

The Photoluminescence properties of Ce^{+3} doped nano sized SiO_2 for transparent coating application

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Ce^{+3} ions were widely used as activators in oxide materials for its allowed optical transitions of 4f-5d. The sol-process provides an attractive low temperature producing silica. Ce^{+3} doped nano sized SiO_2 was synthesized by a condenser reflux system at 70 °C. In this investigation Ce-doped SiO_2 ($\text{Ce}:\text{SiO}_2$ molar ratio in the range 0.01 to 0.2) were prepared using tetraethoxysilane (TEOS) and $\text{Ce}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O}$ as precursors. Size of synthesized particle was measured by size analyzer. FTIR spectrometer was used to characterization of particles. Transmission electron microscope (TEM) was used to determine morphology of particles. The absorption bands were determined by UV-VIS spectrophotometer. The luminescence spectra were measured using fluorescence spectrophotometer.

Approximately 10nm sized SiO_2 particles were synthesized by sol-gel method. Ce-doped SiO_2 sols were prepared by dispersing ultrasonically in ethanol without using dispersant. When excited with the wavelength at 260nm, the emission band was observed at 290nm for Ce-doped SiO_2 sols. The intensity of emission peak was increased with amount of Ce^{+3} doping.