

Author's Accepted Manuscript

Evidence of exciton dissociation into carriers induced by electric field in rubrene crystals

K. Goto, T. Takayama, K. Ohata, Y. Matsushita, I. Akimoto



PII: S0022-2313(18)30376-4
DOI: <https://doi.org/10.1016/j.jlumin.2018.08.068>
Reference: LUMIN15866

To appear in: *Journal of Luminescence*

Received date: 27 February 2018
Revised date: 22 July 2018
Accepted date: 23 August 2018

Cite this article as: K. Goto, T. Takayama, K. Ohata, Y. Matsushita and I. Akimoto, Evidence of exciton dissociation into carriers induced by electric field in rubrene crystals, *Journal of Luminescence*, <https://doi.org/10.1016/j.jlumin.2018.08.068>

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 galley proof before it is published in its final citable 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.

Evidence of exciton dissociation into carriers induced by electric field in rubrene crystals

K. Goto, T. Takayama, K. Ohata, Y. Matsushita, and I. Akimoto*
Faculty of Systems Engineering, Wakayama University

Abstract

We investigated optical carrier injection mechanisms in an organic semiconductor rubrene crystals. We simultaneously measured exciton photoluminescence (PL) and photocurrent under an electric field higher than 1 kV/cm at room temperature. An anti-correlation between the exciton PL intensity and photocurrent was observed. This directly indicates that carriers are generated through an exciton dissociation induced by the electric field. The estimated exciton dissociation efficiency is on the order of 10^{-2} for an excitation wavelength of 442 nm under an electric field of 12 kV/cm at room temperature. In addition, we revealed that both carriers and excitons are trapped at oxidation sites at the surface area of the crystal and more efficiently emit a modified luminescence.

Keywords, rubrene, exciton dissociation, photocarrier

* Corresponding author

akimoto@sys.wakayama-u.ac.jp

Sakaedani 930, Wakayama 640-8510, Japan

Faculty of Systems Engineering, Wakayama University

Download English Version:

<https://daneshyari.com/en/article/8961404>

Download Persian Version:

<https://daneshyari.com/article/8961404>

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