New erbium (3+) hexafluoroacetylacetonates with spirocyclic photochromes: synthesis, structure, properties

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The functionalization of monomolecular magnets (MMM), viz metal complexes with various organic ligands, in order to give them additional (photo-, conductive, etc.) properties is a "hot topic" in the chemistry and physics of new materials. For example, the reversible photocyclization of complexes containing a photochromic component in the molecule upon UV or visible light irradiation can cause “switching on/switching off” the slow MMM relaxation [1].

Heavy lanthanide ions are increasingly being used for the design of MMMs due to their significant magnetic anisotropy and greater sensitivity to the surrounding crystal field [2]. It has been established that in a number of such molecular systems, the quantum tunneling mechanism of relaxation is controlled by photoisomerization [3, 4]. However, due to the high degree of coordination of 4f ions, systems with a weak modification of magnetic properties have been obtained so far [5–8].

In this work, new Er (3+) hexafluoroacetylacetonates with spirocyclic photochromes were synthesized. Their structure, magnetic properties, and photochemical activity were studied.

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