

industrial, biochemical, and medicinal application [1]. Although rare earth metal cations are widely used, little is known about the stability and the structure of their complexes in solution. In the absence of strongly stabilizing ligands, the complex formation is often precluded by the competition for the coordination sites from the solvent molecules and the counteranions. Metal complexes of phenanthroline and other structurally related ligands are of increasing importance in studies with DNA. Obviously, investigation on rare earth metal complexes of phenanthroline are of significant value for modern coordination chemistry [2,3].

Herein, we report crystal structure of $\text{Ho}(\text{phen})_2(\text{NO}_3)_3$. The branched tube method was employed for the preparation of suitable single crystals. $\text{Ho}(\text{phen})_2(\text{NO}_3)_3$ was synthesized from the mixture of $\text{Ho}(\text{NO}_3)_3$ and phenanthroline in stoichiometric amount. The title compound was placed in one arm of a branched tube, methanol was carefully added to fill both arms, the tube sealed and the compound containing arm immersed in a bath at 80°C , while the other was at ambient temperature. After 2 days, crystals were deposited in the cooler arm which was filtered off, washed with ether, and air dried. The tencoordinate $\text{Ho}(\text{III})$ ion is chelated by four N atoms from two phenanthroline (phen) ligands and six O atoms from three bidentate nitrate groups. The environment around the Ho atom can be described as a distorted bicapped square antiprism. It is believed that the Phen ligand may displace the coordinated water molecules. Almost all of the complexes were crystallized in the monoclinic space group C2/c [4]. In the title compound, four nitrogen atoms (from two phen ligands) and six oxygen atoms from three bidentate nitrate groups are coordinated to the central $\text{Ho}(\text{III})$ ion. Bond lengths and angles have normal values. In the crystal structure, short intermolecular distances between the centroids of six-membered rings prove an existence of π - π interactions, which link the molecules into stacks extended in direction. The crystal packing is further stabilized by the weak intermolecular $\text{C}\cdots\text{H}\cdots\text{O}$ hydrogen bonds.

In conclusion, synthesis and crystal structure of $\text{Ho}(\text{phen})_2(\text{NO}_3)_3$ has been investigated.

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X-Ray diffraction and photophysical studies on new platinum complexes

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Non covalent interactions highly contribute to the arrangement of smaller molecules into more elaborate structures generating a diverse number of different architectures. They have also been recognized to play an important role in molecular recognition, crystal engineering, self assembly and molecular electronics [1-3]. Besides, some of these weak interactions (π - π or $\text{Pt}\cdots\text{Pt}$) can display rich photoluminescent properties fairly different from the observed in the single molecules.

We report the preparation of a new 2, 6-diphenylisonicotinic derivative, its mono- and bis-cycloplatination, using a slightly modified version of the Rourke's method [4]. Reactions of this new compound $[(\text{EtO}_2\text{C}-\text{C}^{\wedge}\text{N}^{\wedge}\text{C})\text{Pt}(\text{DMSO})]$ with a range of monodentate

and bidentate ligands as well as with some metallic species gave rise to a brand new series of platinum (II) complexes which were analitically and spectroscopically characterized.

Solid state structures of these complexes have also been determined by X-ray diffraction studies, showing, the presence of weak inter- and intramolecular interactions (metal---metal, π --- π , $\text{C}-\text{H}\cdots\pi$ and $\text{C}-\text{H}\cdots\text{X}$). All these weak non-covalent interactions lead to the generation of different supramolecular bi- and tridimensional structures.

Photophysical studies have been performed on these complexes whether in solid state or in solution, showing a correlation between the crystalline structures and the emissive behaviour.

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Gel-based dimensionality control in multifunctional coordination polymers

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The use of gels as a crystal growth media of a wide range of compounds has been reported in the literature including inorganic salts, organic molecules, coordination compounds and also proteins. Gel media enables a mass transport in a convection-free diffusive regime, reducing the nucleation rate and generally improving crystal quality. In addition, higher degrees of supersaturation without instantaneous nucleation can be reached with crystallization in gels, enabling the access to metastable phases and inducing polymorphism. On the other hand, the use of gels can tune the ratio metal to ligand ratio when used in advanced crystallization techniques such as the counter diffusion method and thus lead to the formation of compounds with different dimensionalities [1].

The properties of metal-organic compounds depend to a large extent in the different dimensionality they may present (isolated complexes, 1D, 2D, or 3D coordination polymers). Moreover, the same ligands and metal atoms can form different dimensioned polymorphs and hydrates [2]. The aim of this research work is to control systematically the obtaining of the different polymorphs and hydrates of the coordination polymers prepared by diffusion through different gel media (varying the conditions), and in studying the nature and properties of the crystals obtained.

A family of coordination polymers with transition metals (Mn, Co, Ni, Cu, Zn) and mixed ligands (2,6-Naphthalenedicarboxylic acid: *NDC*, and 4,4'-bipyridine: *44bipy*) has been analyzed. Isolated (0D) structures and 1D paddle-wheel complexes of this family of compounds are found in the literature with Co, Ni and Zn, all of them obtained by hydrothermal synthesis [3-4].

