Non-symmetrical benzothiadiazole derivatives live cell fluorescence imaging probes

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Keywords: Live-cell imaging, benzothiadiazole, fluorescence.

INTRODUCTION

The development of new live cell fluorescence imaging probes is a subject of major concern.[1] The scope of their application covers several areas of interest such as forensic and pharmaceutical sciences.

Herein, we describe the synthesis and application of non-symmetric benzothiadiazole derivatives (BTD, Figure 1) and their use as fluorescent probes in live cell-imaging experiments.

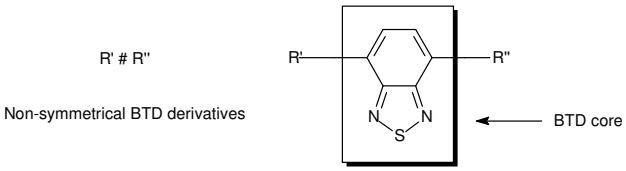
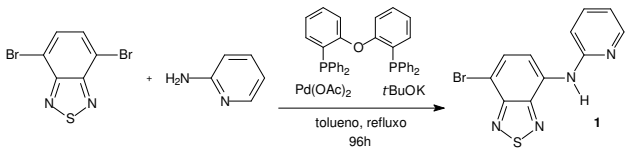


Figure 1: 4, 7-disubstituted-2,1,3-benzothiadiazole

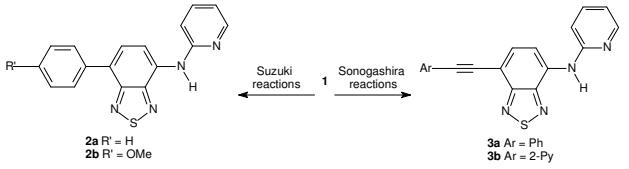
RESULTS AND DISCUSSION

Following a Buchwald-Hartiwig amination protocol,[2] the key intermediate **1** was obtained (Scheme 1).



Scheme 1. Synthesis of intermediate **1**.

Compound **1** was submitted to a Suzuki cross-coupling reaction, giving products **2a,b** or Sonogashira reactions to form products **3a,b** (Scheme 2).



Scheme 2: Suzuki and Sonogashira cross-coupling reactions.

It is interesting to note that compound **1** has the possibility to participate in an excited-state intramolecular proton transfer (ESIPT) process. The observed Stokes shift (1.00 x 10^{-5} M, MeCN solution) was 194 nm (369 nm of absorption and 563 nm of emission).

Derivatives **2a,b** and **3a,b** were directly applied in live cell-imaging experiments and presented promissory results (Figure 2).

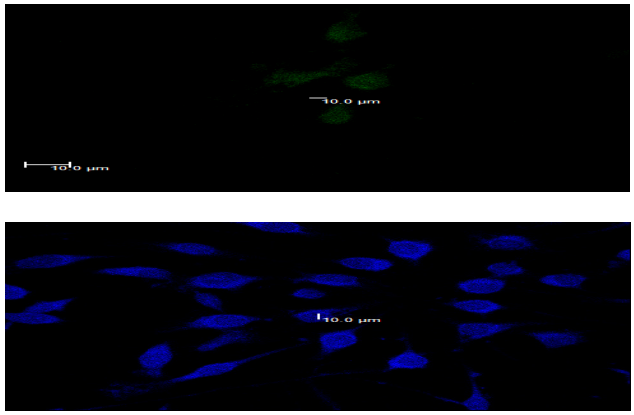


Figure 2. Live cell-imaging test of cellular staining using compound **3a** (top) and **3b** (bottom).

CONCLUSION

The non-symmetrical π-extension of the BTD core generated new compounds with high potential to be used in live cell-imaging. These derivatives will help the understanding of molecular architecture needed to the design and synthesis of new photoluminescent compounds to be used in fluorescent studies or applications.

ACKNOWLEDGEMENTS

We thank CNPq, CAPES and FAPDF for partial financial support.

REFERENCES

[1] Neto, B.A.D.; Lapis. A.A.M. *Molecules*, **2009**, *14,* 1725.
[2] Buchwald, S. T.; Strieter, E. R.; Blackmong, D. G.; Mathew, J. S.; Hartwig, J. F.; Ryberg, P.; Shekhar, S. *J. Am. Chem. Soc.* **2006**, *128,* 3584.