Stability of Graphene/Carbon/Boron nitride Quantum Dots and Doxorubicin aggregates evaluated by optical methods

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Quantum dots (QDs), with advanced surface functionalization and luminescent properties that allow controlling the intracellular localization of nanocarrier-drug complexes, are promising nanostructured materials for theranostics, as they can simultaneously provide imaging and therapeutic effects. Theranostic agents must meet several requirements. The most important condition is that it delivers the medicine to the target. For this, it must be soluble in water and stable under physiological conditions. The nanocomplex must be biocompatible. It is highly desirable that it can be tracked optically to monitor its pharmacodynamics and accumulation in cancer tissue. In this study, we intend to investigate the stability, optical, and fluorescent properties of nanocomplexes of QDs and compounds with anticancer properties using spectroscopic methods.

The stability of blue and green luminescent graphene, carbon or boron nitride quantum dots, and doxorubicin aggregates was evaluated by optical methods. During this study, the absorption and fluorescence spectra of QDs and DOX, as well as the quenching kinetics, were measured in different pH environments using stationary spectrophotometry methods.

Different types of QDs forming a complex with doxorubicin have unique characteristics, but they also share a common feature. In all cases, doxorubicin's fluorescence quenching is observed, which can be a key indicator in determining the stability of QDs.

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