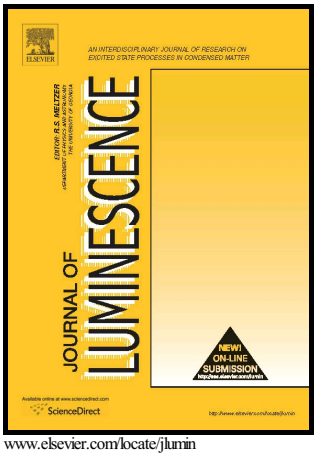

www.elsevier.com/locate/jlumin

WHITE LIGHT EMISSION OF CARBON DOTS BY CREATING DIFFERENT EMISSIVE TRAPS

Julin Joseph, Aji A. Anappara

PII: S0022-2313(16)30302-7
DOI: http://dx.doi.org/10.1016/j.jlumin.2016.05.051
Reference: LUMIN14022

To appear in: *Journal of Luminescence*

Received date: 7 March 2016
Revised date: 25 May 2016
Accepted date: 27 May 2016

Cite this article as: Julin Joseph and Aji A. Anappara, WHITE LIGHT EMISSION OF CARBON DOTS BY CREATING DIFFERENT EMISSIVE TRAPS, *Journal of Luminescence* http://dx.doi.org/10.1016/j.jlumin.2016.05.051

WHITE LIGHT EMISSION OF CARBON DOTS BY CREATING DIFFERENT EMISSIVE TRAPS

Julin Joseph, Aji A. Anappara*

Department of Physics, National Institute of Technology Calicut (NITC),
Kerala-673601, India

Abstract

Here we report a facile and rapid synthetic strategy for white light emitting carbon dots (CDs) by creating inhomogeneity in the surface-moieties by carbonizing ethylene diamine tetra acetic acid (EDTA) and ethylene glycol (EG) which are having different functional groups. The aqueous solution of the as-synthesized nanoparticles exhibits broad-band emission at several excitation wavelengths, with CIE parameters in the white gamut. Furthermore, white light emission is demonstrated through remote-phosphor technology, by capping 365 nm UV chip with PMMA, after dispersing the polymer with CDs. The resulting emission from the white-LED reported colour parameters such as CIE (0.34, 0.38), CRI of 84 and CCT of 5078 K.

1 Introduction

The materials having broad-emission which cover a significant region of visible spectra will appear as white light for human eye. White light emitting (WLE) materials are interesting in solid-state lighting because of their use in flat panel displays and light emitting diodes [1-5]. A variety of WLE materials based on organic, polymer, rare-earth based inorganic and semiconductor quantum-dot based materials have been reported [6-8]. Typically white light emission is based on photoluminescence (optical excitation), electroluminescence (stimulated by electric field), magnetic-induced luminescence (stimulated by magnetic field) or mechanoluminescence (induced due to mechanical deformations) [9-13]. A typical route to generate white light emitting materials is by mixing different components that emit primary

*Corresponding author. Tel: +91 495 2285107. E-mail: aji@nitc.ac.in (Aji A. Anappara)