

Functional properties of transition metal complexes modulated by molecular and supramolecular exotic arrangements

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The preparation, characterization and optimization of the functional properties of coordination complexes containing nitrogen ligands obtained exploring a variety of building blocks will be discussed. Very minor changes in connectivity, composition and polarity of the molecular entities employed in the self-assembly steps significantly affect the structural, thermal and mesogenic behavior of the resulting materials. Indeed the molecular architectures of the selected systems have been controlled by the modulation of different and tunable molecular motifs: the metal-ligand fragment as central unit, which can be constituted by 4,4'-disubstituted-2,2'-bipyridines, 4,4'-disubstituted-2,2'-phenantrolines, 4,4'-disubstituted-2,2'-bisquinolines, 3,5-disubstituted-2,2'-pyrrolopyrroles, 2-methylquinoline and silver(I), palladium (II), zinc(II), gallium(III) ions, the number of flexible chains at the periphery, the type of complementary ligands completing the coordination sphere of the metal ion, and the counter-ion when the complex is ionic. Moreover, the appropriate choice of the molecular construction motifs allows to control the supramolecular architectures and to induce pre-selected properties from the single molecule level to the supramolecular network, confirming that metal coordination provides a versatile concept for the synthesis of 'non conventional' systems and the potentiality of soft materials for functional devices.

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