# Europium complexes containing aliphatic and indandionate diketonate ligands: synthesis, characterization and luminescence

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The complexes of trivalent lanthanide ions, $Ln^{3+}$, containing β-diketonated ligands, have been widely studied because their unique physical and chemical properties [1]. This work reports the synthesis, characterization and luminescent properties of $Eu^{3+}$ tetrakis mixed complexes containing tris-(2-acyl-1,3-indandionates) and thenoyltrifluoroacetonate TTA, employeeing triethylamonium ion ($(CH_3CH_2)_3HN^+$) to balance the charge. These complexes were synthesized in two steps: In the first step it was synthesized tris-diketonate hydrated lanthanide compounds and in the second stage water the molecules were replaced by a different diketone ligand. The compounds of formulas $(CH_3CH_2)NH[Ln(TTA)_3(BIND)]$, $(CH_3CH_2)NH[Ln(BIND)_3(TTA)]$, $(CH_3CH_2)NH[Ln(TTA)_3(ACIND)]$ e $(CH_3CH_2)NH[Ln(ACIND)_3(TTA)]$ were characterized by complexometric titration, elemental analysis of C, H and N and absorption spectroscopy in the infrared (IR) region. The IR spectra showed shift to lower energy regions for the band assigned to the ν(C=O) strenching, indicating that diketonate act as chelating ligands by the carbonyl oxygen atoms. Thermogravimetric analysis curves were recorded in synthetic air atmospheres which provided information on the thermal and residual stability of the compounds [2]. Luminescence studies of the compounds were performed based on the emission and excitation spectra of the compounds at 298 K and 77 K. Emission spectra exhibited narrow bands characteristic of the intraconfigurational-4f transitions of the Eu(III) ion. The high luminescence intensity of the complexes under ligand excitation suggests an operative *antenna effect* in the mixed Tetrakis-complexes.

*Keywords:* Tetrakis, mixed, 2-acylindan-1,3-diones, thenoyltrifluoroacetonate, europium complexes

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**References**

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