

## Accepted Manuscript

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PII: S0167-577X(17)30285-9  
DOI: <http://dx.doi.org/10.1016/j.matlet.2017.02.094>  
Reference: MLBLUE 22196

To appear in: *Materials Letters*

Received Date: 5 December 2016  
Revised Date: 12 February 2017  
Accepted Date: 22 February 2017

Please cite this article as: X.G. Zheng, H.L. Wang, G.Q. Ding, G.L. Cui, L. Chen, P.H Zhang, Q. Gong, S.M. Wang, Facile Synthesis of Highly Graphitized Nitrogen-Doped Carbon Dots and Carbon Sheets with Solid-State White-Light Emission, *Materials Letters* (2017), doi: <http://dx.doi.org/10.1016/j.matlet.2017.02.094>

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**Facile Synthesis of Highly Graphitized Nitrogen-Doped Carbon Dots and Carbon Sheets with Solid-State White-Light Emission**

X.G. Zheng<sup>a,\*</sup>, H.L. Wang<sup>b</sup>, G.Q. Ding<sup>c</sup>, G.L. Cui<sup>a</sup>, L. Chen<sup>a</sup>, P.H. Zhang<sup>a</sup>, Q. Gong<sup>c</sup>, S.M. Wang<sup>c</sup>

<sup>a</sup>Institute of Condensed Matter Physics, Linyi University, Linyi 276005, China

<sup>b</sup>Department of Physics, Qufu Normal University, Qufu 273165, China

<sup>c</sup>Shanghai Institute of Microsystem and Information Technology, Shanghai 200050, China

\*Corresponding author

E-mail address: zhengxuegang2@163.com (X.G. Zheng) Tel/fax: +86 5398766218

**ABSTRACT**

We report the hydrothermal synthesis of nitrogen-doped carbon dots (NCDs) and carbon sheets (NCSs) with glucose and ammonia as precursors. The formation and N-doping of NCSs were one-step obtained. NCSs are highly graphitized with six-fold symmetry single-crystal character. The optical properties of NCDs and their application as single-phase solid-state phosphors toward white light-emitting diodes (LEDs) were thoroughly investigated. NCDs solutions exhibit strong blue-green emission under ultraviolet (UV) light illumination and possess excitation-dependent photoluminescence (PL) behavior. Irradiated by UV LEDs, NCDs solutions show broad PL in visible spectral region. To resist self-quenching of NCDs powder resulting from aggregations, poly (vinyl alcohol) (PVA) was added into NCDs solution. Without adding any other phosphors, solid-state NCDs/PVA composite demonstrates direct white-light emission. Our research offers a valuable reference for growing highly graphitized NCSs by facile hydrothermal method and developing white UV-LEDs with environment-friendly and metal-free NCDs phosphors.

**Keywords:** carbon materials, hydrothermal method, fluorescence, nitrogen doping, white light-emitting

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