

Lanthanide coordination compounds containing 2-thenoyltrifluoroacetone and triphenylarsine oxide: Synthesis, characterization and energy transfer mechanism

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The trivalent lanthanides complexes containing β -diketonate ligands have been widely studied because they have peculiar chemical and physical properties, which provides a range of applications, including their use in the development of Light Converter Molecular Devices (LMCDs). In this context, this work reports the synthesis, characterization and investigation of luminescent properties and molecular energy transfer process of the new complex bis and tris-diketonates of Europium, Terbium and Gadolinium containing (TTA = 2-thenoyltrifluoroacetate) and (TPAsO = Triphenylarsenoxide) ligands. The complexes were synthesized by direct reaction among the lanthanide chloride, β -diketone and triphenylarsenoxide on the ratio 1: 2: 2 and 1: 3: 2, thereby producing bis-diketonate and tris-diketonate complexes, respectively. The complexes were characterized by elemental analysis of carbon, hydrogen and nitrogen (CHN) and complexometric titration with EDTA. They were also characterized by infrared, ultraviolet and visible spectroscopies. The luminescent properties were investigated based on the excitation and emission spectra, and based on the mono exponential decay curves measured at 298 and 77 K. The bis and tris-diketonate lanthanide complexes exhibit high luminescence intensities, indicating their potential for applications in LCMDs.