

One-Step Synthesis of Fluorescent Carbon Dots in a Green Way as Effective Fluorescent Probes for Detection of Iron Ions and pH Value

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Abstract : In this study, fluorescent carbon dots (CDs) were synthesized in a green way using a one-step hydrothermal method. Carbon dots are carbon-based nanomaterials with a size of less than 10 nm, unique structure, and excellent properties such as low toxicity, good biocompatibility, tunable fluorescence, excellent photostability, and easy functionalization. These properties make them a good candidate to use in different fields such as biological sensing, photocatalysis, photodynamic, and drug delivery. Fourier transformed infrared (FTIR) spectra approved OH/NH groups on the surface of the as-synthesized CDs, and UV-vis spectra showed excellent fluorescence quenching effect of Fe (III) ion on the as-synthesized CDs with high selectivity detection compared with other metal ions. The probe showed a linear response concentration range (0-2.0 mM) to Fe (III) ion, and the limit of detection was calculated to be about 0.50 μ M. In addition, CDs also showed good sensitivity to the pH value in the range from 2 to 14, indicating great potential as a pH sensor.

Keywords : carbon dots, fluorescence, pH sensing, metal ions sensor

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