QUANTUM DOTS CdSe-ZnS WITH AN AROMATIC DITHIOCARBAMATE LIGAND AS POSSIBLE MERCURY SENSOR

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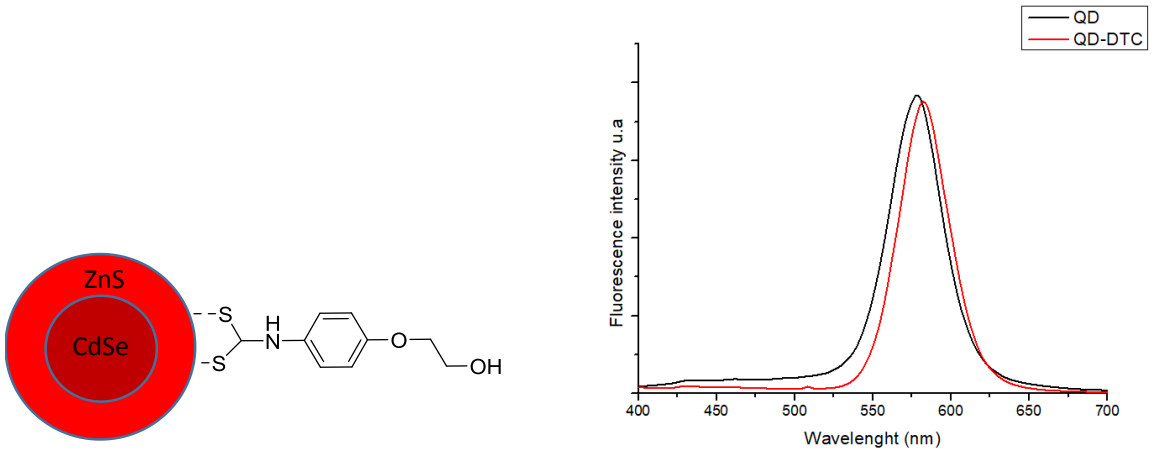
In recent years, the development of quantum dots (QDs) for use in detecting metal ions and biological species has attracted increasing attention because of their excellent optoelectronic properties. Mercury ion pollution results from the illegal gold mining mainly in countries such as Indonesia and Colombia, which is harmful for public health and the environment. Analysis of mercury requires specialized tools and is not possible on-site. To address this problem the current work concerns quantum dots modified with an aromatic dithiocarbamate (DTC) ligand as mercury sensor. The DTC ligand was capped in QDs with exchange ligand using hexane (QDs) and methanol (DTC) at 60°C for 1 hour, following the changes in UV-Vis and fluorescence spectrum. The absorption and fluorescence spectra of DTC capped QDs display a red shift with respect to the initial QDs, the emission maximum change from 578 to 582 nm due to the delocalization of the exciton over the ligand shell [1]. In addition, the exchange ligand shows a small quenching of fluorescence, due the electron donor influence of hydroxyl group in the DTC [2]. Finally, the QDs was solubilized in ethanol to evaluate the detection of mercury using concentrations from 0.5-5µM, the fluorescence of new QDs show a quenching with the increasing of mercury concentration.



a) **b)**

Figure 1. a) Representation QD-DTC, **b)** Exchange Ligand Fluorescence Spectrum

[1] Matthew T. Frederick, Victor A. Amin, Laura C. Cass, and Emily A. Weiss, Nano Letters, **2011**, 11, 5455-5460.

[2] Meghan B. Teunis, Sukanta Dolai, and Rajesh Sardar, Langmuir, **2014**, 30, 7851-7858.