

NANOTECHNOLOGY

CARBON DOTS

RECENT DEVELOPMENTS AND FUTURE PERSPECTIVES



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Carbon Dots: Recent Developments and Future Perspectives

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Volume 1465

Publication Date (Web): April 17, 2024

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Explore the World of Carbon Dot Nanomaterials. *Carbon Dots: Recent Developments and Future Perspectives* is a comprehensive exploration of the world of carbon dots and their multifaceted applications. Part 1 lays the groundwork introducing the classification and fundamentals of carbon dots while Part 2 covers the myriad areas where carbon dot technology is being applied, including electrochemistry, energy storage, chemical and gas sensing, photoelectrochemistry, food

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eISBN: 9780841296992

DOI: 10.1021/bk-2024-1465



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DOI: 10.1021/bk-2024-1465.fw001

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Publication Date (Web): April 17, 2024



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Chapter 9

Carbon Dots in Humidity Sensing, pH Sensing, and Nitro Explosives Detection

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Detection of environmental pollutants—such as heavy metals, hazardous gases, and other contaminants in soil, air, water, and food items—is a necessary step in terms of environmental safety and good health care. Several sensors are being employed to achieve a clean and healthy environment. Among different used sensors, the synthesis of carbon dots (CDs) using different chemical and green synthesis routes has achieved attention because of their small size and quantum confinement effect. They show unique potential including exceptional biocompatibility along with low cytotoxic activity and unresponsiveness toward targeting chemicals. The lowest limit of detection and faster response of CDs has molded them to be used in the form of photoluminescence, electrochemiluminescence, humidity sensing, pH sensing, and nitro explosives detection of gases. This chapter describes different modes of CDs for the detection of humidity, pH sensing, and nitro explosives along with their limit of detection and reusability. The obstacles and breakthroughs in the utilization of CDs have also been highlighted. The detection of environmental pollutants using CDs has been found to be a better approach to replacing the existing fluorescent nanomaterials to generate a pollution-free environment.

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