Influence of nickel substitutions on the structural, optical and spectroscopic properties of potassium zinc chloride sulfate single crystals

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Abstract:

Crystals of potassium zinc chloride sulfate (KZCS) undoped and doped with Ni2+ ions with different concentrations were crystallized by slow evaporating of saturated aqueous solution. The crystal habit changes considerably by doping. Grown crystals were investigated by various characterization techniques. X-ray powder diffraction analysis was executed to detect the structure parameters of the grown crystals. Slight changes in the unit cell parameters of KZCS crystals after doping with Ni2+ ions have been detected. Different functional groups were detected and assigned from the Fourier transform infrared (FTIR) spectra. Optical properties were investigated in the incident wavelength in the range from 190 to 900 nm. Absorption coefficient was calculated and the grown crystals show indirect allowed inter-band transition and the energy gap decreased continuously with increasing the concentration of Ni2+ ions. The

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