Electronic Supplementary Information

Near-infrared emissive carbon dots for two-photon fluorescence bioimaging

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Supporting Figures

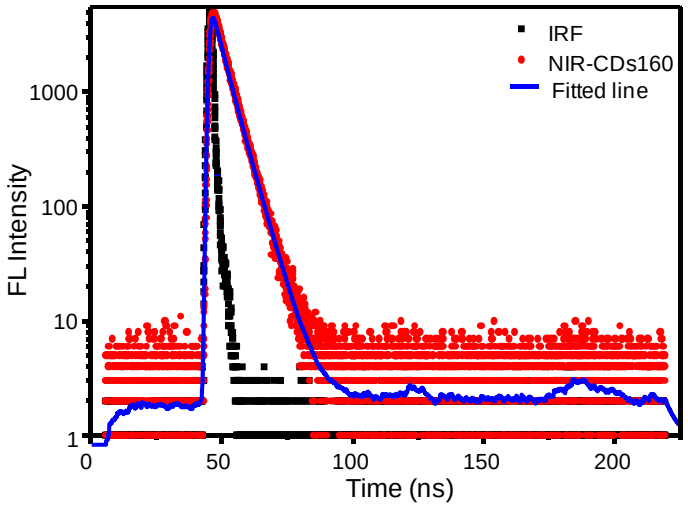

Fig. S1 Fluorescence decay (red lines) and fitting (blue lines) curves of NIR-CDs160 recorded at emission wavelengths of 685 nm with excitation at 420 nm in deionized water.

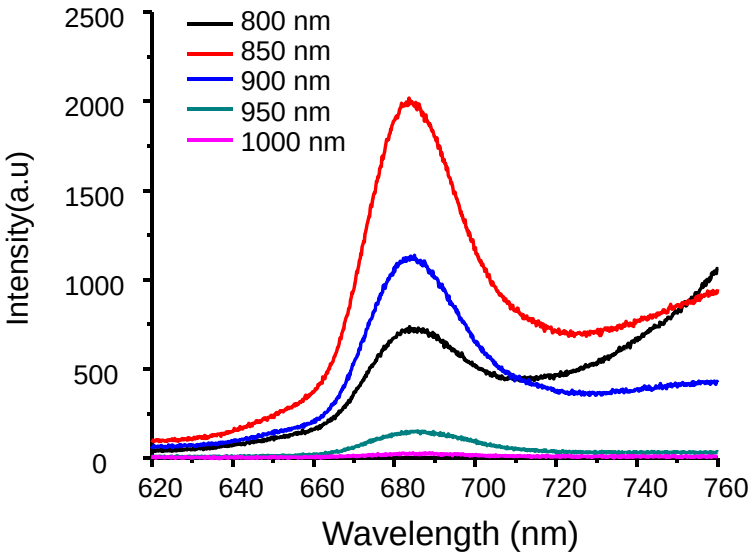

Fig. S2 Two-photon emission of NIR-CDs160 (aqueous solution) under different excitation wavelengths of femtosecond pulse laser.

