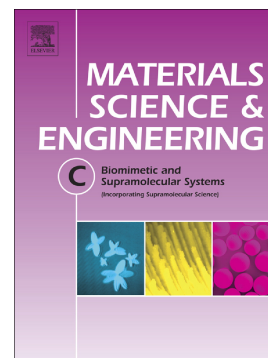


Accepted Manuscript

Cholesterol derived carbon quantum dots as fluorescence probe for the specific detection of hemoglobin in diluted human blood samples

Gopi Kalaiyarasan, James Joseph



PII: S0928-4931(18)30295-9
DOI: [doi:10.1016/j.msec.2018.10.007](https://doi.org/10.1016/j.msec.2018.10.007)
Reference: MSC 8933
To appear in: *Materials Science & Engineering C*
Received date: 29 January 2018
Revised date: 10 September 2018
Accepted date: 2 October 2018

Please cite this article as: Gopi Kalaiyarasan, James Joseph , Cholesterol derived carbon quantum dots as fluorescence probe for the specific detection of hemoglobin in diluted human blood samples. Msc (2018), doi:[10.1016/j.msec.2018.10.007](https://doi.org/10.1016/j.msec.2018.10.007)

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 proof before it is published in its final 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.

Cholesterol derived carbon quantum dots as fluorescence probe for the specific detection of hemoglobin in diluted human blood samples

Gopi Kalaiyarasan^{1, 2} and James Joseph^{1, 2*}

¹Academy of Scientific and Innovative Research (AcSIR), CSIR-Central Electrochemical Research Institute (CECRI) Campus, Karaikudi-630 003, India

²Electrodeics and Electrocatalysis Division, CSIR-CECRI, Karaikudi-630 003, India

*Email: jameskavalam@yahoo.com, jamescecricri@cecricri.res.in

Abstract

In the current decade, carbon quantum dots (CQDs) are promising fluorescence probe in bio/analytical chemistry due to its unique properties. The functional groups of CQDs can be tuning the optical properties and selectively make a strong bond with target molecules. The interactions between Hb and cholesterol through hydrophobic batches are more favorable than the usual π - π interaction between CQDs and Hb. Hence we prepared highly stable CQDs with a fluorescence quantum yield of 45 % from cholesterol by the hydrothermal method to make hydrophobic interactions with Hb. Concurrently the CQDs possess graphitic crystalline and amphiphilic structure in nature. The fluorescence at 440 nm arises from the intrinsic core of CQDs and it will not affect by solution pH and excitation wavelengths. This fluorescence intensity was selectively quenched by Hb owing to the formation of fluorescence inactive complex (CQDs-Hb) through strong hydrophobic interactions. The quenching mechanism complies with the Forster non-radiative energy transfer (FRET) theory. This method shows good linearity from 0.1 μ M to 2.9 μ M with a limit of detection of 24 nM (S/N = 3). This observation is used for the quenchometric determination of Hb in diluted human blood samples.

Download English Version:

<https://daneshyari.com/en/article/11026848>

Download Persian Version:

<https://daneshyari.com/article/11026848>

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