

## Supporting Information

### Facile synthesis of multifunctional pharmaceutical carbon dots for targeted bioimaging and chemotherapy of tumors

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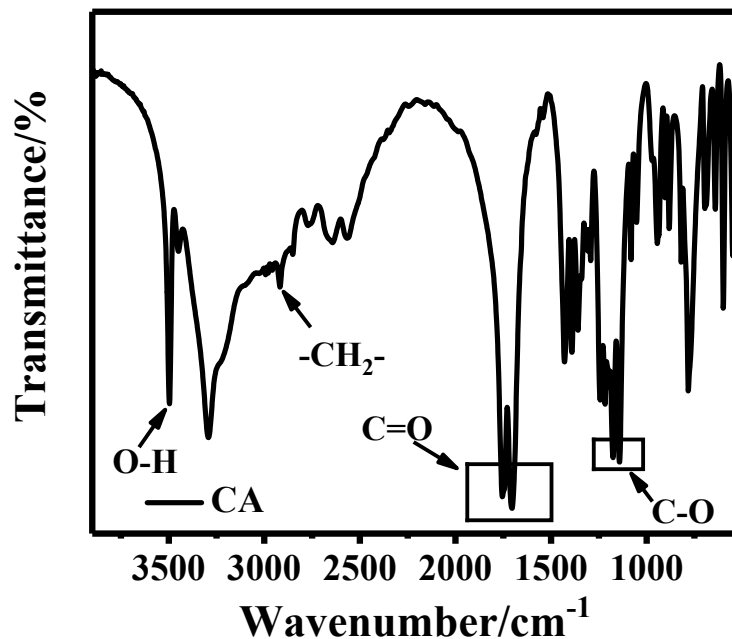


Figure S1. The FTIR spectra of CA.

The peaks at  $3496.0\text{ cm}^{-1}$  and  $2918.1\text{ cm}^{-1}$  are the stretching vibrations of -OH and -CH<sub>2</sub>- in CA.  $1750\text{ cm}^{-1}$  and  $1175\text{ cm}^{-1}$  show two sets of parallel peaks caused by the stretching vibrations of C=O and C-O in different chemical environments.

### Fluorescence lifetime:

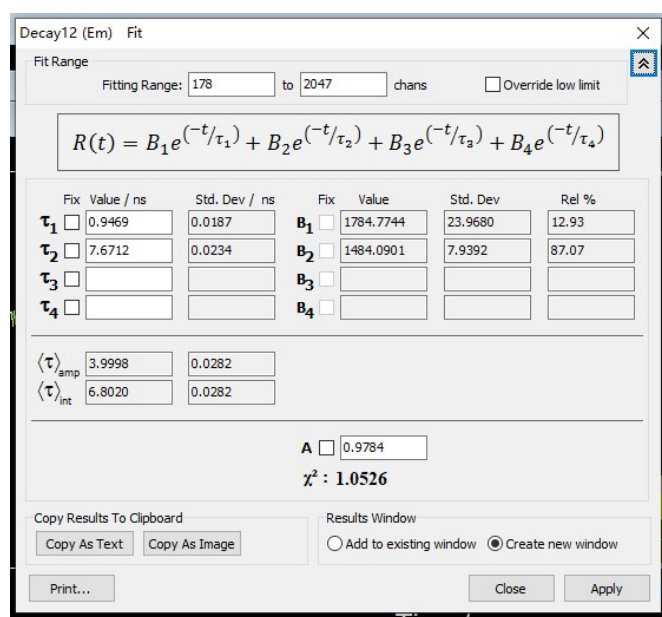
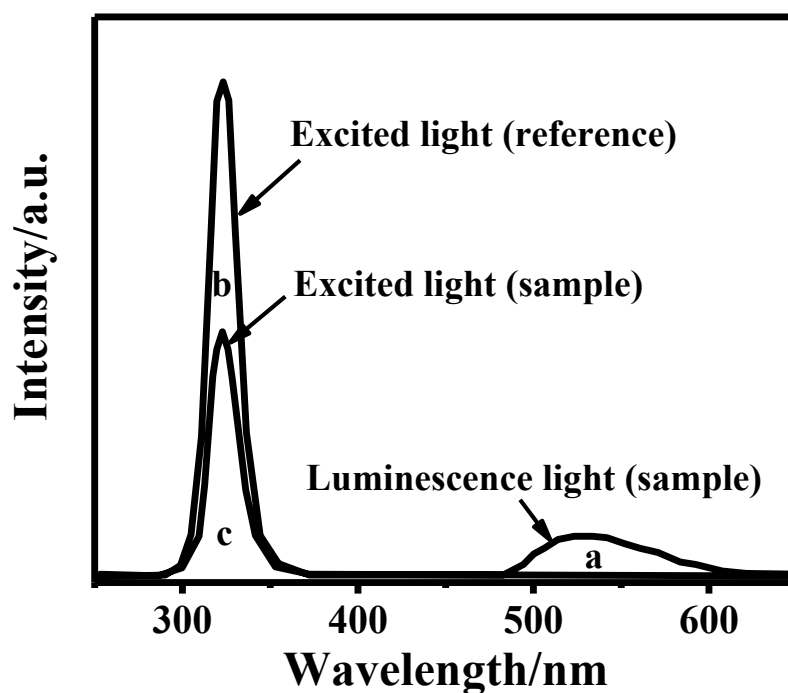


