

**Nitrogen-phosphorus doped carbon dots as a photocatalytic material for reduction of toxic Cr(VI)**

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**Abstract:** The long-known method of doping with n-type and p-type impurities has currently been articulating the optical properties of CD as the newly emergent doped-CD to tune its intrinsic properties for the newer multifunctional applications. Since from the discovery, doped CD trigger the great concern in a wide range of applications, ranging from bio-imaging, [1, 2] sensing, [3] drug-delivery, [4] photo catalysis, [5] energy storage, [6] fluorescent ink [7] to disease diagnosis. Because of its unique properties such as the biocompatibility, robust chemical inertness, non-toxicity, [8] and stability.[9, 10] A fast-facile and single step technique has been described for the synthesis of nitrogen-phosphorus doped fluorescent carbon dots (NP-CD), as a potential photocatalytic material using the domestic microwave. The as-synthesized NP-CD exhibits the blue emission with the quantum yield value of  $\sim 15\%$ , along with excellent photo stability. Under the influence of natural sunlight, simple photocatalytic experiment reveals that NP-CD is highly efficient for the quantitative reduction of Cr(VI) to Cr(III) in a linear range from the 10 ppm (in 10 minutes) to 2000 ppm (in 320 minutes). Indeed, metal doping of CD has been reported to enhance the QY, as well as photo catalysis and hydrogen production efficiency.

**Keywords:** Nitrogen-phosphorus doped carbon dots, Blue-emitting carbon dots, Cr (VI) reduction, Sunlight, Photo catalysis, Photo reduction

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