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Effects of ZnO and Ce³⁺ incorporation on the photoluminescence and cathodoluminescence intensity of Pr³⁺ doped SiO₂.

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The successful incorporation of ZnO nanoparticles and Ce³⁺ ions in Pr³⁺ doped SiO₂ using a sol-gel process is reported. SiO₂:Pr³⁺ gels, with or without ZnO and Ce³⁺, were dried at room temperature and annealed at 600 °C. The Field Emission Scanning Electron Microscopy (FESEM) indicated clustered SiO₂ nanoparticles with particle size diameter ranging between 20 to 120 nm while the high resolution transmission electron microscopy (HRTEM) revealed and energy dispersive x-ray spectroscopy (EDS) the presence of Zn, Ce, and Pr nanoclusters enveloped in SiO₂ matrix. The emission intensity from SiO₂:Pr³⁺-Ce³⁺ was slightly enhanced compared to single doped SiO₂:Ce³⁺. For ZnO:SiO₂:Pr³⁺, the ZnO green emission was suppressed and enhanced emission from Pr³⁺ was observed. Energy transfer mechanism between Pr³⁺ and Ce³⁺ as well as between ZnO and Pr³⁺ is discussed in detail.

Level (Hons, MSc, PhD, other)?

PhD

Consider for a student award (Yes / No)?

YES

Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

YES

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