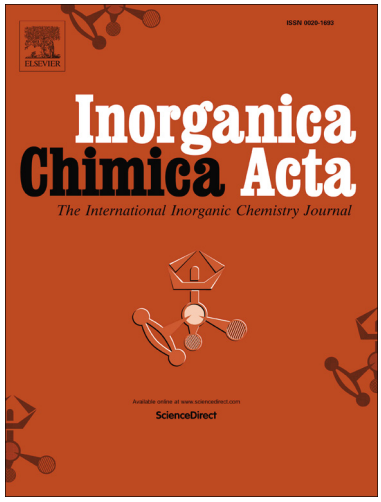

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One-pot metal template synthesis, crystal structures and spectroscopic properties of self-assembled rare earth metal ion complexes of salicylaldimine ligands

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Abstract

The one-step metal-promoted condensation reaction of salicylaldehyde with diethylenetriamine in the presence of rare earth metal ions carried out in the same experimental conditions produces two types of salicylaldimine complexes. The compounds were characterized by spectroscopic data (ESI-MS, IR, UV/Vis, luminescence) and X-ray crystallography. The complexes contain the deprotonated tetradentate $C_{11}H_{16}N_3O$=$(L^1)^{1-}$ *N*-(salicylidene)-diethylenetriamine or pentadentate $C_{18}H_{19}N_3O_2$=$(L^2)^{2-}$ *N,N'*-bis(salicylidene)-diethylenetriamine ligand as a result of the [1+1] or [2+1] Schiff base condensation, respectively. The metal ions are bonded to all the potential nitrogen and oxygen donor atoms. The crystal structures of the complexes reveal two different supramolecular architectures: a monomer in $[Tm(C_{11}H_{16}N_3O)_2]NO_3 \cdot CH_3OH$ complex with formation of a two-dimensional self-assembled network and a dimer in $[M_2(C_{18}H_{19}N_3O_2)_2(NO_3)_2]$ complexes (M = Y^{3+}, Eu^{3+}or Lu^{3+}), although in all cases the metal ions are eight-coordinated with distorted square antiprism geometry.

Keywords: Rare earth metal ions; Self-assembly; Schiff base complexes; Crystal structures

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