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PHOTOLUMINESCENCE PROPERTIES OF THE SUPRAMOLECULAR COMPOUNDS CONTAINING Eu(III)-β-DIKETONATES AND CALIXARENES.

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The luminescence properties of lanthanide ions have been much interest because of their potential use as probes and labels for a variety of chemical and biological applications. In this work is reported the luminescence behavior of two new inclusion compounds $[Eu(TTA)_3]_2$⊂p-t-butylcalix[8]arene (1) and $[Eu(TTA)_3]_2$⊂ octaacetate calix[8]arene (2) that can be used in biological application. The two supramolecular compounds were characterized by elemental analysis, thermogravimetry (TG) and infrared spectroscopy. The emission spectra of compounds shown the intensification of luminescence corresponding to the $^5D_0 \rightarrow {}^7F_J$ (J=0-4) transitions associated with one site of symmetry. Based on the luminescence spectra of the compounds the Ω_λ experimental parameters (λ=2 and 4) were calculated for the electronic $^5D_0 \rightarrow {}^7F_{2,4}$ transitions. The values of Ω_2 (36.0 and 37.0 $10^{-20}cm^2$) intensity parameters for both compounds respectively are higher than the $[Eu(TTA)_3(H_2O)_2]$ precursor salt, suggesting an effective interaction between the calixarenes and Eu^{3+} ion. High values of Ω_2 were obtained and reflect the hypersensitive character of the $^5D_0 \rightarrow {}^7F_2$ transition, indicating that Eu^{3+} ion is in the high polarizable chemical environment and suggest the dominance of short distance effect. The compounds show values for the Ω_4 parameters (7.8 and 9.6 $10^{-20}cm^2$), where $\Omega_2 > \Omega_4$ suggests that the coordination geometry is such that the smaller rank components of these interactions have higher values than the higher rank ones, perhaps as a consequence of the difference in the basicity of oxygen donor ligands.

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