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Optical and Luminescence from Ln³⁺ doped glasses and their applications

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Glasses are source of material have properties like low cost, easy to prepare, high transparency at room temperature, hardness along with sufficient strength, excellent electrical resistance, absence of the grain boundaries and continuously variable composition for the optical applications. Glasses doped with Lanthanide ions (Ln³⁺) can be well developed as luminescence materials because of high emission efficiencies, corresponding to 4f–4f and 4f–5d electronic transitions in the Ln³⁺. The 4f–4f transition gives an especially sharp fluorescence patterns from the ultraviolet to the infrared region, because of shielding effects of the outer 5s and 5p orbitals on the 4f electrons. Investigation of the optical and luminescence properties of the Ln³⁺ doped into various glasses have been found great attention due to their feasible properties, (including intense emissions in the visible and near infrared region) and vast applications in the field of lasers, scintillators, sensors, light converters, hole burning high-density memories, optical fibers, amplifiers, and three dimensional display devices. In this work, optical and luminescence from Ln³⁺ doped glasses and their applications have been explained and the effect of some nano-particles on luminescence properties have been discussed.

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