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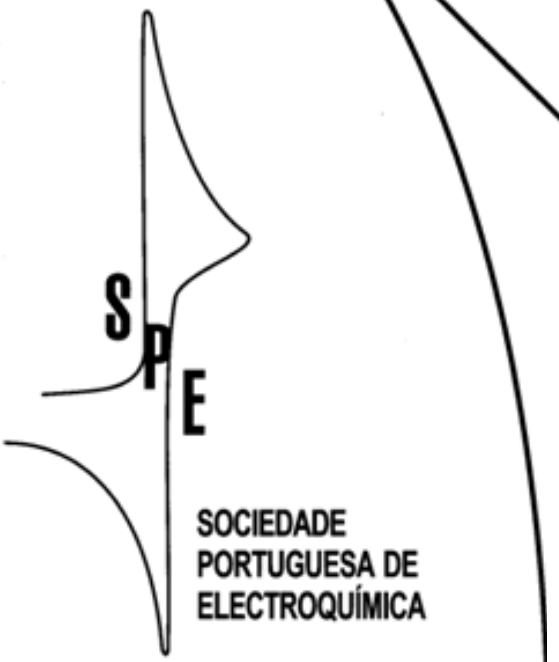

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Complexes for NLO: Cyclic Voltammetry Study

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Organometallic compounds continue to attract considerable interest owing to their application in the field of nonlinear optics (NLO) [1]. For second-order nonlinear optics, strongly asymmetric systems are needed, which led to the development of typical push–pull systems in which the metal centre, bound to a highly polarizable conjugated backbone, acts as an electron donor (D) or acceptor (A) group. This is the case of the general family of η^5-monocyclopentadienylmetal complexes presenting benzene- or thiophene-based conjugated ligands coordinated to the metal centre through nitrile or acetylide linkages which revealed to be much more efficient donor groups for second-order NLO purposes than the traditional organic donor groups [2,3]. Recently, a new promising approach has emerged that is the concept of switchable second-order nonlinear optical (SONLO) properties [4]. This makes possible to achieve a switch in the SONLO response between two forms since they have great difference in the magnitude of the corresponding first hyperpolarizabilities. The hyperpolarizability can be altered, for instance, by reducing the donor capacity of the donor moiety (D) by oxidation. Thus, the presence of redox-active metal centers together with a hyperpolarizable conjugated framework provides good opportunities for modulation of molecular NLO responses, and is hence a primary justification for the study of these systems.

The cyclic voltammetry (CV) plays a role in this field. Besides the information about the electron richness of redox-active centres and the correlation with spectroscopic properties, CV can give an insight on the reversibility/stability of oxidized and reduced species. In our ongoing work on the study of organometallic compounds with molecular SONLO properties, we report the CV studies of η^5-monocyclopentadienyliron(II) and nickel(II) complexes with substituted thiophene-based ligands in view of the potential use of these systems as switchable SONLO molecules.

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References

[1] Goovaerts, E; Wenseleers W.; Garcia, M.H.; Cross G.H. *Handbook of Advanced Electronic and Photonic Materials, Ed. H.S. Nalwa*, 2001, *9*, 127.
[2] Powell, C.M.; Humphrey, M. G. *Coord. Chem. Rev.* 2004, *248*, 725.
[3] Garcia, M.H.; Mendes, P. J.; Robalo, M.P.; Duarte, M.T.; Lopes, N. *J. Organomet. Chem.* 2009, *694*, 2888.
[4] Asselberghs, I.; Clays, K.; Persoons, A; Ward M.; McCleverty, J. *J. Mater. Chem.* 2004, *14,* 2831.