

# 賀 海大光電與材料系洪文誼 特聘教授與台大研究團隊共同發表頂尖期刊 Nature Communications 獲校長頒獎特別表揚

國立臺灣海洋大學 107 學年度第 1 學期第 6 次行政會議紀錄

時間：108 年 1 月 15 日(星期二)上午 9 時 00 分

地點：行政大樓第二演講廳

出席人員：詳簽到單

主席：張校長清風

## 壹、頒獎

一、優秀論文入選國際著名期刊 NATURE COMMUNICATIONS 獲獎教師

單位	姓名	職稱	論文名稱	獎勵
光電科學研究所	洪文誼	教授	Probe exciplex structure of highly efficient thermally activated delayed fluorescence organic light emitting diodes	獎狀乙幀 獎金5萬元



ARTICLE  
DOI: 10.1038/s41467-018-05527-4 OPEN

### Probe exciplex structure of highly efficient thermally activated delayed fluorescence organic light emitting diodes

Tzu-Chieh Lin<sup>1</sup>, Monima Sarma<sup>1</sup>, Yi-Ting Chen<sup>1</sup>, Shih-Hung Liu<sup>1</sup>, Ke-Ting Lin<sup>2</sup>, Pin-Yi Chiang<sup>2</sup>, Wei-Tsung Chuang<sup>3</sup>, Yi-Chen Liu<sup>4</sup>, Hsiu-Fu Hsu<sup>4</sup>, Wen-Yi Hung<sup>2</sup>, Wei-Chieh Tang<sup>1</sup>, Ken-Tsung Wong<sup>1,5</sup> & Pi-Tai Chou<sup>1</sup>

The lack of structural information impeded the access of efficient luminescence for the exciplex type thermally activated delayed fluorescence (TADF). We report here the pump-probe Step-Scan Fourier transform infrared spectra of exciplex composed of a carbazole-based electron donor (CN-Cz2) and 1,3,5-triazine-based electron acceptor (PO-T2T) codeposited as the solid film that gives intermolecular charge transfer (CT), TADF, and record-high exciplex type cyan organic light emitting diodes (external quantum efficiency: 16%). The transient infrared spectral assignment to the CT state is unambiguous due to its distinction from the local excited state of either the donor or the acceptor chromophore. Importantly, a broad absorption band centered at  $-2060\text{ cm}^{-1}$  was observed and assigned to a polaron-pair absorption. Time-resolved kinetics lead us to conclude that CT excited states relax to a ground-state intermediate with a time constant of  $-3\text{ }\mu\text{s}$ , followed by a structural relaxation to the original CN-Cz2:PO-T2T configuration within  $-14\text{ }\mu\text{s}$ .

<sup>1</sup>Department of Chemistry, National Taiwan University, Taipei 10617, Taiwan. <sup>2</sup>Institute of Optoelectronic Sciences, National Taiwan Ocean University, Keelung 202, Taiwan. <sup>3</sup>National Synchrotron Radiation Research Center, Hsinchu City 30076, Taiwan. <sup>4</sup>Department of Chemistry, Tamkang University, New Taipei City 25137, Taiwan. <sup>5</sup>Institute of Atomic and Molecular Science, Academia Sinica, Taipei 10617, Taiwan. Correspondence and requests for materials should be addressed to W.-Y.H. (email: wenhung@mail.ntou.edu.tw) or to K.-T.W. (email: kenwong@ntu.edu.tw) or to P.-T.C. (email: chop@ntu.edu.tw)

NATURE COMMUNICATIONS | (2018)9:3111 | DOI: 10.1038/s41467-018-05527-4 | www.nature.com/naturecommunications