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### ABSTRACT

#### **Carbon Nano-Dots from Natural Resources as Optical Sensors for Iron Ions/Fe<sup>3+</sup>: A Review**

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Carbon nanodots (CDs) are a new category of carbon nanomaterials with sizes under 10 nm, displaying a range of fascinating properties. Broadly speaking, they can be described as small, surface functionalized carbonaceous nanoparticles characterized by an intense and tunable fluorescence, a marked sensitivity to the environment and a range of interesting photochemical properties. CDs are currently the subject of very intense research, motivated by their possible applications in many fields, including bio-imaging, nano-sensing and photo-catalysis. Also, CDs have really been synthesized from a large variety of precursors, natural resources and some waste materials. There are many methods for the synthesis of CDs for example Arc Discharge, Laser ablation, Chemical Oxidation and Hydrothermal Synthesis. Hydrothermal Synthesis method was the most commonly used in the synthesis of CDs. Since the setup is simple and with high Quantum Yield, the result particle is almost uniform in size. In this work, we searched for the different natural resources of CDs and identify their synthesis methods, properties and some of their applications, 69 natural sources of CDs were found. We found nearly 21 natural resources of CDs for sensing iron ions Fe<sup>3+</sup>, that has a great importance in monitoring iron levels in the water, whose excess may cause many diseases.

**Keywords:** carbon nanodots, fluorescence, synthesis methods, hydrothermal, natural resources, bio-imaging, sensing.