

# Accepted Manuscript

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PII: S0925-8388(18)32895-0

DOI: [10.1016/j.jallcom.2018.08.021](https://doi.org/10.1016/j.jallcom.2018.08.021)

Reference: JALCOM 47109

To appear in: *Journal of Alloys and Compounds*

Received Date: 31 May 2018

Revised Date: 30 July 2018

Accepted Date: 3 August 2018

Please cite this article as: K. Lin, L. Wang, F. Tian, K. Du, Y. Chang, L. Han, P. Yao, A facile and controllable protocol for simultaneous synthesis of magnetite nanoparticles and luminescent carbon dots, *Journal of Alloys and Compounds* (2018), doi: 10.1016/j.jallcom.2018.08.021.

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# A facile and controllable protocol for simultaneous synthesis of magnetite nanoparticles and luminescent carbon dots

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## Abstract:

Both magnetic Fe<sub>3</sub>O<sub>4</sub> nanoparticles (Fe<sub>3</sub>O<sub>4</sub> NPs) and luminescent carbon dots (CDs) were simultaneously synthesized via a hydrothermal route at temperature as low as 200 °C. The synthesized magnetic Fe<sub>3</sub>O<sub>4</sub> NPs and luminescent CDs were readily separated and purified from the reaction mixture, without the need for additional energy input and chemicals. The magnetic properties of purified Fe<sub>3</sub>O<sub>4</sub> and photoluminescence (PL) behaviors of purified CDs were investigated using Squid-VSM magnetic property measurement system and fluorescence spectrophotometer, respectively. The size of Fe<sub>3</sub>O<sub>4</sub> NPs and the luminescent properties of CDs were tunable by changing the reaction time or ratio between starting materials within a certain range. Fe<sub>3</sub>O<sub>4</sub> NPs exhibited high saturation magnetization in the range of 36.59-68.22 emu/g and their magnetic behavior significantly depend on the size and structure of Fe<sub>3</sub>O<sub>4</sub> NPs. This work was expected to provide a kind of green and high efficiency simultaneously synthesis of size-controllable Fe<sub>3</sub>O<sub>4</sub> NPs and photoluminescence tunable CDs.

## Introduction

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