



Effect of Cadmium Incorporation on Optical and Electrical Properties of Nickel doped Zinc Phosphate Crystals

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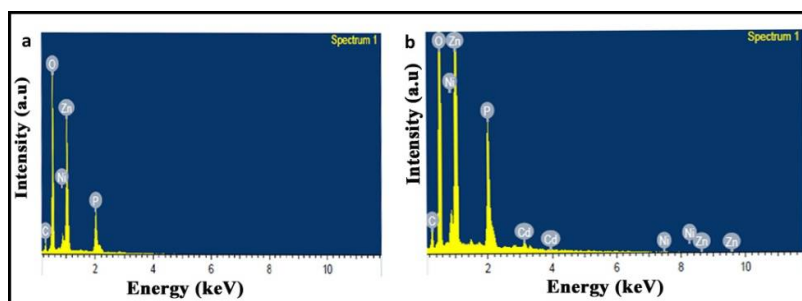
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ABSTRACT

Nickel doped Zinc Phosphate (NZP) and Cadmium incorporated NZP (CNZP) crystals were grown in silica hydro gel media. Specific gravity of Sodium Meta Silicate (SMS), gel setting time, pH of the gel, concentrations of ortho-phosphoric acid and concentration of supernatant solutions were varied to establish the optimum conditions for growth. Energy Dispersive X-ray (EDX) measurements predicted the matrix of Cd^{2+} ions with parental NZP crystal. FTIR spectral studies confirmed the presence of phosphate group, water molecules and metal oxygen link in NZP and CNZP crystals. Thermo Gravimetric Analysis (TGA) showed the thermal stability of the crystals upto $900^{\circ}C$ in their anhydrous state. From UV visible spectrophotometric studies band gap energy measured was 6.09eV for CNZP crystal. Electrical conductivity of NZP crystal is enhanced after incorporation of Cd^{2+} ion to form CNZP crystal.

Graphical Abstract



EDX spectrum of (a) NZP and (b) CNZP crystals

Keywords: Doping, Silica hydro gel, Nickel doped Zinc Phosphate (NZP), Cadmium incorporated NZP (CNZP).