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Preparation and characterization of thulium doped yttrium oxide ($Tm:Y_2O_3$) powders

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Abstract

In the presented work 2at% thulium doped yttrium oxide precursor powders were synthesized by the co-precipitation method using ammonium bicarbonate as a precipitation agent. The main aim of this work was to investigate the influence of co-precipitation parameters such as the process temperature (25°C-70°C) and molar concentration of reagents on the morphology and luminescence properties of $Tm:Y_2O_3$. The lowest average particle size of about 20 nm and the highest value of the specific surface of 55.2 m^2/g were obtained for powder co-precipitated at a temperature of 70°C at a molar concentration of 0.1 M for thulium and yttrium nitrate. The emission spectra of the outcome powders were measured and compared and fluorescence dynamics behavior was presented and discussed.

Key words: $Tm:Y_2O_3$ nanopowders, co-precipitation method, luminescence properties

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