



# XXV INTERNATIONAL CONFERENCE on ORGANOMETALLIC CHEMISTRY

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## PROGRAM

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<http://cqe.ist.utl.pt/events/icomc25/>

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**PA.195**

**NEW ORGANOMETALLIC FE(II) AND RU(II) THIENO[3,2-B]THIOPHENE ALKYNYL COMPLEXES FOR NLO SWITCHING**

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The molecule-based switching of nonlinear optical (NLO) properties is of great interest in the growing fields of optoelectronics and photonics. The concept of molecular switching based on NLO properties is the possibility of achieving a change in the NLO response between two forms ('on' and 'off'), provided that the two molecular forms have a large difference in the magnitude of the corresponding hyperpolarizabilities. [1] In order to accomplish this effect, several kinds of stimuli can be applied, such as chemical, optical or electrochemical stimulus.[2] Organometallic compounds have considerable potential as molecules for NLO switching since the diversity of metal centers, oxidation states, ligand environment and coordination geometries allow to fine tuning the NLO response in order to achieve suitable switchable forms. In fact, organometallic compounds that have been studied for this purpose revealed motivating results.[3]

In this study we present the synthesis of new iron(II) and ruthenium(II) thieno[3,2-b]thiophene acetylide complexes which were characterized by the usual spectroscopic techniques (NMR, Uv-Vis, FTIR) and cyclic voltammetry. A change in pH (protic switch) was used to induce an interchange between the alkynyl and vinylidene complexes for which different NLO responses are expected. The switching abilities were evaluated through Uv-Vis studies at different pH values where the difference in the color of the solutions (from blue to yellow), indicating an interchange between the two forms, was used to correlate the results with the predicted changes in the NLO properties. In general, all the complexes present reversible interchanging between the alkynyl and vinylidene forms in solution. This makes these compounds suitable for the further study of the molecular switching based on the NLO properties.

[1] B. Coe, *Chem. Eur. J.* 1999, 5, 2464. [2] I. Asselberghs, K. Clays, A. Persoons, M. Ward, J. McCleverty, *J. Mater. Chem.* 2004, 14, 2831. [3] Katy A. Green, Marie P. Cifuentes, Marek Samoc, Mark G. Humphrey, *Coord. Chem. Rev.* 2011, 255, 2530.

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