

## Carbon dots for anti-corrosion

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**Abstract:** Carbon dots (CDs) have garnered extensive attention owing to their excellent biocompatibility, elevated specific surface area, and facile functionalization, as well as their diverse methods of preparation. In recent times, CDs have been applied for anti-corrosion and obtained some significant results. In this article, the preparation methods of CDs were first briefly introduced, and the relative merits of different approaches highlighted. Subsequently, the application of CDs in the realm of corrosion inhibitors was discussed, and the corrosion inhibition effects and mechanism of nitrogen-doped CDs, nitrogen and sulfur-co-doped CDs, as well as CDs functionalized with other elements and nitrogen-co-doped were summarized. Finally, the application of CDs and functionalized CD-modified coatings for anti-corrosion and its protective mechanism was analyzed in detail. This review summarizes recent progress in research related to CDs and heteroatom-doped CDs in anti-corrosion applications and anticipates the prospects and applications of CDs in corrosion protection. With their unique properties and versatile applications, CDs are expected to assume a progressively pivotal role in the advancement of cutting-edge corrosion protection technologies.

**Keywords:** Carbon dots, Corrosion inhibitor, Coating, Anti-corrosion.

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