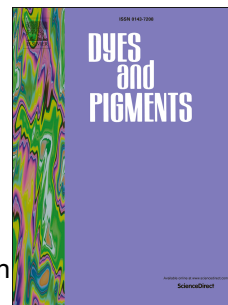


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A dual-mode sensor for colorimetric and “turn-on” fluorescent detection of ascorbic acid

Yinghua Liu¹, Zhenni Wei¹, Wenxiu Duan², Cuiling Ren^{1,*}, Jiang Wu¹, Dan Liu², Hongli Chen¹

¹ State Key Laboratory of Applied Organic Chemistry, Key Laboratory of Nonferrous Metal Chemistry and Resources Utilization of Gansu Province, College of Chemistry and Chemical Engineering, Lanzhou University, Lanzhou 730000, P. R. China.

² School of Life Sciences, University of Science and Technology of China, Hefei 230027, China.

Abstract

In the present work, a dual mode sensor, which was obtained by integrating B, N, S *co*-doped carbon dots and Fe³⁺ (BNS-CDs@Fe³⁺), was developed for sensing ascorbic acid (AA). The fluorescent signal of BNS-CDs@Fe³⁺ sensor could be enhanced by AA, and a good linear relationship was obtained in the range of 0.1-600 μM with a detection limit down to 0.05 μM. More fascinatingly, the color of the sensor solution gradually changed from blue to red with the increasing concentrations of AA, which allowed establishing a simple colorimetric assay for AA detection in the linear range of 1-110 μM with a detection limit of 0.3 μM. Notably, a paper sensor for the determination of AA was developed with a lowest visual concentration of 1 μM, providing a novel and convenient platform for AA detection. More importantly, cell imaging experiments showed that this sensor can be applied for AA detection in HeLa cell, suggesting this sensing system holds great potential in biosensing and bioimaging.

Keywords: colorimetric; “turn-on” fluorescent; red emission; L-ascorbic acid; paper sensor

* Corresponding author. Fax: +86-931-8912582 TEL: +86-931-8912763.

E-mail address: rencl@lzu.edu.cn.

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