

Electronic Supplementary Information

Decorated reduced graphene oxide for photo-chemotherapy

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Preparation of folic acid modified dextran-g-octadecanoic Acid (C18DF)

C18DF is prepared as the following methods shown in Scheme S1 (b). Briefly, C18D (0.5 g), EDC·HCl (0.070 g), DMAP (0.0045 g) and folic acid (0.082 g) were dissolved in the aqueous solution at room temperature with stirring. After reacting for 72 h, the unreacted substances were removed by dialysis for three days. And then, the solution was lyophilized to obtain the final product, C18DF, yield 82.3 %.

Preparation of rGO/dextran-g-octadecanoic acid-folic acid (rGO/C18DF)

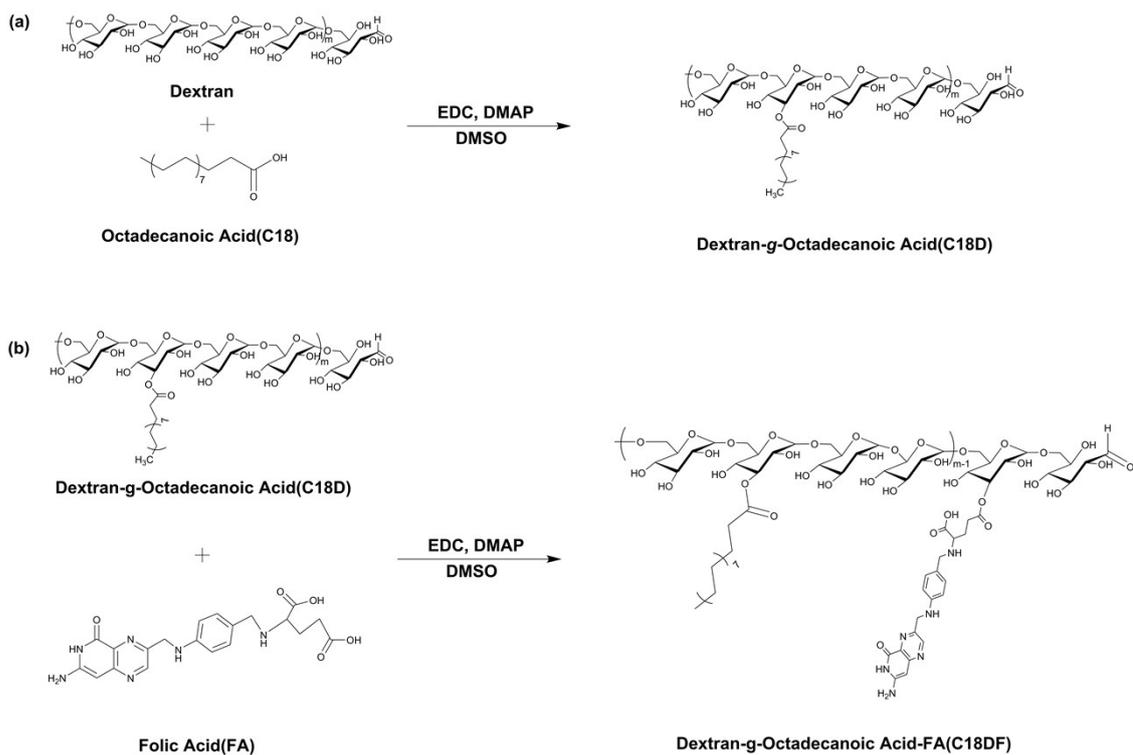
rGO/C18DF was prepared in the similar way as C18D. 0.98 g of C18DF and 1.05 g of rGO were added in an aqueous solution and sonicated for 3 h. The suspension was centrifuged at 12,000 rpm for 15 min to remove the supernatant liquid of excess C18DF. Then the aqueous solution of the mixed solid was centrifuged at 8000 rpm for 20 min. After that, the supernatant was collected and lyophilized to obtain the final product, yield 69.3 %.

Cytotoxicities

The cytotoxicities of rGO were examined with a MTT assay toward HeLa cells. The cells were seeded in 96-well plates at 8.0×10^3 cells per well in 180.0 μL of complete HG-DMEM, and then incubated at 37 °C in 5 % (v/v) CO_2 for 24 h. Subsequently, rGO was added respectively to the wells with a concentration range from 0.94 $\mu\text{g mL}^{-1}$ to 60 $\mu\text{g mL}^{-1}$. After incubation for 24 h, 20.0 μL of MTT (5.0 mg mL^{-1}) was added to each well and incubated for 4 h. The upper solution was then carefully removed, and 180 μL of DMSO was added to each well to dissolve the MTT formazan crystals. The plates were shaken for 5 min before detection. The absorbance of media was measured on a Bio-Rad 680 microplate reader at 490 nm. The cell viability was calculated on the basis of Equation S1 below:

$$\text{Cell Viability} = \frac{A_{\text{sample}}}{A_{\text{control}}} \times 100 \quad (\text{S1})$$

In Equation (S1), A_{sample} and A_{control} represented the absorbances of sample and control wells, respectively.



Scheme. S1 The synthesis routes of C18D (a) and C18DF (b).

