

Investigations of the spectral properties of lanthanide(III) complexes with 3,3'-bi-isoquinoline-2,2'-dioxide (biqO₂) and a biqO₂-cryptate in solution, solids, and gels.

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Increasing interest has been observed in the spectroscopic properties of lanthanide ions in cryptates and heteroaromatic ligands where the lanthanide ions are encapsulated into the ligand structure [B. Alphonse, J.M. Lehn, G. Matkis, *Angew. Chem.* 99 (1987) 259; J.M. Lehn, in: V. Balzani (Ed.), *Supramolecular Photochemistry*, Reidel, Dordrecht, 1987, pp. 29–42; N. Sabbatini, S. Perathoner, V. Balzani, B. Alphonse, J.M. Lehn, in: V. Balzani (Ed.), *Supramolecular Photochemistry*, Reidel, Dordrecht, 1987, pp. 187–206]. Of special interest are those cryptates and chelating ligands in which efficient energy transfer between the ligands and the rare-earth ion takes place. The goal of the present studies is the description of the best conditions for this intra-system energy transfer in two types of compounds with 3,3'-biisoquinoline-2,2'-dioxide (biqO₂), and for a cryptate incorporating biqO₂. Results are reported for these complexes prepared in water and non-aqueous solutions, and in gels obtained by different methods. Spectroscopic methods, including absorption, emission and excitation spectra, at 293 and 77 K were used to characterize the type and symmetry of the complexes formed in solutions and gels under different conditions (pH and concentration). It is demonstrated that the type of solvent used in the sol–gel process affects the emission intensity through perturbation of the ligand:metal electronic energy levels, and the symmetry and stability of the complexes. Correlation of the solid state spectroscopic results with those in solution and gel for Eu(III) ions, illustrates the role of the energy back transfer process in emission quenching. This is found to be temperature dependent.

Słowa kluczowe

Absorption, Excitation, Emission spectroscopy, biqO₂-cryptate, Energy transfer, Emission quenching

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