

Supporting Information

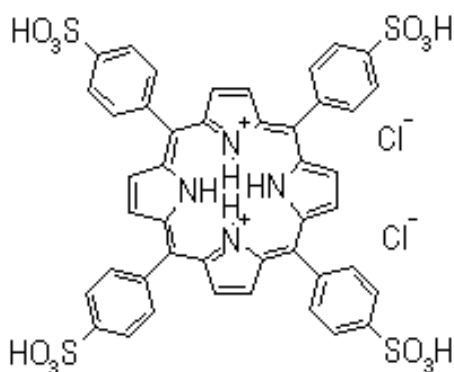
Singlet Oxygen Generation from Water-soluble Quantum Dot-Organic Dye Nanocomposites

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Chemicals:

All solvents and chemicals were obtained commercially and used without further purification. All experiments were carried out in Milli-Q water 18.2 Ω , except laser and NMR experiments, which were carried out in D₂O. The molecular structure of TSPP is shown below.



Synthesis of CdTe-NH₂ nanocrystals:

Colloidal CdTe nanocrystals were prepared as described¹⁵ with a slight modification. Briefly, freshly prepared 0.1 M NaHTe solution was added to 1.25×10⁻³ M N₂-saturated CdCl₂ solution at pH 5.6-5.9 in the presence of 2-aminoethanethiol (AET) as a stabilizing agent. Best results were obtained when the molar ratio of Cd²⁺/AET/HTe⁻ was fixed at 1:2.4:0.5. After vigorously stirring the mixture for 10 min, it was refluxed for 3h to control the growth of the CdTe nanocrystals.

Preparation of the CdTe-TSPP nanocomposites:

1.65 mL 4×10⁻² mM TSPP (dissolved in 0.1M pH7.0 phosphate buffer solution, PBS) was added to 1 mL of CdTe aqueous solution with constant stirring for 30 min. The resulting substance was then chromatographed with Sephadex G-25 gel to remove excess free TSPP. The nanocomposites were dried *in vacuo*.

UV-vis absorption spectra and Photoluminescence spectra were carried out on a Vary 300 Bio spectrofluorimeter and a Cary Eclipse fluorescence spectrophotometer.

Singlet oxygen quantum yield determination: quantum yield measurements were done with a Nd:YAG laser at an excitation wavelength of 355 nm (New Wave Research Mini-Laser II). Singlet oxygen luminescence decay signals were recorded using a liquid nitrogen cooled Ge photodiode detector (Applied Detector Corp. Model 403S). All experiments were run in D₂O with free TSPP as the standard for known singlet oxygen quantum yield ($\Phi_{\Delta} = 0.64$ in D₂O). The optical density of the solutions at 355 nm was recorded on a Vary 300 Bio spectrometer. ¹O₂ luminescence decay signals were recorded on a 500 MHz oscilloscope (LeCroy 9350 CM) and fitted to a first order exponential function on Origin 6.0.

TEM experiment: The CdTe and CdTe-TSPP were freeze-dried and then redissolved in Milli-Q water. Single drops of these solutions were placed on carbon coated copper grids and evaporated. Images of representative areas were recorded on a Philip E430 TEM operating at 300 keV.

Photooxidation experiments were carried out using an Oriel Tungsten-halogen 300 W lamp equipped with a 10 cm water filter under an O₂ atmosphere. ¹H NMR spectra were recorded on a Bruker 300 MHz spectrometer. Stock solutions of the CdTe and CdTe-TSPP nanoparticles with 0.01 M Methionine in D₂O were used for all ¹H NMR experiments.