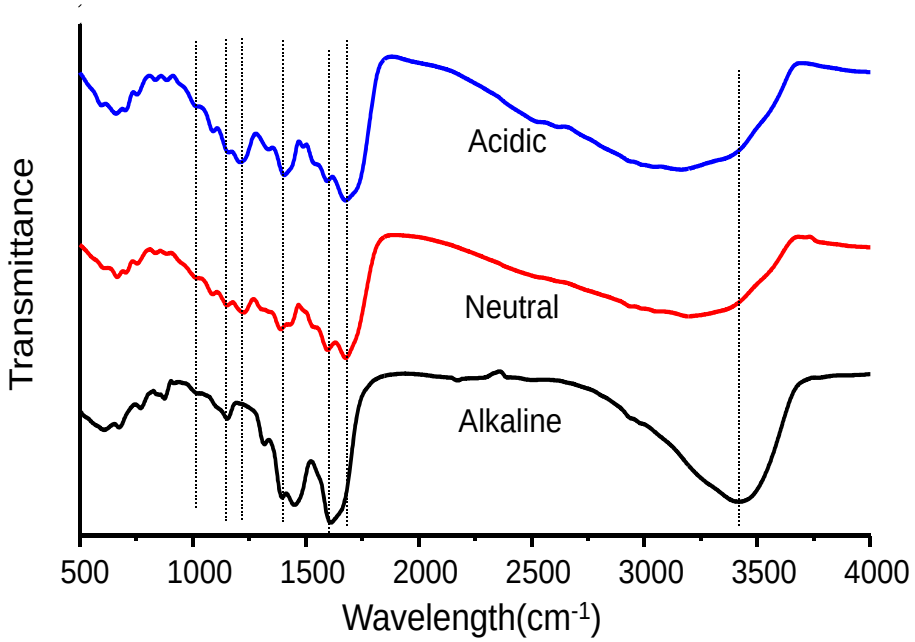

Fig. S3 FT-IR spectra of NIR-CDs160 in acidic, neutral and alkaline conditions.

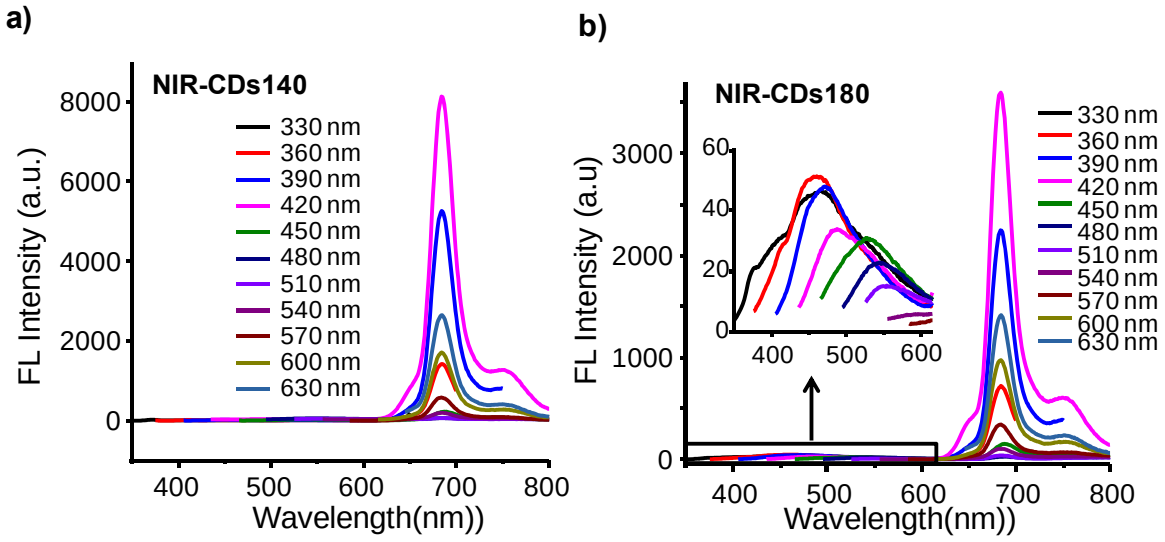

Fig. S4 Fluorescence emission spectra of NIR-CDs140 (a), and NIR-CDs180 (b) under different excitation wavelengths.

