

عنوان مقاله:

Quantum dots and their application in different fields

محل انتشار:

سومین کنفرانس بین المللی پژوهش ها و دستاوردهای نو در علوم، مهندسی و فناوری های نوین (سال: 1402)

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خلاصه مقاله:

Quantum dots or nanocrystals are nanostructures made of semiconductor materials. Quantum dots exhibit unique electronic properties, intermediate between bulk semiconductors and discrete molecules, partly as a result of the unusually high surface-to-volume ratios of these particles. One type of carbon dot is CQD, also known as carbon quantum dots; The properties and applications of CQD can be described in their application in the field of diagnosis and treatment of diseases, such as their application in the field of imaging and biondiagnosis, but considering that biosensors based on nanostructures provide more sensitive diagnosis due to their outstanding properties, that is why we started The use of quantum dots based on semiconductors with more applications in the field of medicine and treatment, among which drug delivery applications can be mentioned; Of course, it should be noted that these types of materials have applications beyond the medical field. Semiconductor quantum dots are also called semiconductor nanocrystals, however, nanocrystals with wide absorption spectra and emission spectra with limited and tunable sizes are very stable [1], known as theranostic, which was invented in 1980 [2] with dimensions. Physically, they are smaller than Bohr's exciton radius [3] and their size is stated to be below 10 nm, due to their semi-conductors, they also have electrical properties that are different from larger particles due to quantum mechanics; It can also be said that these are the main topic for nanotechnology [3]. Nanoparticles with the potential to improve bioavailability, increase blood circulation time, reduce toxicity, and control drug delivery have become promising approaches for the development of new treatments and drug efficacy [4]. Quantum dots are one of the modern types of nanomaterials that have special properties for the diagnosis and treatment of diseases and their biological applications in agriculture [5]. Nanotechnology has the potential to produce new materials and products that may revolutionize all areas of life. In the past decades, due to their versatile surface chemistry, small size, incredible electromagnetic properties, and nocturnal properties, real-time monitoring of QDs' vehicle transport and drug release has been recognized as one of the six key enabling technologies that will revolutionize our society in the foreseeable future. is known and has attracted the attention of scientists [3], [6]. Their advantages over conventional materials such as organic dyes with high QY1

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