Figure S2. Parameters related to fluorescence life.

$$\tau = \frac{B_1\tau_1^2 + B_2\tau_2^2}{B_1\tau_1 + B_2\tau_2} \text{ or } \tau = \tau_1 * Rel_1\% + \tau_2 * Rel_2\%$$

Fluorescence life:

**Calculation method of absolute quantum yield:**

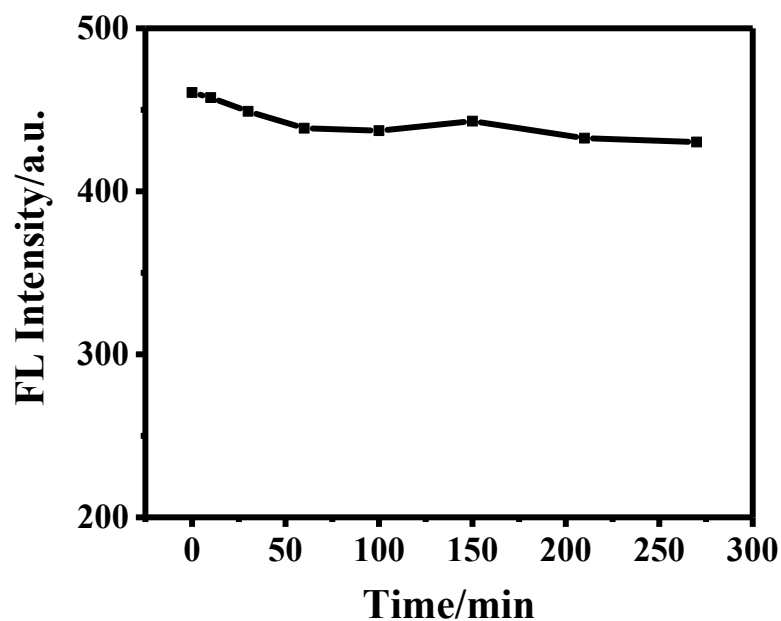


**Figure S3.** Calculation diagram of absolute quantum yield.

As shown in **Figure S3**, Absolute quantum yield:  $QY (\%) = S_a / S_b$

**Light bleaching resistant:**

Natural light is simulated using Perfectlight's PCX-50 C Discover multi-channel photocatalytic system. The synthesized Met-CDs solution is placed in the above instrument and sunlight is turned on to illuminate the solution. At 0 min, 10 min, 30 min, 60 min, 100 min, 150 min, 210 min, 270 min and so on, 5 mL Met-CDs solution is taken. The fluorescence intensity of Met-CDs solution in each group is measured by fluorescence spectrophotometer LS 55.



