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Synthesis of new aryl-thienyl-thiophenes



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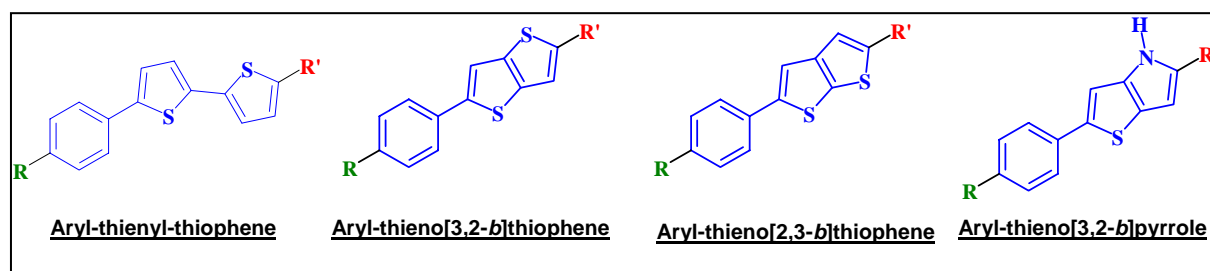
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Abstract- This work is the continuation of a collaboration with a Portuguese group involved since several years in the development of organic compounds having some peculiar physical behavior. For such an application, these compounds should possess the following structure: heterocyclic conjugated π system bearing an electron-acceptor and an electron-donor group.

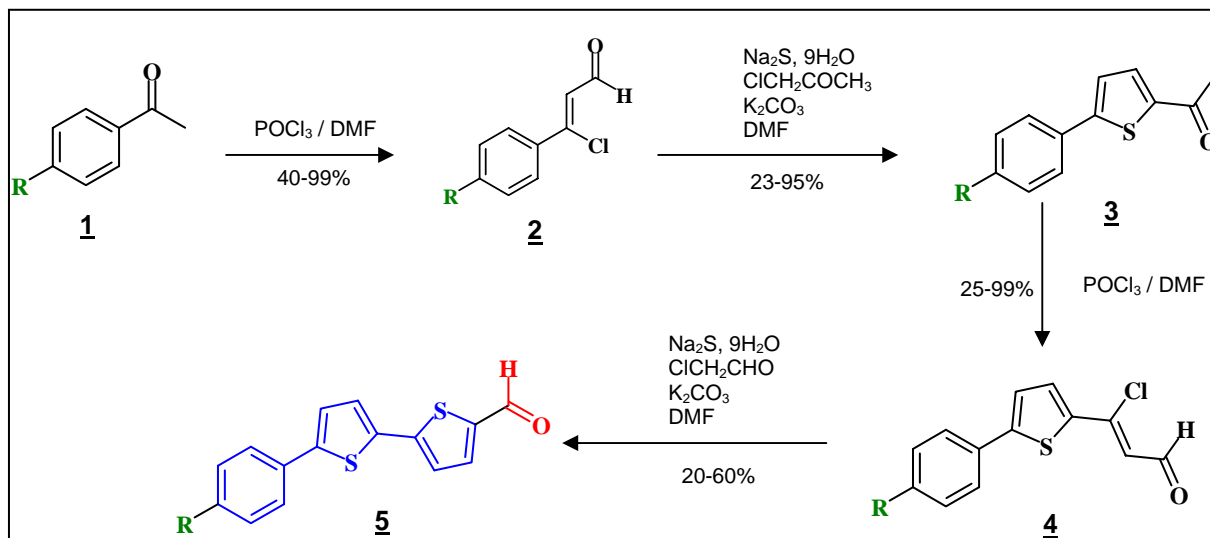
Introduction


Dipolar chromophores constituted as follows: **Donor group** - **Heterocyclic π system** - **Acceptor group** are very interesting in physics for their applicability to electrooptic devices. In recent papers^{1,2}, diversely substituted 5-aryl-thiophene-2-carbaldehyde were prepared and their properties evaluated for nonlinear optical application. We decided to prepare similar structures replacing the thiophene ring with 2-thienyl-thiophene, thieno[3,2-*b*]pyrroles, thieno[3,2-*b*]thiophenes and thieno[2,3-*b*]thiophenes (structures below) and developed synthetic ways based on the expertise of our laboratory.



Results and discussions

Since many years, construction of the thiophene ring is one of the main subjects of the laboratory. Vilsmeier-Haack-Arnold reaction³ on the acetophenone **1** gave the *b*-chloroactroleine **2**, followed by the use of sodium sulfide in the presence of a methylene active compound to obtain the thiophene **3**. Nevertheless, the originality of this work lies in the double use of this classical combination.



R	Global Yield
-H	0,2%
-OMe	4,7%
-OEt	2,1%
-N(Me) ₂	-
-N(Et) ₂	4,6%
	30%

Although the yields are quite low, this 4 steps original method allows to obtain quickly the expected compounds

Conclusion and perspectives

Substituted aryl-thienyl-thiophenes-2-carbaldehyde have been obtained using an original, easy to handle 4 steps synthetic way, starting from commercially available acetophenones.

Physical properties of derivatives of these compounds are currently investigated at the university of Braga, Portugal.

Preparations of the other structures mentioned on that poster are underway.

References

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