

## Accepted Manuscript

Analysis of the phosphorescent dye concentration dependence of triplet-triplet annihilation in organic host-guest systems

L. Zhang, H. van Eersel, P.A. Bobbert, R. Coehoorn

PII: S0009-2614(16)30538-3

DOI: <http://dx.doi.org/10.1016/j.cplett.2016.07.048>

Reference: CPLETT 34042

To appear in: *Chemical Physics Letters*

Received Date: 14 June 2016

Revised Date: 21 July 2016

Accepted Date: 23 July 2016

Please cite this article as: L. Zhang, H. van Eersel, P.A. Bobbert, R. Coehoorn, Analysis of the phosphorescent dye concentration dependence of triplet-triplet annihilation in organic host-guest systems, *Chemical Physics Letters* (2016), doi: <http://dx.doi.org/10.1016/j.cplett.2016.07.048>

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.



# Analysis of the phosphorescent dye concentration dependence of triplet-triplet annihilation in organic host-guest systems

L. Zhang<sup>a</sup>, H. van Eersel<sup>b</sup>, P. A. Bobbert<sup>a</sup>, R. Coehoorn<sup>a,\*</sup>

<sup>a</sup>*Department of Applied Physics and Institute for Complex Molecular Systems, Eindhoven University of Technology, P.O. Box 513, NL-5600 MB Eindhoven, The Netherlands*

<sup>b</sup>*Simbeyond B.V., P.O. Box 513, NL-5600 MB Eindhoven, The Netherlands*

---

## Abstract

Using a novel method for analyzing transient photoluminescence (PL) experiments, a microscopic description is obtained for the dye concentration dependence of triplet-triplet annihilation (TTA) in phosphorescent host-guest systems. It is demonstrated that the TTA-mechanism, which could be a single-step dominated process or a diffusion-mediated multi-step process, can be deduced for any given dye concentration from a recently proposed PL intensity analysis. A comparison with the results of kinetic Monte Carlo simulations provides the TTA-Förster radius and shows that the TTA enhancement due to triplet diffusion can be well described in a microscopic manner assuming Förster- or Dexter-type energy transfer.

## Keywords:

triplet-triplet annihilation, transient photoluminescence, kinetic Monte-Carlo simulations, organic semiconducors, organic light-emitting diodes

---

## 1. Introduction

Triplet excitons play a crucial role in modern organic optoelectronic devices, such as organic light-emitting diodes (OLEDs) and organic photovoltaic

---

\*

*Email address:* r.coehoorn@tue.nl (R. Coehoorn)

Download English Version:

<https://daneshyari.com/en/article/5378422>

Download Persian Version:

<https://daneshyari.com/article/5378422>

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