



Fluorescent-Nitrogen-Doped Carbon Quantum Dots Derived from Citrus Lemon Juice: Green Synthesis, Mercury (II) Ion Sensing, and Live Cell Imaging

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Abstract:

In this study, we report a green and economical hydrothermal synthesis of fluorescent-nitrogen-doped carbon quantum dots (NCQDs) using citrus lemon as a carbon source. The prepared NCQDs possess high water solubility, high ionic stability, resistance to photobleaching, and bright blue color under ultraviolet radiation with a high quantum yield (31%). High-resolution transmission electron microscopy (HRTEM) results show that the prepared NCQDs have a narrow size distribution (116 nm) with an average particle size of 3 nm. The mercury ion (Hg^{2+}) sensing efficiency of the NCQDs was studied, and the result indicated that the material has high sensitivity, high precision, and good selectivity for Hg^{2+} . The limit of detection (LOD) is 5.3 nM and the limit of quantification (LOQ) is 18.3 nM at a 99% confidence level. The cytotoxicity was evaluated using MCF7 cells, and the cell viabilities were determined to be greater than 88% upon the addition of NCQDs over a wide concentration range from 0 to 2 mg/mL. Based on the low cytotoxicity, good biocompatibility, and other revealed interesting merits, we also applied the prepared NCQDs as an effective fluorescent probe for multicolor live cell imaging.

Biography:

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Publication of speakers:

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