STUDY OF FLUORESCENT CARBON PARTICLES AND THEIR INTERACTION WITH MOLECULES OF ANALYTICAL INTEREST.

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Abstract

In recent years, much attention has been paid to carbon materials due to their potential application in many areas. Particularly, Carbon Dots (CDs) is one of these carbon structures recently discovered which show important and radically different properties from the macroscopic material, among them, their optical properties confer them a high potential to be used as a bio-sensor. Several methods have been developed to prepare CDs by other authors, such a laser ablation, electrochemical shocking of carbon nanotubes, electrochemical exfoliation of graphite or laser ablation [1].

In the present work, CDs were synthesized by applying different methods (bottom-up and top-down), such as, thermal carbonization and microwave heating of suitable molecular precursors and acid dehydratation of activated carbon.

The different samples were characterized using microscopic (HRTEM, SEM) and spectroscopic techniques (uv-vis absorption, ATR-FTIR and fluorescence). In order to be used as a sensor based on their fluorescent properties, the effect of the solvent and pH value on their intensity and wavelength was checked. The size and shape of CD could be studied by using microscopic techniques as Fig. 1 shows.

The samples with most interesting luminescent properties were used to study their interaction with other species, such as metals or biological molecules (biogenic amines, drugs, aminoacids or peptides) using different methods of functionalization. Fig. 2 shows how the interaction of CD with europium tetracycline complex decreases the fluorescence intensity of CDs.

References

[1] Esteves da Silva, J. C. G., Gonçalves, H. M. R. Trends in Analytical Chemistry, **Vol. 30, No. 8,** (2011) 1327.

Figures

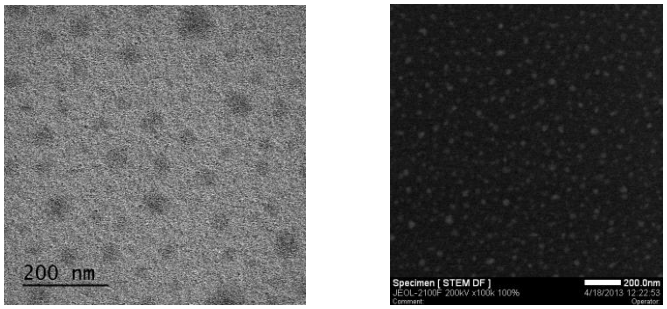

Fig. 1 Electron microscopic images of two different samples of CDs: a) TEM; b) STEM.

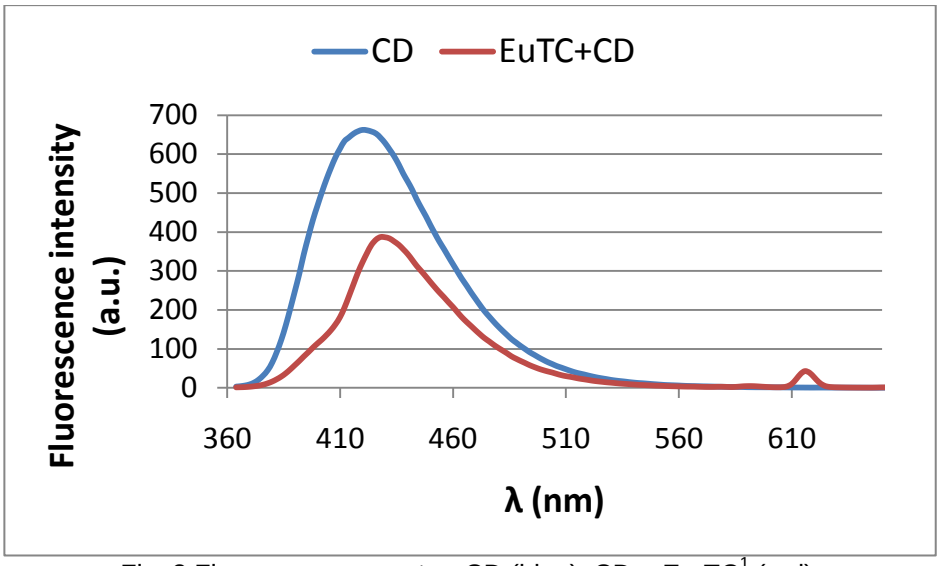

Fig. 2 Fluorescence spectra: CD (blue); CD + Eu-TC[1] (red).

[1] Europium tetracycline comlpex.