Chirality transfer between hexaazamacrocycles in heterodinuclear rare earth complexes.

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Streszczenie

Both the chiral hexaazamacrocyle L1 based on *trans*-1,2-diaminocyclohexane and the achiral hexaazamacrocyle L2 based on ethylenediamine form lanthanide(III) dinuclear μ-hydroxo bridged complexes which have been characterized by NMR and CD spectroscopy. The homodinuclear complexes of the type $[Ln_2(L1)_2(\mu\text{-}OH)_2](NO_3)_4$ (Ln = Nd^{III}, Eu^{III}, Tb^{III} and Yb^{III}) have been synthesized in the enantiopure form and the X-ray crystal structures of Nd^{III}, Eu^{III} and Yb^{III} derivatives have been determined. The heterodinuclear cationic complexes $[Ln(L1)Ln'(L2)(\mu\text{-}OH)_2X_2]^{n+}$ have been generated and characterized in solution by using the mononuclear complexes of L1 and L2 as substrates. While the formation of $[LnLn'(L1)_2(\mu\text{-}OH)_2X_2]^{n+}$ dinuclear complexes is accompanied by chiral narcissistic self-sorting, the formation of $[Ln(L1)Ln'(L2)(\mu\text{-}OH)_2X_2]^{n+}$dinuclear complexes is accompanied by the sizable sociable self-sorting of macrocyclic units. The homodinuclear complexes $[Y_2(L1)_2(\mu\text{-}OH)_2X_2]^{n+}$ and $[Ln_2(L2)_2(\mu\text{-}OH)_2X_2]^{n+}$ (Ln = Dy^{III}, Pr^{III} and Nd^{III}) are CD silent in the visible region due to the lack of f–f transitions and the presence of an achiral ligand, respectively. In contrast, the heterodinuclear $[Y(L1^S)Ln(L2)(\mu\text{-}OH)_2X_2]^{n+}$ complexes give rise to CD signals arising from the f–f transitions because of the chirality transfer from the L1 macrocyclic unit to the L2 macrocyclic unit.

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