Synthesis and Characterization of Pyrrole-Based Pyridinium Salts as Novel Heterocyclic NLO Materials

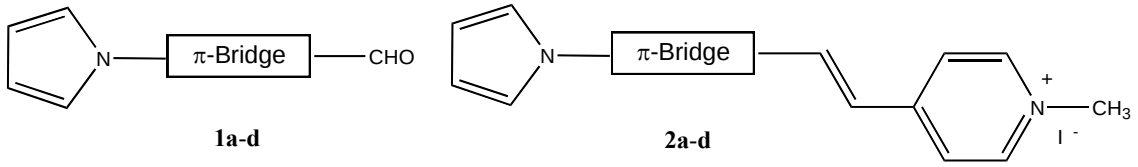
M. C. R. Castro,[1] A. M. C. Fonseca,[1] M. Belsley,[2] and M. M. M. Raposo*[1]

[1]*Centre of Chemistry, University of Minho, Campus de Gualtar, 4710-057, Braga, Portugal*

[2]*Centre of Physics, University of Minho, Campus de Gualtar, 4710-057, Braga, Portugal*

e-mail: mfox@quimica.uminho.pt

Organic salts with strong nonlinear optical (NLO) responses are the focus of much recent attention, in part due to their stability and the ease of tailoring them for specific physical properties. In particular, styryl-pyridinium salts have been widely applied in such diverse areas as frequency-upconversion, optical power limiting, fluorescent probes, laser scanning fluorescent microscopy and molecular electronics.[1] Motivated by our recent results[2] in donor-acceptor heterocyclic NLO-phores we synthesized chromophores **2** containing pyrrole as electron donor group linked to different π-bridges (thiazolyl, phenyl, biphenyl, arylthienyl) functionalized with the pyridinium acceptor moiety. Pyridinium salts **2** were synthesized through Knoevenagel reaction between the precursor aldehydes **1** and 1-methylpyridinium salt in good yields. On the other hand, aldehydes **1** were prepared through Paal-Knorr synthesis and Suzuki cross coupling reaction (Figure). Here we report on the synthesis of compounds **2** and evaluate their potential as efficient and thermally stable NLO materials by experimentally characterizing their redox properties, thermal stability and second order nonlinear optical response (β_{HRS}).



1a-d **2a-d**

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References

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