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Optimized Growth, Thermal, Magnetic and Optical Studies of Co^{2+} and Cu^{2+} mixed Cadmium Oxalate Crystals

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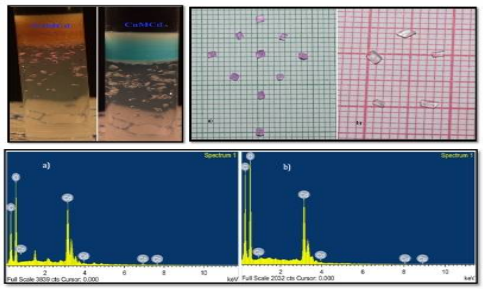
ABSTRACT

Growth of Co^{2+} mixed and Cu^{2+} mixed Cadmium oxalate single crystals were grown by single diffusion method in silica hydro gel at room temperature. Optimum conditions of the as grown crystals were established by varying Specific gravity of Sodium Meta Silicate (SMS), gel setting time, pH of the gel, concentrations of Oxalic acid and concentration of supernatant solutions. Energy dispersive X-ray analysis (EDX) confirmed the presence of major elements such as Co^{2+}, Cu^{2+}, Cd^{2+} ions in the lattice of the grown crystals. Fourier transform infrared (FT-IR) spectral studies of the crystals exhibit water of crystallization, carboxyl group and metal–oxygen bonding. Thermo-gravimetric analysis (TGA) of the crystals elucidated the thermal stability up to 600℃ and the presence of water molecules. Magnetic studies confirm the paramagnetic behavior and UV-Visible spectroscopic analysis measured the energy gap and insulating behavior of the crystals.

Graphical Abstract



Keywords: SMS, EDX, FT-IR, TGA.