

Accepted Manuscript

Title: Wavelength Dependent Photochemistry of Expanded Chromophore and Asymmetric Dibenzothiophene S-Oxides Derivatives

Authors: John T. Petroff II, Sara M. Omlid, Satyanarayana M. Chintala, Ryan D. McCulla



PII: S1010-6030(17)31770-7
DOI: <https://doi.org/10.1016/j.jphotochem.2018.03.001>
Reference: JPC 11170

To appear in: *Journal of Photochemistry and Photobiology A: Chemistry*

Received date: 4-12-2017
Revised date: 6-2-2018
Accepted date: 1-3-2018

Please cite this article as: John T.Petroff, Sara M.Omlid, Satyanarayana M.Chintala, Ryan D.McCulla, Wavelength Dependent Photochemistry of Expanded Chromophore and Asymmetric Dibenzothiophene S-Oxides Derivatives, Journal of Photochemistry and Photobiology A: Chemistry <https://doi.org/10.1016/j.jphotochem.2018.03.001>

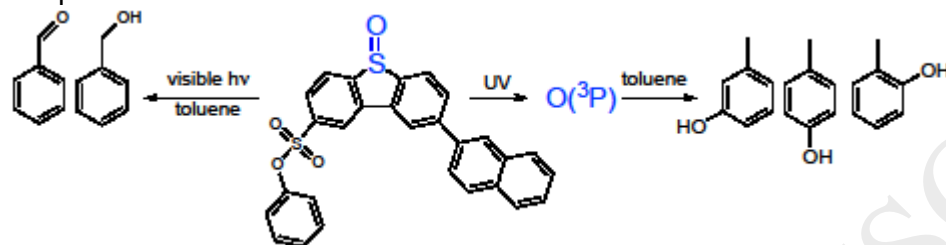
This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Wavelength Dependent Photochemistry of Expanded Chromophore and Asymmetric Dibenzothiophene S-Oxides Derivatives

John T. Petroff II, Sara M. Omlid, Satyanarayana, M. Chintala, Ryan D. McCulla

3501 Laclede Ave., Department of Chemistry, Saint Louis University, St. Louis, MO 63103, United States of America.

Graphical abstract



Highlights

- Irradiation of aryl and sulfonate ester substituted dibenzothiophene S-oxides exhibits wavelength dependent photochemistry.
- Upon irradiation with UV-light, photodeoxygenation yielding atomic oxygen was observed.
- The dibenzothiophene S-oxide derivatives when irradiated by visible light facilitated the oxidation of the benzylic position of toluene.

Abstract

Irradiation of dibenzothiophene S-oxide (DBTO) is believed to generate ground state atomic oxygen [$O(^3P)$]. The irradiation conditions and the efficiency of the deoxygenation event are not ideal when working with biological systems. Dinaphtho[2,1-b:1',2'-d]thiophene S-oxide (DNTO) and several other analogs were shown to allow visible light to drive deoxygenation due to red-shifted absorbance of the DBTO derivatives. Additionally, DNTO and its analogs did not substantially improve quantum yield of deoxygenation ($\Phi_{\text{deox.}}$). To improve both $\Phi_{\text{deox.}}$ and absorbance, changes were made to the DBTO scaffold. The first change was an addition of an electron withdrawing group (EWG) to weaken the S–O bond strength of the sulfoxide to improve $\Phi_{\text{deox.}}$. The second change was the addition of an aromatic substituent to enhance and red-shift the absorbance. Common intermediate experiments were performed in toluene to examine if these new DBTO analogs produced a common oxidant under both UV and visible light

Download English Version:

<https://daneshyari.com/en/article/6492557>

Download Persian Version:

<https://daneshyari.com/article/6492557>

[Daneshyari.com](https://daneshyari.com)