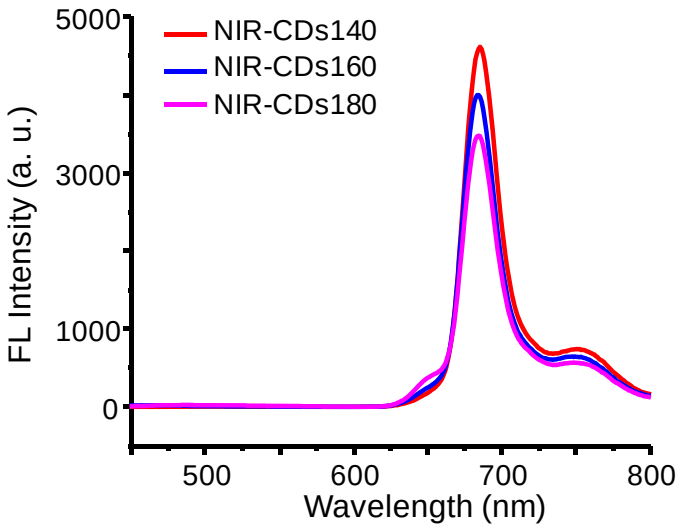

Fig. S5 Comparison of the emission intensities of NIR-CDs140, NIR-CDs160 and NIR-CDs180 at the same mass concentration (λ_{ex}=420 nm).

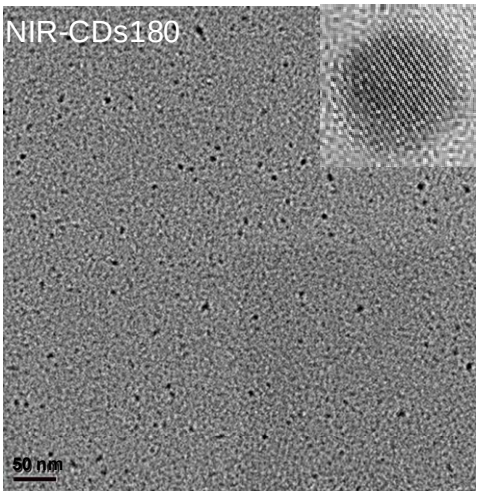

Fig. S6 TEM image of NIR-CDs180 (insert: HRTEM).

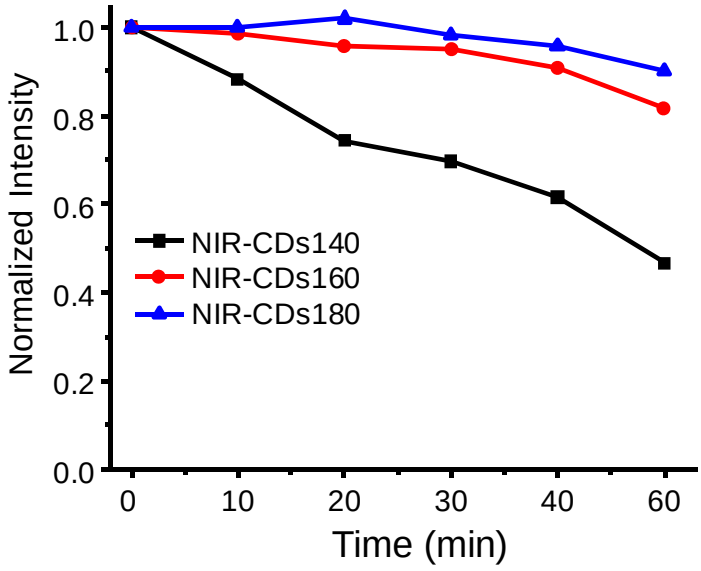

Fig. S7 Photostability of NIR-CDs140, NIR-CDs160 and NIR-CDs180 (the same mass concentration) under contineous irridiation of a xenon lamp (150 W) for 60 min .

