

Luminescent properties of the Eu(III)-complexes with 2-isovaleryl-1,3-indandionate and heteroaromatic ligands

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Coordination complexes containing trivalent lanthanide ions are widely studied due to their distinct spectroscopic properties. These compounds typically exhibit intense emissions with characteristic colors, which arise from the interaction between the lanthanide ion and the ligand, which acts as a luminescence sensitizer.[1] However, the emission intensity can be reduced by the presence of non-radiative processes, among which multiphonon relaxation and low-energy ligand-to-metal charge transfer (LMCT) states stand out. In this context, the present work reports the synthesis, characterization, and luminescence studies of new trivalent lanthanide ion compounds (Ln^{3+} : Eu^{3+}) containing the ligand 2-isovaleryl-1,3-indandionate (isovind) and neutral ligands L: 2,2',6',2''-terpyridine (terpy), 1,10-phenanthroline (phen) or 2,2'-bipyridine (bipy), with the general formula $[\text{Eu}(\text{isovind})(\text{NO}_3)_2\text{L}]$. The Fourier-transform infrared spectroscopy (FT-IR) data suggest that bidentate isovind and nitrate ligands are coordinated to the metal ion via oxygen atoms, while the heteroaromatic ones are coordinated by nitrogen atoms. The Luminescence properties of the complexes were investigated based on emission spectra recorded at 300 and 77 K. The complexes containing ancillary neutral ligands exhibit high emission intensities in the red region. Therefore, the results suggest that the newly prepared compounds have great potential to act as light emitters in molecular devices

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References

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