

SEPTEMBER
23-27TH
2024

19TH BMO S

BRAZILIAN MEETING
ON ORGANIC SYNTHESIS
BENTO GONÇALVES, RS - BRAZIL

Photoactive formyl benzimidazoles: New molecular scaffolds for optical sensing

Lilian C. Luz,* Leandro Scorsin, Vitor P. Toledo, Vitória M. Capellão, Fabiano S. Rodembusch

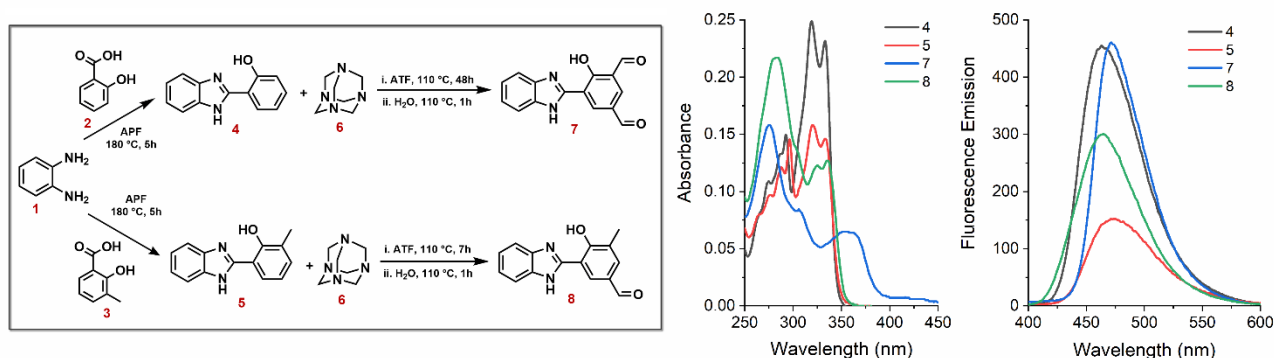
Laboratory of Molecular Catalysis (LAMOCA), Institute of Chemistry, Federal University of Rio Grande do Sul (UFRGS), Porto Alegre-RS, Brazil

*e-mail: liliancmrg@gmail.com

Keywords: benzazoles, formyl derivatives, proton transfer, fluorescence, optical sensors.

ABSTRACT

Excited-state intramolecular proton transfer (ESIPT) is a photochemical process that results in the formation of a tautomer with an electronic structure different from that of the initial conformer. ESIPT-responsive fluorophores exhibit remarkable photophysical properties, such as large Stokes shifts and intense fluorescence emission.^{1,2} This work presents the synthesis and photophysical characterization of photoactive compounds via ESIPT, specifically substituted hydroxyphenyl benzazolic heterocycles, obtained through the classical condensation reaction methodology between a functionalized aromatic amine and a salicylic acid derivative.³ From these precursors, the Duff formylation methodology enabled the synthesis of mono- and biformylated benzazolic heterocycle derivatives. This modification preserved important photophysical characteristics, such as absorption in the UV-region and fluorescence emission in the visible region, with a large Stokes shift (~150 nm), while causing a significant increase in the fluorescence of these molecules if compared with their precursors. Notably, the presence of a formyl group in an aromatic system facilitates the design of new fluorescent compounds.⁴



ACKNOWLEDGEMENTS

We thank the National Council for Scientific and Technological Development (CNPq) and The Coordination for the Improvement of Higher Education Personnel of the Ministry of Education (CAPES) for the fellowship and financial support. We gratefully acknowledge the support of the Graduate Program in Chemistry (PPGQ) by the Federal University of Rio Grande do Sul (UFRGS).

REFERENCES

- [1] Duraisamy, U.; Jerome, P.; Vijay, N.; Oh, T. ESIPT: An approach and future perspective for the detection of biologically important analytes. *J. Lumin.* **2024**, *267*, 120350.
- [2] Sedgwick, A.; Wu, L.; Han, H.; Bull, S.; He, X.; James, T.; Sessler, J.; Tang, B.; Tian, H.; Yoon, J. Excited-state intramolecular proton-transfer (ESIPT) based fluorescence sensors and imaging agents. *Chem. Soc. Rev.* **2018**, *47*, 8842.
- [3] Santos, F.S.; Medeiros, N.G.; Affeldt, R.F.; Duarte, R.C.; Moura, S.; Rodembusch, F.S. Small heterocycles as highly luminescent building blocks in the solid state for organic synthesis. *New J. Chem.* **2016**, *40*, 2785.
- [4] Dias, G.; Rodrigues, M.; Paz, M.; Nunes, M.; Araujo, M.; Rodembusch, F.; Silva Júnior, E. Aryl-phenanthro [9,10-d]imidazole: A versatile scaffold for the design of optical-based sensors. *ACS Sens.* **2022**, *10*, 2865.