Electronic Supplementary Material

Increment of FRET efficiency between carbon dots and photosensitizer for enhanced photodynamic therapy

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FRET measurements and analysis

$$R_0^6 = \frac{9000\ln10k_p^2Q_0}{128\pi n_D^4N_a}$$

$$I = \int_0^\infty f_\lambda(\lambda)\varepsilon_{\lambda}\lambda^2d\lambda$$

$$f_\lambda(\lambda) = \frac{F_{D\lambda}(\lambda)}{\int_0^\infty F_{D\lambda}(\lambda)d\lambda}$$

$\varepsilon_\lambda = 9.76 \times 10^4 \text{ M}^{-1}\text{cm}^{-1}$

$I = 2.97 \times 10^{-28} \text{ M}^{-1}\text{cm}^{-1}\text{nm}^4$

$Q_0 = 0.846$

$k_p^2 = 2/3$, a value for randomly oriented dipoles

$n_D = 1.33$

$R_0^6 = (9000\ln10 \times 2/3 \times 0.846 \times 2.97 \times 10^{-28})/(128 \times 3.14^5 \times 1.33^4 \times 6.023 \times 10^{23})$

$R_0 = 19\text{Å}$
Fig. S1 Fluorescence quantum yields calculation of CDs

Fig. S2 XPS N1s spectra of CDs
Fig. S3 TG curves of CDs and CDs-Ce6

Fig. S4 TEM image of CDs-Ce6 (scale bar: 20 nm)
Fig. S5 The spectral overlap between absorption spectrum of Ce6 and emission spectrum of CDs ($\lambda_{ex}=380$ nm)

Fig. S6 FRET measurement according to the equation $E=1-F_D/F_D^\prime$, the excitation wavelength is 380 nm, the fluorescence integrated intensity is calculated from 420 nm to 490 nm.
Fig. S7 The effect of excitation wavelength on the FRET efficiency in the range of 350-400 nm

Fig. S8 UV/vis absorption spectra of CDs-Ce6 incubated with 9, 10-Anthracenedipropionic acid, irradiated at 380 nm for various time intervals.
Fig.S9 Two groups were rinsed with and without CDs-Ce6 at a concentration of 15µM irradiated for various times with 660 nm laser.