**Figure S4.** The fluorescence intensity of Met-CDs changes with time at the optimal excitation wavelength, simulating natural light. (Ex=290 nm, Em= 440 nm)

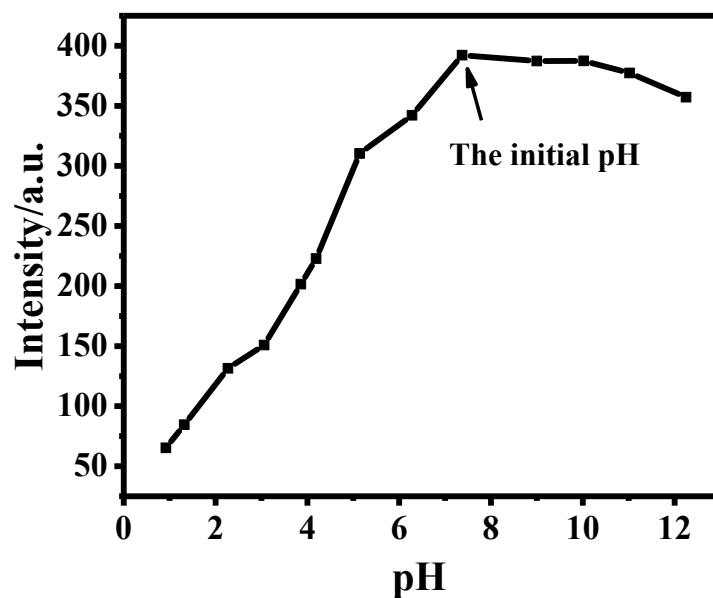
**Table S1.** The fluorescence intensity of Met-CDs changes with time at the optimal excitation wavelength, simulating natural light. (Ex=290 nm, Em= 440 nm)

Time/min	FL intensity
0	460.58525
10	457.46517
30	449.07401
60	438.72381
100	437.18132
150	443.0613
210	432.62202
270	430.22609

**pH stability:**

The pH of the Met-CDs solutions is first measured using a pH meter, and then the pH of the Met-CDs solutions is adjusted using concentrated HCl solution and NaOH solid particles to

obtain different pH Met-CDs solutions, and 5 mL of the Met-CDs solutions are taken separately. Finally, the fluorescence intensity of each Met-CDs solution is measured using a fluorescence spectrophotometer LS 55.



**Figure S5.** The fluorescence intensity of Met-CDs changes with pH at the optimal excitation wavelength. (Ex=290 nm, Em= 440 nm)

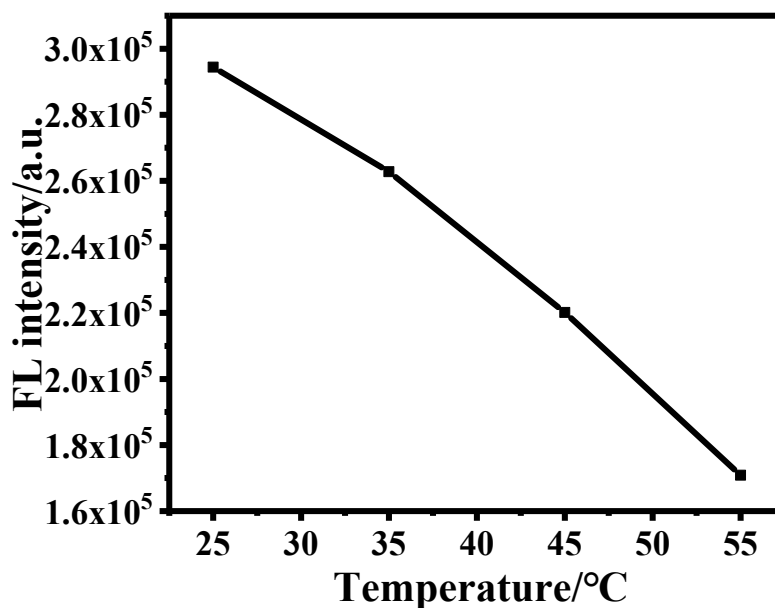
**Table S2.** The fluorescence intensity of Met-CDs changes with pH at the optimal excitation wavelength.

