Highly Efficient N-Doped Carbon Quantum Dots for Detection of Hg²⁺ and Cd²⁺ ions in Dendrobium huoshanense

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The addition of heteroatoms changes the structure and optical properties of carbon quantum dots (CQDs). In the paper, nitrogen (N)-doped CQDs are prepared via one-step hydrothermal method from Auricularia auricular and ethylenediamine. Transmission Electron Microscope (TEM) analysis reveals that the average size of carbon quantum dots is 5±2 nm, whereas the chemical study shows the existence of C-N bond. The produced N-doped CQDs have fluorescence quantum yields of 28.4%. Moreover, the prepared CQDs showed high sensitivity and accuracy and had a good proportional band of 0-50 μM for detection Hg²⁺ (R²=0.9919) and Cd²⁺ (R²=0.9964). The low detection limits were 77.21 nM and 101.55 nM for Hg²⁺ and Cd²⁺, respectively. The CQDs was triumphantly used to track metal ions in environmental samples. So, it was a promising method for environmental pollutant detection.

Keywords: carbon quantum dots, fluorescent probe, detection, dendrobium plant, heavy metal ions

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