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preparation of erbium activated orthovanadate-phosphate by chemical bath deposition

In this work, erbium (Er3+) activated Yttrium orthovanadate-phosphate (YV0.5P0.5O4) nanomaterials were prepared by chemical bath deposition. The concentration of Er3+ was varied between 1 and 10 mole percentage. The structure, surface morphology, elemental composition and optical analysis were carried out by X-ray diffraction (XRD), scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS), Fourier – transform infrared spectroscopy (FTIR), and UV–vis spectroscopy (UV). XRD results showed that all the samples have a tetragonal zircon structure. Furthermore, the results showed that the crystallite size increases with Er3+ concentration. SEM shows that the particles were in nano-range and portrayed various shapes. The presence of all the elements forming YV0.5P0.5O4: Er3+ was verified by EDS. FTIR results showed a series of absorption peaks in the range of 650 to 4000 cm-1 and it confirmed the EDS results. Diffuse reflectance spectra (DRS) revealed a broad absorption band in the UV-region which is attributed to the absorption of VO43-. Other f⟶f transitions of Er3+ were also observed at 380, 407, 451, 489, 523, 546 and 654 nm and were attributed 4I15/2 – 4G11/2, 4I15/2 – 4FJ (J= 3/2, 5/2, 7/2, 9/2), 4I15/2 – 2H9/2, 2H11/2 – 4I15/2, and 4S3/2 – 4I15/2 electronic transitions of Er3+. Lastly, The estimated band gaps were found to range between 3.76 and 3.81 eV.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

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