New rare earth compounds with diketonates acting as efficient luminescence sensitizers

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In this work we reported the syntheses, characterization, X-ray diffraction structures and anomalous luminescence properties of the RE(III)-bis-diketonate complexes, presenting the formulas $[RE(TTA)_2(NO_3)L_2]$, $[RE(DBM)_2NO_3L_2]$ and $[RE(DBM)(NO_3)L_2]$, (where RE = Tb, Eu or Dy and L = TPPO or HMPA ligands). These compounds have been characterized by single crystal X-ray diffraction, elemental analysis and vibrational spectroscopy. Luminescence data at room temperature showed that these complexes exhibit abnormal luminescence intensity when compared with the tris-diketonate similar complexes. These results clearly attest for the highest energy transfer efficiency from TTA and DBM antenna ligands to RE(III) ion in the bis-diketonate complexes. The data have been interpreted in terms of increasing of triplet state when one TTA or DBM ligand is replaced by NO_3^- ion in the first coordination sphere.

Keywords: rare earths, luminescence, β-diketonates, sensitizer,

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