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Synthesis, Spectral Characterization and Photoluminescence Properties of Europium(III) and Terbium(III) Complexes with Schiff bases Derived from 5-(phenyl/substituted phenyl)-2-hydrazino-1,3,4-thiadiazoles and Benzyl/Diacetyl

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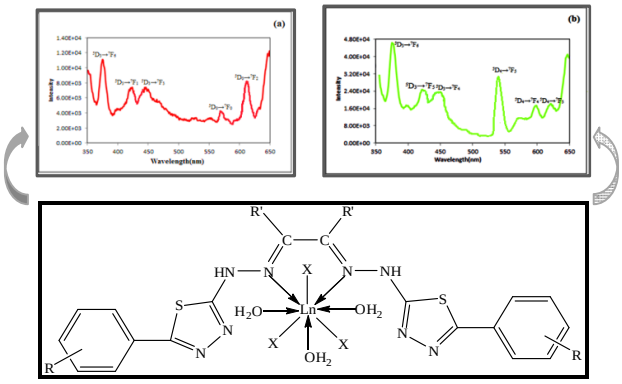
ABSTRACT

A novel class of europium(III) and terbium(III) complexes with Schiff bases derived by the condensation of 5-(phenyl/substituted phenyl)-2-hydrazino-1,3,4-thiadiazoles and benzyl/ diacetyl have been prepared in ethanol. The structures of the complexes have been proposed on the basis of elemental analysis, electrical conductance, magnetic moment, spectroscopic measurements (IR, UV spectra), X-ray diffraction studies and photoluminescence properties such as emission spectra of the complexes were investigated. Emission spectra of the europium(III) and terbium(III) complexes exhibit strong characteristic emission in red and green regions, respectively.

Graphical Abstract



(Where, Ln= Eu, Tb; X= Cl in case of Eu and OAc in case of Tb)

Highlights:

- Ligands act as bidentate chelating agent and have “antenna effect”.
- X-ray diffraction pattern shows that the particles are in the range of 09-20 nm.
- The characteristic peaks of Eu(III) and Tb(III) show the strong red and green emission at $^5D_0 \rightarrow {}^7F_2$ and $^5D_4 \rightarrow {}^7F_5$ transitions, respectively.

Keywords: Europium(III), Terbium(III), IR, Luminescence.