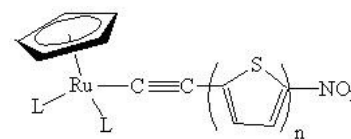


Syntheses and characterization of η^5 -monocyclopentadienylruthenium(II) complexes with thienyl acetylide chromophores for nonlinear optics

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Over the past 20 years, there has been a growing interest in the design and synthesis of organic and organometallic molecules for the development of novel nonlinear optical (NLO) materials owing to their potential application in the area of integrated optics.¹ Ultimately, these materials could be used with enhanced efficiency and versatility in areas such as optical communications, computing and data storage. Fundamental research has been focused in the establishment of detailed structure–activity correlations in view to obtain large intrinsic optical nonlinearities. For second-order nonlinear optics, this lead to the development of typical push-pull systems in which the metal center, bonded to a hyperpolarizable organic chromophore, acts as an electron releasing or withdrawing group. Among the organometallic compounds presenting this structural feature, systematic studies were made on half-sandwich complexes presenting benzene-based chromophores bonded to the metal center via nitrile or acetylide linkages.^{2,3} The results revealed that the compounds possessing acetylide ligands have better NLO properties than the nitrile analogues. In addition, recent results on half-sandwich complexes presenting thiophene nitrile chromophores showed an enhanced NLO performance when compared to that observed on analogue benzenoid structures.⁴ These results suggest that combination of acetylide thiophene ligands with appropriate organometallic fragments would maximize the NLO response. Thus, we report herein the preliminary results concerning the synthesis and characterization, together with solvatochromic behavior of new compounds derived from the organometallic fragment RuCpL_2 (L =phosphines) possessing different thiophene acetylide based chromophores (an example of target molecules is depicted in figure). Spectroscopic data will be used as a probe on the NLO properties of these compounds.



$\text{L} = \text{PPh}_3$; $\text{L}_2 = \text{DPPE}$; $n = 1-2$

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