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Discrimination and Detection of Benzaldehyde Derivatives Using Sensor Array Based on Fluorescent Carbon Nanodots

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Highlights

- The as-prepared carbon nanodots (CDs) could respond to benzaldehyde derivatives.
- A Schiff-base based sensing mechanism was proposed.
- A sensor array constructed by 3 CDs could discriminate 5 benzaldehyde derivatives.
- PCA method was applied to analyze benzaldehyde derivatives.
- The CD-based sensor array could work under a certain environmental interference.

Abstract

Excessive residual benzaldehyde derivatives in environment can cause severe ecological problems. There are currently less simple, rapid, sensitive and low-cost methods available to detect benzaldehyde derivatives. In this study, fluorescent nano-probes based on carbon nanodots (CDs) were developed for the determination of benzaldehyde derivatives in aqueous solution. Three kinds of classical CDs with different structure and photoluminescence characteristic were randomly chosen and prepared by using different carbon source and synthetic methods. Static fluorescent quenching occurred to CDs in the presence of benzaldehyde derivatives. The concentration detection range covered from μM level to mM level, and the minimum detection limit reached $0.3 \mu\text{M}$. Benzaldehyde derivatives with various structures and functional groups

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