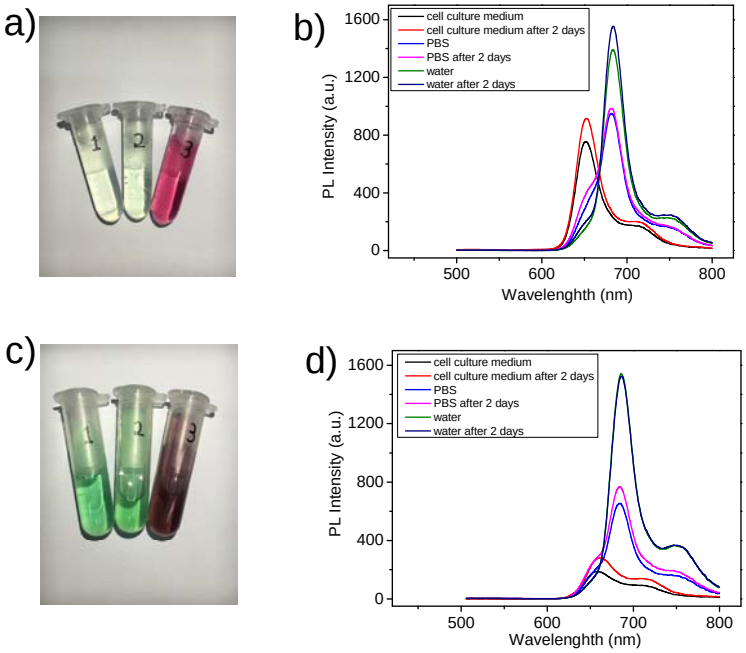

Fig. S8 Stabilities of the NIR-CDs160 in different media after standing for 2 days. a-b) 10 μg/mL, and c-d) 50 μg/mL (in a and c: 1, water; 2, PBS (10 mM pH 7.4); 3, cell culture medium).

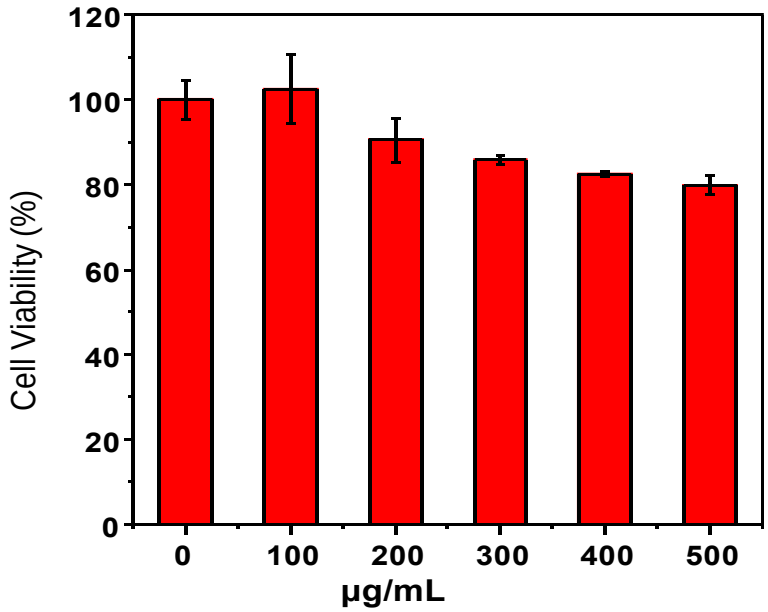

Fig. S9 Cell viabilities of MCF-7 after incubation with NIR-CDs160 for 24 h by MTT assay.

