



Luminescent Lanthanide Complexes with the Helicate Molecular Structure for New Aspects

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Owing to their chirality and optical properties, helical luminescent architectures have lately attracted considerable interest in material science. Based on rare earths coordination compounds, the synthesis of strategic helicate molecules displaying luminescence or magnetic properties has been reported [1]. We have designed helical mononuclear f-complexes based on hexadentate organic ligands and investigated their photophysical stability in solution. Figure 1 shows the solid-state structures obtained by X-ray diffraction on single crystals of a series of f-coordinating helicates based on an organic ligand consisting of two bipyridine moiety bridged by ethylenediamine [2]. Owing to its energy donor level, the ligand efficiently promotes the $f-f$ transitions *via* intramolecular energy transfer in organic solvents and in ionic liquids[3]. The introduction of carboxyl groups on the ligand backbone, renders these complexes soluble in water. Interestingly, in aqueous media, the f-complexes display stable luminescence in a wide pH range (2.6-11.4) [4]. Recently, the introduction of an acyl group bearing alkyl chains resulted in an unexpected coordination mode [5]. For the Eu complex five chelate rings are substituted by oxygen atoms belonging to acyl groups.

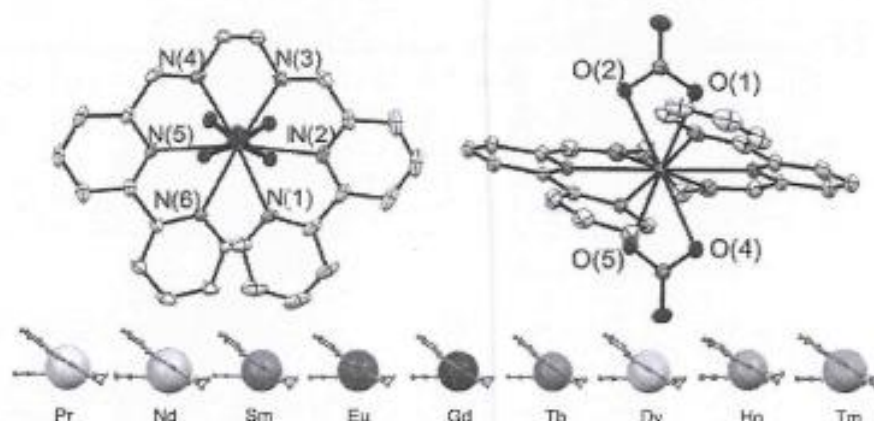


Figure 1 (top) Structure of metal complexes LnL and (bottom) their side-views.

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4. S. Ogata, M. Hasegawa, *et al.*, *New J. Chem.*, **2017**, 41, 6385.
5. S. Ogata, M. Hatanaka, M. Hasegawa, *et al.*, *Dalton Trans.*, **2018**, 47, 7135.