SEPTEMBER 23-27 2024
19BMOS
BRAZILIAN MEETING ON ORGANIC SYNTHESIS
BENTO GONÇALVES, RS - BRAZIL

Eletrochemical Diselenation of BODIPY Fluorophores for Bioimaging Applications and Sensitization of $^1O_2$

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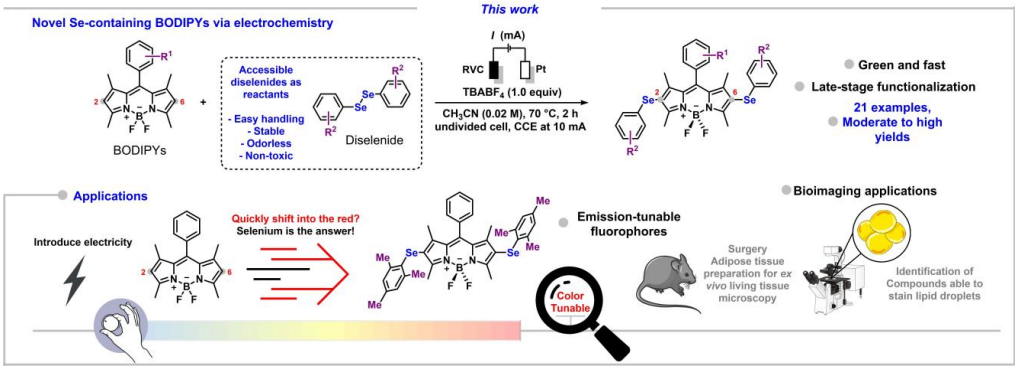
Keywords: *electrochemistry, BODIPY, synthesis, selenium, fluorescence*

ABSTRACT

In this study, we discuss the development of a new efficient method with a scope-extensive approach for the late-stage electrochemical diselenation of BODIPYs. The photophysical studies of the selenium-compounds reveal red-shifted absorption – corroborated by TD-DFT and DLPNO-STEOM-CCSD computations – and color-tunable emission with large Stokes shifts when compared to their precursors. The effect of the heavy atoms of Se facilitate the intersystem crossing that generates triplet states that sensitize 1O2 and display phosphorescence in PMMA films at RT and in a frozen glass matrix at 77 K. Importantly, the seleniumcontaining BODIPYs demonstrate the ability to selectively stain lipid droplets, exhibiting distinct fluorescence in both green and red channels. This work demonstrates the potential of electrochemistry as an efficient method for synthesizing unique emission-tunable fluorophores with broad-ranging applications in bioimaging and related fields.



ACKNOWLEDGEMENTS

Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG), Pró-Reitoria de Pesquisa da Universidade Federal de Minas Gerais (PRPq-UFMG), Instituto Nacional de Ciência e Tecnologia (INCT-Catalises), Fundação Alexandre Von Humboldt

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