PHOTOLUMINESCENT CARBON DOTS

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Abstract

Carbon dots (or C-dots) define a new class of functional nano-carbons that have recently drawn considerable attention thanks to their inherently unique photoluminescent properties. In general, three main characteristics distinguish C-dots: i) they consist of discrete, quasi-spherical nanoparticles with sizes below 10 nm, ii) they are surface-passivated by organic ligands, and, iii) they display multi-color emission in the visible region. Several methods have been already demonstrated for the synthesis of C-dots. Among them, the synthesis by thermal oxidation of molecular organic salts combining the carbon source and the surface modifier in a single precursor is an attractive route. This strategy involves thermal oxidation in open air at mild temperatures and leads directly to surface-passivated C-dots with a variety of modifiers. Herein, we outline such preparative methods with emphasis on the characterization and fluorescence properties of the derived dots. Furthermore, we show that C-dots is a rich chemical pool of fluorescent species that can be used for the fluorescent coating of various nanomaterials towards multifunctional core-shell hybrids (e.g. magnetofluorescent).

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