Structural and Luminescent Properties Of $Sral_2o_4$:Ce^{3+} Nanomaterials

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Abstract

Blue and violent emitting cerium doped strontium aluminate nanophosphor was synthesised through solution combustion method. The colour of undoped $SrAl_2O_4$ powders was white while that of $SrAl_2O_4$: Ce^{3+} powders were pale yellow. Both $SrAl_2O_4$ and $SrAl_2O_4$: Ce^{3+} emitted blue and faint violent colours when irradiated by strong UV radiations using a UV spectrometer but $SrAl_2O_4$: Ce^{3+} gave more intense blue colour. In this research project, different concentrations of cerium at 0mol% Ce^{3+}, 0.25mol% Ce^{3+}, 0.5mol% Ce^{3+} and 1mol% Ce^{3+} were used. Small amounts of each sample were dissolved in propanol and the solutions used to get the absorbance of each sample using UV/VIS spectrophotometer. The absorption increased from 0mol% Ce3+ to 0.5mol% the decreased at 1mol% Ce^{3+}. Urea was used as a fuel. The energy band gap of $SrAl_2O_4$: Ce^{3+} was calculated using the wavelength at 355nm and was found to be 3.475eV. The synthesised phosphor can be used in solid state lighting for production of white light emitting diodes due to its ability to emit blue colour as well as in conventional fluorescent, halogens, discharge and incandescent lamps where near UV light is needed.