and Strontium mixed (SMCO) Cadmium oxalate crystals are grown by gel diffusion method in silica hydro gel by optimizing the growth parameters. Ca^{+2} and Sr^{+2} ions are used to occupy the vacancies of intrinsically available Cd^{+2} ions in the lattice of Cadmium oxalate crystals (ICO). This causes change in morphology of ICO crystals and resulted in the growth of CAMCO and SMCO crystals. Energy dispersive X-ray spectroscopy (EDX) confirmed the presence of Cd^{+2} , Ca^{+2} and Sr^{+2} ions in the lattices of CAMCO and SMCO crystals. Thermo-gravimetric analysis (TGA) of the crystals elucidated the thermal stability up to 950°C and the presence of three water molecules. Fourier transform infrared (FT-IR) spectral studies of the crystals exhibit water of crystallization, carboxyl group and metal-oxygen bonding. Powder X-ray diffraction (P-XRD) studies showed that both CAMCO and SMCO crystals belong to triclinic system. UV-Visible spectroscopic analysis measured the energy gap and insulating behavior of the crystals. Electrical conductivity measurements showed more conductivity in SMCO crystals. CAMCO exhibits higher capacitance than SMCO due to larger dielectric constant. Spectroscopic and structural parameters of both the mixed crystals are compared and analyzed.

Graphical Abstract



High Lights:

Crystals are finest form of solids, used in the study of properties of light, as opto-electronic devices, dielectrics in capacitors and PCBs. Pure, good quality water insoluble crystals were grown using gel

method. We have grown Strontium and Calcium Mixed Cadmium oxalate crystals adopting gel method and their properties were studied.

Keywords: Mixed Crystal, Spectrum, Strontium, Calcium, gel, Dielectric