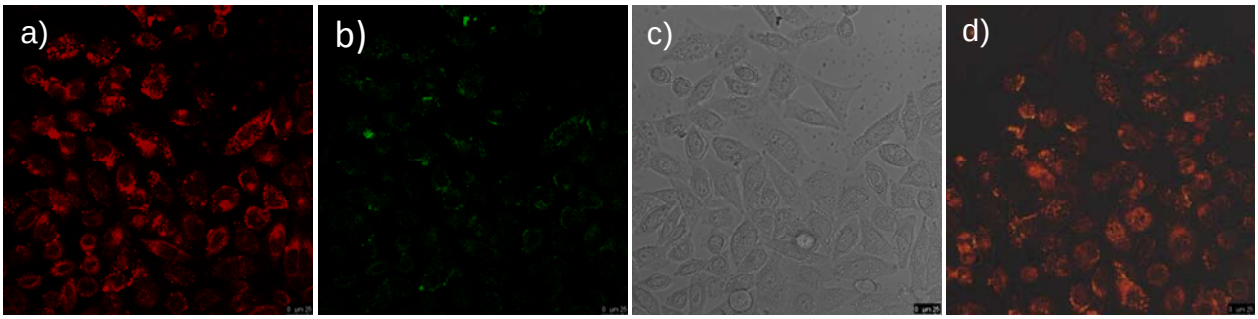

Fig. S10 One-photon fluorescence images of NIR-CDs160 against MCF-7 living cells. The images (a) and (b) are collected in the ranges of 550−750 nm (collection for NIR-CDs160) and 493−540 nm (collection for fluorescein), respectively, under excitation of 488 nm; the image (c) is bright field, and the image (d) is the overlay of (a), (b) and (c).

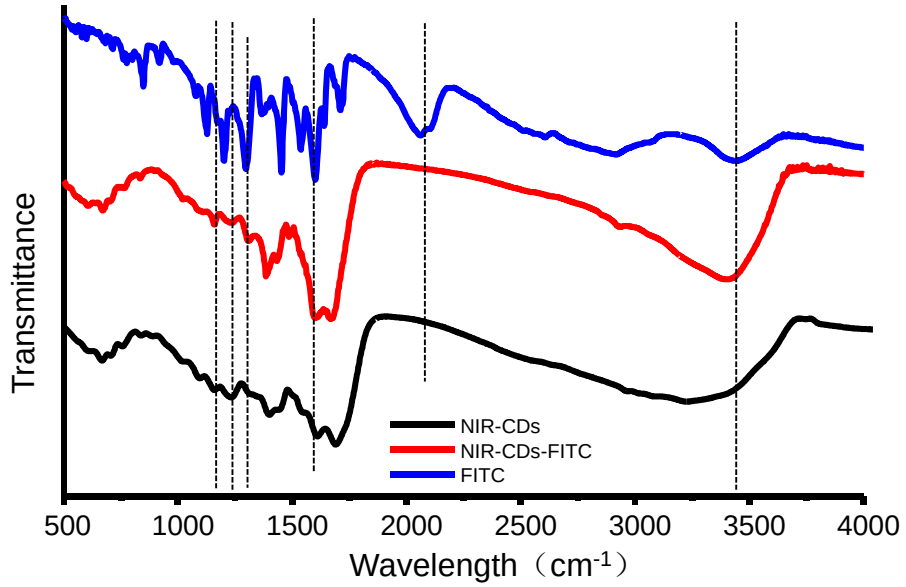

Fig. S11 FT-IR spectra of the NIR-CDs160 (black line), FITC (blue line) and NIR-CDs160-FITC (red line).

