

# Synthesis and characterization of novel thienyl-phthalazine based heterocyclic systems functionalized with (bi)thiophene moieties

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## Abstract:

The phthalazine heterocycle has a highly  $\pi$ -deficient aromatic character that makes it a good candidate to be incorporated as electron acceptor group, or even as spacer with auxiliary electron withdrawing abilities, into push-pull systems. Additionally, offers the possibility of protonation, hydrogen bond formation, and chelation through the nitrogen atoms.<sup>1</sup>

Phthalazine derivatives have applications as therapeutic agents,<sup>2</sup> chemiluminescent materials,<sup>3</sup> ligands in transition metal catalysis,<sup>4</sup> and as optical materials.<sup>5</sup>

Some time ago, our research group developed a methodology for the preparation of phthalazine derivatives in three steps, affording halo-thienyl-phthalazine derivatives that play an important role in diazine chemistry since they offer great potential for further functionalization by nucleophilic displacement of the halogen, making numerous otherwise inaccessible diazines become available.<sup>6</sup>

In continuation of the work developed before by our research group,<sup>4b-c, 6</sup> we report in this communication the synthesis and the evaluation of the optical properties of two novel thienyl-phthalazine derivatives, functionalized with (bi)thiophene moieties, having in mind further functionalization in order to prepare push-pull heterocyclic systems for several optical and photovoltaic applications. These studies showed that the optical properties could be readily tuned by varying the  $\pi$ -conjugation path length through the introduction of a second thiophene unit.

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