Synthesis and photophysical properties of imidazole derivatives based on 9-ethylcarbazole heterocycle

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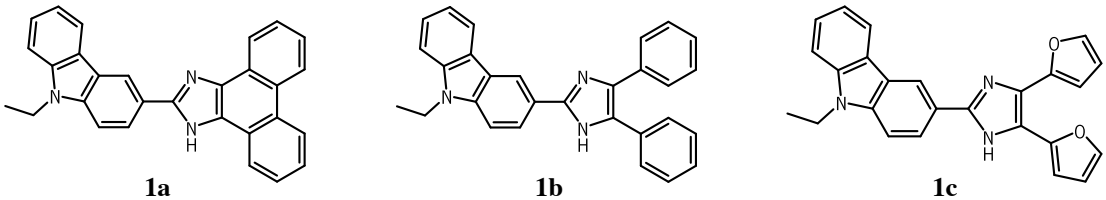
During the last few years, donor-acceptor substituted π-conjugated heterocyclic molecules have gained special research interest, as they have applications as electroactive and photoactive materials in optoelectronic field such as chemiluminescence, fluorescence and photovoltaic technology.[1,2] Imidazole derivatives are very versatile compounds, as they can be applied in various areas due to their optical, redox and thermal properties. Taking into account the substitutions that can be made on the imidazole ring, the optoelectronic properties can be improved and these depend on the electronic nature of the substituted groups and their location in the π-system. It should be noted that the presence of electron rich and/or electron deficient heterocycles in π-conjugated systems can contribute to the improvement of the photophysical properties, especially the increase of the fluorescence efficiency.[3,4] One of the substituents that can be used to enhance these properties is carbazole. This heterocycle has been studied for several years and the literature presents several carbazole derivatives and the study of their optoelectronic properties. In addition, carbazole has been used as electron-donating units in push-pull sistems, which allows for an increase in luminescence properties.[2,5] In this communication, we report the synthesis of new imidazole derivatives **1a-c** substituted in position 2 with 9-ethylcarbazole heterocycle (Figure) and in positions 4 and 5 with (hetero)aromatic groups, using a simple synthetic methodology and an easy purification procedure. These molecules were characterized by ^{1}H and ^{13}C nuclear magnetic resonance (NMR). Finally, a detailed photophysical study was undertaken in acetonitrile solutions.



1a **1b** **1c**

Figure. *Structures of imidazole derivatives* ***1a-c*** *based on 9-ethylcarbazole heterocycle.*

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