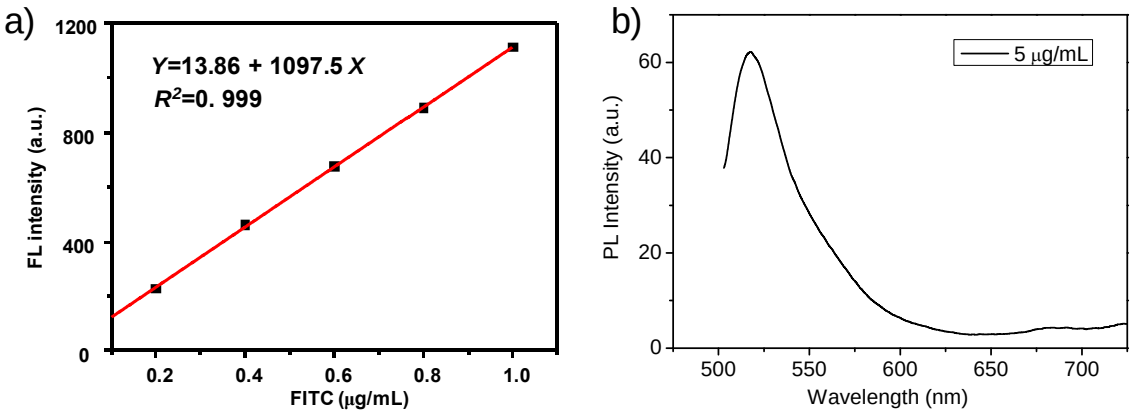

Fig. S12 a) Plot of PL intensity of FITC with different concentrations (i.e. calibration line); b) PL emission spectrum of the NIR-CDs160-FITC (5 μg/mL). The amount of FITC linked to the NIR-CDs160 can be easily calculated based on this calibration line (i.e. 8.9 mg per gram of the NIR-CDs160).

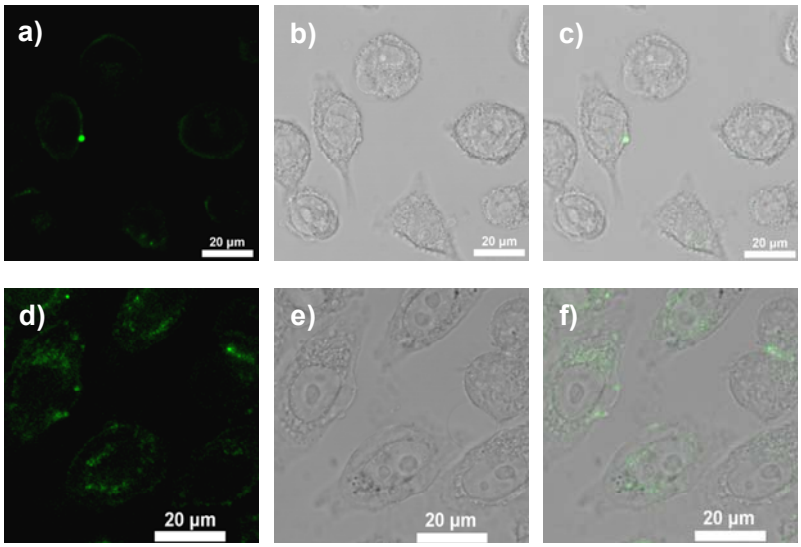

Fig. S13 One-photo fluorescence images of MCF-7 cells after being incubated with FITC (a-c: 0.8 μg/mL; d-f: 5.0 μg/mL). The images of (a) and (d) are collected in the ranges of 493−540 nm under excitation of 488 nm; images (b) and (e) are bright fields; and (c) and (f) are the overlays of (a) and (b), and (d) and (e), respectively.

Supporting Tables

Table S1. QYs of Rhodamine 6G and NIR-CDs under excitation at 420 nm.

sample	solvent	λ_{ex}/nm	Φ_1	Φ_2	Φ_3	Φ_4	Φ_5	Φ_{ave}	$\Phi_{corr.}$
Rhodamine 6G	EtOH	488	88.0%	87.4%	87.8%	86.9%	87.1%	87.4%	**95%**
NIR-CDs140	H_2O	420	22.5%	21.3%	21.2%	21.3%	22.0%	21.7%	**23.6%**
NIR-CDs160	H_2O	420	14.6%	15.1%	16.1%	15.7%	15.9%	15.5%	**16.8%**
NIR-CDs180	H_2O	420	11.5%	11.9%	11.4%	12.5%	12.1%	11.9%	**12.9%**

Table S2. FL lifetimes of CNP160 under excitation at 420 nm.

λ_{ex}/nm	**λ_{em}/nm**	**B[%]**	**τ_1/ns**	**B[%]**	**τ_2/ns**	**τ(avg)/ns**	**χ^2**
588	685	23.24	3.07	76.76	5.27	4.52	1.10