Diphenylbenzofulvene as White Light Emitters

Ana Clara B. Rodrigues[1]*, Mariana Peixoto[1], Carla Gomes[1], Marta Pineiro[1], J. Sergio Seixas de Melo[1]

[1] CQC, Department of Chemistry, University of Coimbra, P3004-535 Coimbra, Portugal.
* *ana.beltran@uc.pt*

Propeller-shaped molecules such as hexaphenylsilole (**HPS**), tetraphenyletylene (**TPE**) and diphenylbenzofulvene (**DPBF**) are among the first described to display aggregation induced emission (AIE) properties a term coined by Tang and his co-workers to illustrate the enhancement of emission in solid and aggregate state of poorly or non-emissive molecules in solution [1]. Despite the successful examples of solid-state emissive materials based on the AIE-active cores, it is still challenging to design AIE-active fluorophores with tunable solid-state emission that covers the whole visible light spectrum[2]. According to Kasha's rule, upon excitation, photons can only be emitted from the lowest excited state of a molecule; however, since white light emission (WLE) covers whole visible range of the EM spectra (400–700 nm), it is very hard to obtain a single molecule with white light emission.[3] In this work, we have synthesized and investigated the photophysical properties of three **DPBF** derivatives in solution and thin films. The absorption spectra of the films of the three compounds are similar and are described by a broad band between 300-450 nm, with maxima at 340 nm (Figure 1A). Notably, all the derivatives have solid-state emission in films with a broad emission band, that comprehend most of the visible spectra. Moreover, the three films also presented large Stokes-shift making them good candidates for single-molecule white light emission (Figure 1B).

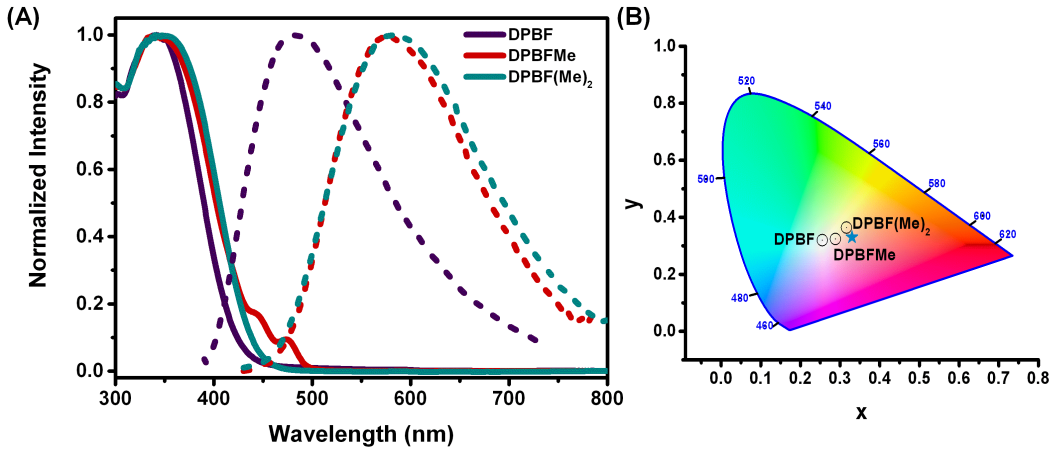

Figure. *A) Absorption (solid line) and emission (dashed line) spectra of* ***DPBF*** *derivatives in Zeonex® films and (B) Photoluminescence color coordinates plotted in the CIE 1931 chromaticity diagram. The blue star corresponds to the coordinates attributed to pure white light emission (0.33, 0.33).*

References

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