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LIGAND-SENSITIZED FLUORESCENCE OF EU(III) AND TB(III) USING AROMATIC CARBOXYLIC ACIDS)

Lanthanide complexes are a new type of luminescent materials used for several optical applications, including biological fluoro-immuno assays, lasers, solid-state lighting, electroluminescent devices, and Light Emission Diodes (LEDs). The Direct excitation of Lanthanide ions inefficient absorption is due to forbidden transitions resulting in low quantum yield. However, it has been observed that organic ligands highly conjugated coordinated with lanthanide centers enhances luminescence immensely through an energy transfer mechanism also known as antenna effect.

In this work, aromatic ligands of carboxylic acids coordinated with Europium (III) and Terbium (III) were obtained by precipitation method. Photoluminescence spectroscopy (PL), Infrared spectroscopy (IR) and powder X-ray diffraction (PXRD) are reported to determine luminescence properties, coordination modes and crystal structure respectively. PL shows the direct excitation of the organic ligand which transfers energy towards the lanthanide ion, a process known as antenna effect. IR revealed coordination. In addition, the chromatic coordinate CIE 1931, color temperature, and color purity are presented.

Preliminary results indicate that coordination compounds with Eu(III) and Tb(III) sensitized with aromatic carboxyl ligands have promising applications as light-emitting phosphors in several technological fields.

Keywords

Lanthanide complex, luminescent materials, aromatic carboxylic acids

Reference

Wei, C. et al. Advances in luminescent lanthanide complexes and applications. Sci. China Technol. Sci. 61, 1265–1285 (2018).

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