Comparison of the spectroscopic properties of lanthanide polymeric and dimeric carboxylates (Pr, Eu).

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Streszczenie

Recently, interest in the spectroscopy of concentrated and doped lanthanide systems, especially the luminescence of different dimer systems, has been renewed. This is important for both fundamental and application reasons. The luminescence of rare-earth ions has been applied, among other areas, in luminescent lighting, color television screens, computer tomography, fluorescence immunoassay, lasers, solar concentrators, and up-conversion laser materials. The most efficient up-coversion processes in lanthanide systems rely on two-ion energy transfer[I]. A crystal lattice in which lanthanide ions form dimers is therefore ideally suited for the study of such processes[2]. The investigation of the effect of dimeric structure on the spectroscopic properties of lanthanide ions is worthwhile, sinceit yields better understanding of the ion-ion interaction. Frequently, the cooperative effect competes with radiative and nonradiative single-ion relaxation processes. These effects have been investigated for both kinds of lanthanide compounds: mainly ionic systems [2-7] and sporadically molecular systems [8-131. In this paper we present studies of the second type of compounds.

In order to gain insight into the nature of the ion-ion interaction, our group has been systematically investigating the effect of dimeric and polymeric structures on the spectroscopy of lanthanide ions. Most of our efforts are devoted to praseodymium and europium systems, because the structures of the electronic levels of these ions are advantageous for studies of single-ion relaxation processes and ion pair interaction.The main focus of our studies was a comparison of spectroscopic data of polymeric and dimeric systems.

Adres publiczny

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