(Ex=290 nm, Em= 440 nm)

pH	FL intensity
0.92	65.28294
1.32	84.49211
2.27	131.50013
3.06	150.87694
3.86	201.52866
4.19	222.87124
5.14	310.38664
6.28	342.17601
7.37	392.12993

9.00	387.35351
10.02	387.44588
11.02	377.32981
12.25	357.22826

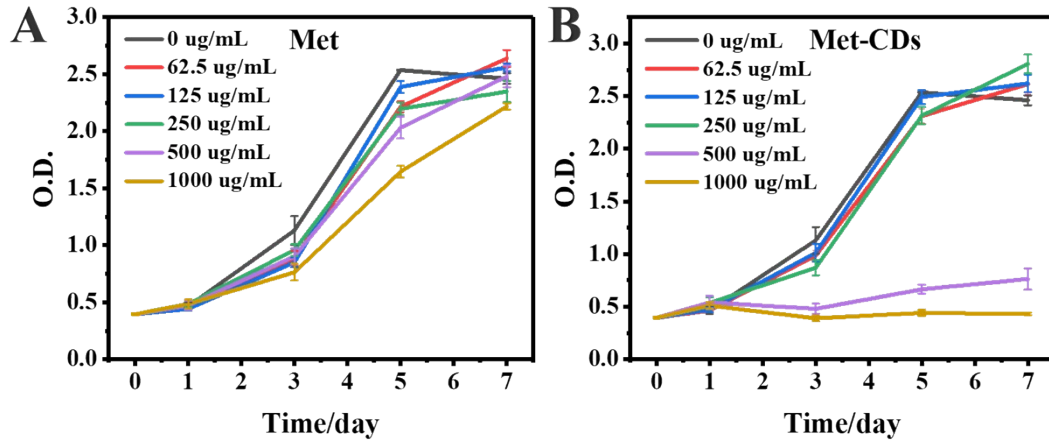
**Thermal stability:**



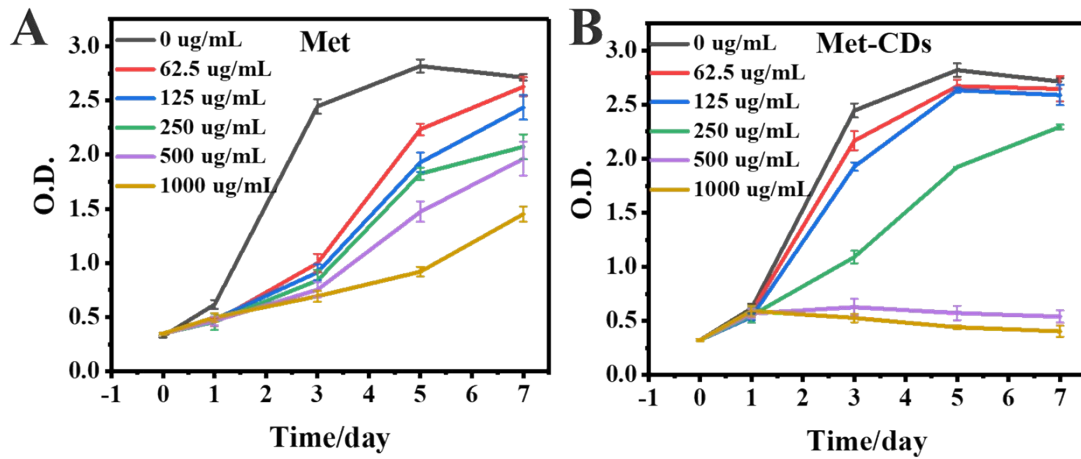
**Figure S6.** The fluorescence intensity of Met-CDs changes with temperature at the optimal excitation wavelength. (Ex=290 nm, Em= 440 nm)

**Table S3.** The fluorescence intensity of Met-CDs changes with temperature at the optimal excitation wavelength. (Ex=290 nm, Em= 440 nm)

Temperature/°C	FL intensity
25	294414.875
35	262753.75
45	220151.094
55	170878.281



**Figure S7.** (A) Detection of Met toxicity to A549 cells ( line graph); (B) Detection of Met-CDs toxicity to A549 cells ( line graph).



**Figure S8.** (A) Inhibitory effect of Met on the growth of A549 cells (line graph); (B) Inhibitory effect of Met-CDs on the growth of A549 cells (line graph).