Thiophene based molecular materials for (non)linear optics

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New generations of the optoelectronic devices for communications, optical switching and information storage require the development of materials with exceptional nonlinear optical (NLO) response [1]. Thus, organic materials, polymeric materials, organometallic or coordination metallic complexes as well as new hybrid organic/inorganic nanocomposites have been the subject of both experimental and theoretical investigations during many years because of their valuable potential applications in photonics and optical devices

We have been recently interested in the synthesis and characterization of both electroactive and photoactive organic materials as well as their coordination metal complexes for nonlinear optical applications. These NLO properties could be modulated by the nature of the donor/acceptor and in the case of metal complexes by the nature of the metal cation used [2-4].

In this presentation a focus will be made on first the chemical synthesis and characterization of the organic push-pull materials and the ligands and their corresponding metal complexes using d-transition metal cations such as Zn(II) (see the figure below) , Ru(II), Fe(II),… Then we will discuss about the valuable potential of such materials to be used in photonics by studying their nonlinear optical properties. A particular interest will be on the effect of the nature of substituents within the organic materials and then on the effect of the nature of the metal used in the metal complexes.

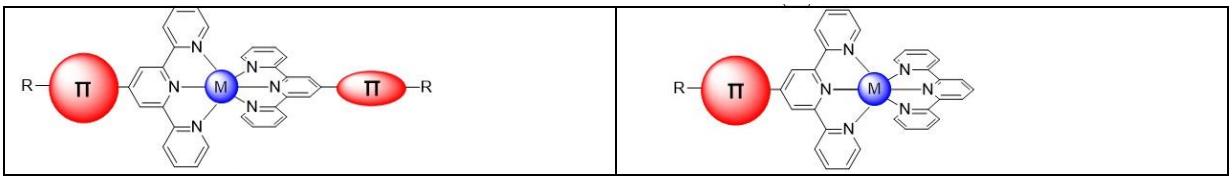

Figure 1. Homo and heteroleptic functionalized metal complexes

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