

## Author's Accepted Manuscript

Solution Processed Multilayer Red, Green and Blue Phosphorescent Organic Light Emitting Diodes using Carbazole Dendrimer as a Host

Zainal Abidin Hasan, Kai Lin Woon, Wah Seng Wong, Azhar Ariffin, Show-An Chen



PII: S0022-2313(16)30929-2  
DOI: <http://dx.doi.org/10.1016/j.jlumin.2016.11.054>  
Reference: LUMIN14392

To appear in: *Journal of Luminescence*

Received date: 15 July 2016  
Accepted date: 19 November 2016

Cite this article as: Zainal Abidin Hasan, Kai Lin Woon, Wah Seng Wong, Azhar Ariffin and Show-An Chen, Solution Processed Multilayer Red, Green and Blue Phosphorescent Organic Light Emitting Diodes using Carbazole Dendrimer as Host, *Journal of Luminescence*, <http://dx.doi.org/10.1016/j.jlumin.2016.11.054>

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

# Solution Processed Multilayer Red, Green and Blue Phosphorescent Organic Light Emitting Diodes using Carbazole Dendrimer as a Host

Zainal Abidin Hasan<sup>1</sup>, Kai Lin Woon<sup>2</sup> Wah Seng Wong<sup>2</sup> Azhar Ariffin<sup>1</sup>, Show-An Chen<sup>3</sup>

<sup>1</sup>Department of Chemistry, University of Malaya, 50603 Kuala Lumpur, Malaysia

<sup>2</sup>Low Dimensional Materials Research Center, Department of Physics, University of Malaya

<sup>3</sup>Department of Chemical Engineering and Frontier Research Center on Fundamental and Applied Sciences of Matters, National Tsing-Hua University, 101, Section 2, Kuang-Fu Road, Hsinchu 30041, Taiwan, Republic of China

## Abstract

4, 4'-bis(3,6-bis(3, 6-ditert-pentyl-carbazol-9-yl)carbazol-9-yl)-2,2'-dimethylbiphenyl, a novel carbazole dendrimer, has been synthesized. This compound shows an excellent thermal stability with a high glass transition temperature of 283 °C and decomposition temperature of 487 °C. Density functional theory is used to investigate the frontier orbitals. It was found that the Highest Occupied Molecular Orbital and the Lowest Unoccupied Molecular Orbital levels of 4, 4'-bis(3,6-bis(3, 6-ditert-pentyl-carbazol-9-yl)carbazol-9-yl)-2,2'-dimethylbiphenyl are nearly degenerate to the next highest or lowest frontier orbitals. The electron rich outer dendrons along with Highest Occupied Molecular Orbital level of 5.24 eV as determined from cyclic voltammetry makes 4, 4'-bis(3,6-bis(3,6-ditert-pentyl-carbazol-9-yl)carbazol-9-yl)-2,2'-dimethylbiphenyl a good hole transporting material. This compound also shows a triplet energy of 2.83 eV. Solution processable multilayer red, green and blue phosphorescent organic light emitting diodes are fabricated having 4, 4'-bis(3,6-bis(3,6-ditert-pentyl-carbazol-9-yl)carbazol-9-yl)-2,2'-dimethylbiphenyl as a hole transporting host. It was found that the CIE-coordinates remain constant within a wide range of brightness.

Keywords: dendrimer, multilayer organic light emitting diode, solution process, carbazole

## 1. Introduction

Organic light-emitting diodes (OLEDs) have attracted great attention in academic [1] and industrial interests [2] for flat panel displays [3] and solid-state lighting [4-7]. Currently OLEDs are dominated by small molecules which often require vacuum deposition. This increases the cost of production. Solution process light emitting polymers offer the possibility of using large scale roll to roll

Download English Version:

<https://daneshyari.com/en/article/5397666>

Download Persian Version:

<https://daneshyari.com/article/5397666>

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