

Iodine-Doped Carbon Dots as a Catalyst for Water Remediation Application

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Abstract : Polluted water by industrial effluents or dyes has become a major global concern, particularly in developing countries. Such environmental contaminants constitute a serious threat to biodiversity, ecosystems, and human health worldwide; thus, their treatment is critical. The usage of nanoparticles has been discovered to be a potential water treatment method with high efficiency, cheap manufacturing costs, and green synthesis. Carbon dots have attracted the interest of researchers due to their unique properties, such as high water solubility, ease of production, great electron-donating ability, and low toxicity. In this context, we synthesized iodine-doped clove buds-derived carbon dots (I-CCDs) for the Fenton-like degradation of environmental contaminants in water (such as methylene blue (MB) and rhodamine-B (Rh-B) dye). The formation of I-CCDs has been confirmed using various spectroscopy techniques. I-CCDs have demonstrated remarkable optical, cytocompatibility, and antibacterial capabilities. The C-dots that were synthesized were found to be an effective catalyst for the reduction of MB and Rh-B utilizing NaBH_4 as a reducing agent. UV-visible spectroscopy was used to construct a detailed pathway for dye reduction step by step. As-prepared I-CCDs have the potential to be a promising solution for wastewater purification and treatment systems.

Keywords : iodine-doped carbon dots, wastewater treatment and purification, environmental friendly, antibacterial

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