

عنوان مقاله:

Mercaptoacetic Acid Capped Cadmium Sulfide Quantum Dots as Novel Fluorescence Sensors for Determination of Cetirizine

محل انتشار:

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خلاصه مقاله:

In a one-step process using low-priced materials, water-soluble mercaptoacetic acid capped cadmium sulfide quantum dots (MAA-CdS QDs) were synthesized. The mercaptoacetic acid was used as a stabilizing agent and surface modifier in the aqueous solution. The synthesis conditions were optimized to discover the effects of sodium sulfide concentration and pH values on the optical properties of cadmium sulfide quantum dots. Transmission electron microscopy (TEM), ultraviolet-visible absorption spectroscopy (UV-Vis), Fourier transform infrared (FT-IR) spectroscopy, and photoluminescence emission spectroscopy were used for studying the as-prepared quantum dots. This nanosized probe was used for selective and fast determination of cetirizine. The fluorescence emission intensity of mercaptoacetic acid capped cadmium sulfide quantum dots with excitation/emission peaks at ۳۳۵/۵۰۰ nm was quenched by cetirizine, effectively. The significant factors in the detection of cetirizine were examined, and the optimum conditions were recorded. Linear fluorescence intensity response of Mercaptoacetic acid capped cadmium sulfide quantum dots with cetirizine concentration is proportional in the concentration range of 1.6×10^{-10} to 1.16×10^{-9} mol L⁻¹ under optimum conditions. The detection limit of this nanosensor was 6.48×10^{-11} mol L⁻¹, and its correlation coefficient was ۰.۹۹۰۴. In the presence of other drugs and amino acids, the fluorescence emission intensity of the MAA-CdS QDs probe was investigated to define the sensor's selectivity.

کلمات کلیدی:

Cadmium sulfide quantum dots, Mercaptoacetic acid, Fluorescence, Cetirizine

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