

Synthesis of tetraaryl-1,4-dihydropyrrolo-[3,2-b]pyrroles derivatives using niobium pentachloride

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Heteropentalenes are aromatic compounds with 10π delocalized electrons in its structure. That characteristic make these compounds potential candidates as sensitizing dyes of organic electronic devices. Thieno[3,2-b]thiophene is a commercial available product that is used as basis for new compounds with the heteropentalene structure. The pyrrolo-[3,2-b]pyrroles derivatives are scarcely studied as sensitizing dyes in organic electronic devices.

Recently, a synthesis route was described for tetraaryl-1,4-dihydropyrrolo-[3,2-b]pyrroles derivatives (**4a-h**) through a multicomponent reaction between 2 moles of aldehydes derivatives, 2 moles of aniline derivatives and 1 mol of butanedione in the presence of acetic acid at 100°C , with low yields (5-34%).

Based on that, and in the objectives of our research group of applying the niobium compounds as catalyst in organic synthesis, we carried out the synthesis of tetraaryl-1,4-dihydropyrrolo-[3,2-b]pyrroles derivatives using niobium pentachloride as catalyst for the pentacomponent reaction among toluidine (**1**), benzaldehyde derivatives (**2a-h**), and 2,3-butanedione (**3**). The reactions proceeded in room temperature and in anhydrous solvent (CH_3CN). We could synthesize the products in a good reaction time (20-90 min) and with very good yields (49-98%). The products were purified by recrystallization and characterized by spectroscopic and spectrometric methods.

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