Photophysics and structure of selected lanthanide compounds.

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This paper is devoted to photophysical studies of selected lanthanide compounds defining their applicability. The photophysical behaviour of three classes of compounds will be discussed: (1) lanthanide complexes with amino acids, their phosphonic analogues and peptides, (2) lanthanide chelates as efficient luminophores, and (3) new kinds of compound applicable in biomedical assays. The majority of the results reported to date have been obtained for solutions, applying lanthanide ions as a spectroscopic probes in biologically active systems. Thus, our effort is addressed to solid-state spectroscopic and structural investigations. On the other hand advances in the development of efficient luminophores based on molecular light conversion in lanthanide chelates are presented—mainly the results of our group. Attention has been focused on: the radiative and non-radiative processes, the mechanism of the intramolecular energy transfer, the role of the charge–transfer states in this process, the electron–phonon coupling, including the resonance effect, the multi-ion cooperative interactions, and dynamics of the excited states in chiral systems—the phenomena affecting the luminescenscence efficiency. High resolution electron spectroscopy at low temperatures has been particularly useful in determining metal ion symmetry and the number of the sites.

Słowa kluczowe

Photophysics, Lanthanide chelates, Spectroscopy, Structure, Energy transfer, Amino acids, Peptides

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