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Synthesis of 2-phenyl-1H-benzo[d]imidazole-derived fluorescent G-quadruplexes ligands

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ABSTRACT

This work presents the unprecedented results of the synthesis, structural characterization and determination of the photophysical properties of a series of 1-ethyl-2-aryl-1H-benzo[d]imidazoles iodide salts with potential application as fluorescent ligands for G-quadruplexes. The products were obtained by a condensation reaction of benzene-1,2-diamine with substituted benzaldehydes (**1a-e**) and two subsequent alkylations, obtaining the compounds (**3a-e, 4a**). The synthetic route and the yield of products **3a-e** and **4a** are shown in **Scheme 1**. The UV-vis emission properties were investigated, all compounds absorbed in the ultraviolet region presenting fluorescence. Thermal stability was evaluated by thermogravimetric analysis and the results are shown in **Table 1**. The chemical structure of the compounds was determined by ^{1}H, ^{13}C NMR and two-dimensional experiments: COSY, HSQC, HMBC.

Scheme 1. Synthesis of salts derived from 1-ethyl-2-phenyl-1H-benzo[d]imidazole.

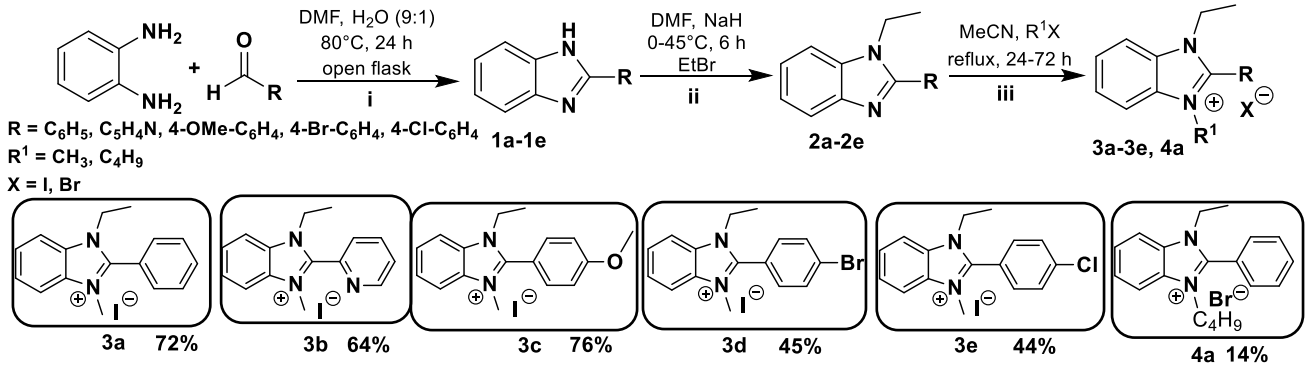

Table 1. Decomposition temperature (T_d) and melting point (T_m) of compounds **3a-e** and **4a**.

Compound	T_d[a] (°C)	T_m[b] (°C)	Compound	T_d[a] (°C)	T_m[b] (°C)
3a	261	198	3d	270	160
3b	233	150	3e	266	244
3c	273	171	4a	243	248

[a]Decomposition temperature. [b]Melting temperature.

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