

عنوان مقاله:

Synthesis, feasibility study of production of singlet oxygen and hydroxyl radical and performance in antibacterial activity of ZnS:Eu QDs

محل انتشار:

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خلاصه مقاله:

ZnS:Eu nanoparticles also have the ability to produce reactive oxygen species that can be used to treat cancers. Eu doped zinc sulfide quantum dots (QDs) were prepared by the chemical Co-precipitation method. X-ray diffraction analysis (XRD), scanning electron microscopy (SEM) and infrared Fourier transform (FT-IR) analysis were used to characterize the quantum dots. The photoluminescence spectrum (PL) of ZnS:Eu QD in excitation wavelength of 280 nm shows two emission peaks at 384 and 715 nm. In order to use these QDs as photosensitizer in photodynamic therapy, anthracene and methylene blue chemical detectors were used for detection of singlet oxygen and hydroxyl radical, respectively. The significant point for these quantum dots is that, in addition to production of hydroxyl radical, they also have the ability to produce singlet oxygen with UV-C radiation. The antimicrobial effect of ZnS:Eu QDs was also investigated using a disc diffusion method on 11 microbial strains. Zinc sulfide nanoparticles with Europium impurities can have good medical application due to their good antibacterial activity and ability to produce reactive oxygen species. ZnS:Eu nanoparticles also have the ability to produce reactive oxygen species that can be used to treat cancers. Eu doped zinc sulfide quantum dots (QDs) were prepared by the chemical Co-precipitation method. X-ray diffraction analysis (XRD), scanning electron microscopy (SEM) and infrared Fourier transform (FT-IR) analysis were used to characterize the quantum dots. The photoluminescence spectrum (PL) of ZnS:Eu QD in excitation wavelength of 280 nm shows two emission peaks at 384 and 715 nm. In order to use these QDs as photosensitizer in photodynamic therapy, anthracene and methylene blue chemical detectors were used for detection of singlet oxygen and hydroxyl radical, respectively. The significant point for these quantum dots is that, in addition to production of hydroxyl radical, they also have the ability to produce singlet oxygen with UV-C radiation. The antimicrobial effect of ZnS:Eu QDs was also investigated using a disc diffusion method on 11 microbial strains. Zinc sulfide nanoparticles with Europium impurities can have good medical application due to their good antibacterial activity and ability to produce reactive oxygen species.

کلمات کلیدی:

Nanoparticles, ZnS:Eu, Co-precipitation, Antibacterial, Cancer

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