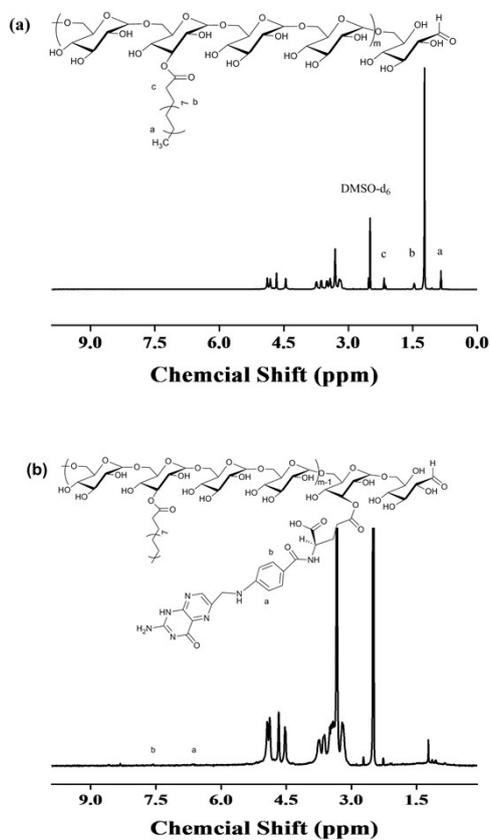


Fig. S1 $^1\text{H-NMR}$ spectra of (a) C18D and (b) C18DF.

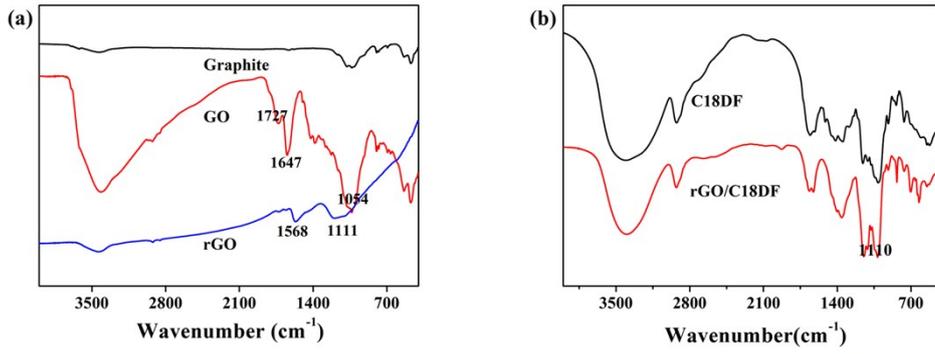


Fig. S2 (a) FT-IR spectra of the Graphite, GO, and rGO. And (b) FT-IR spectra of C18DF and rGO /C18DF.

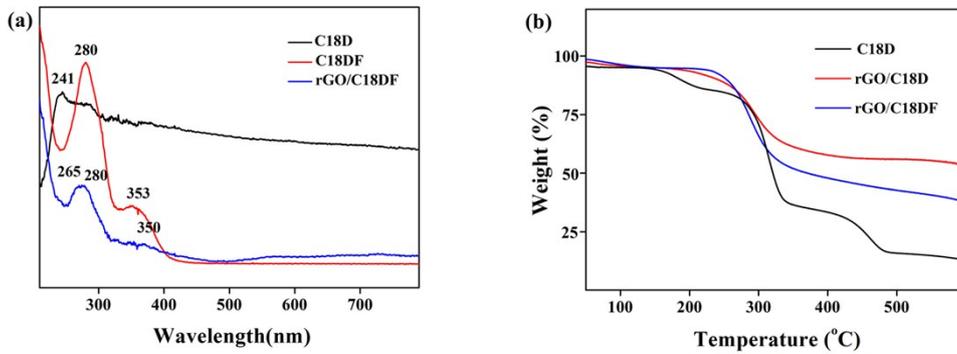


Fig. S3 (a) UV-vis spectra of C18D, C18DF and rGO/C18DF. And (b) TGA curves of C18D, rGO/C18D, and rGO/C18DF with a heating rate of 10 °C/min.

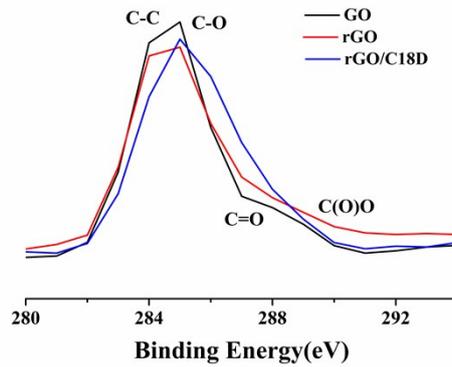


Fig. S4 XPS curves of GO, rGO and rGO/C18D.

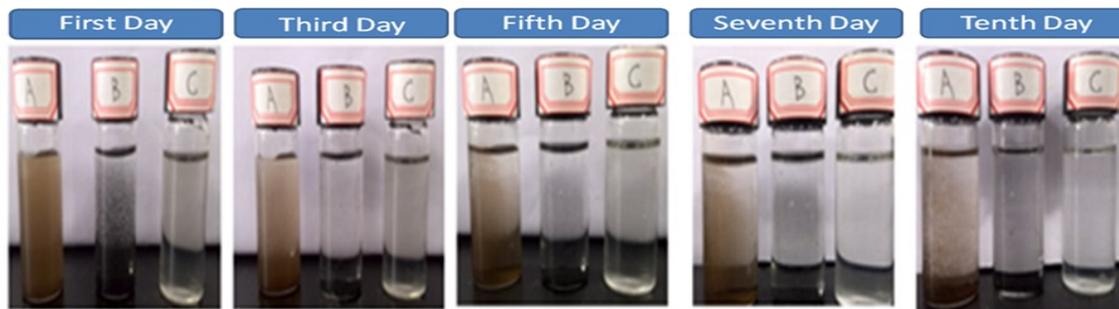


Fig. S5 Colloidal stability of GO (A), rGO (B), and rGO/C18D (C) in water solution after placing 1, 3, 5, 7, and 10 days.

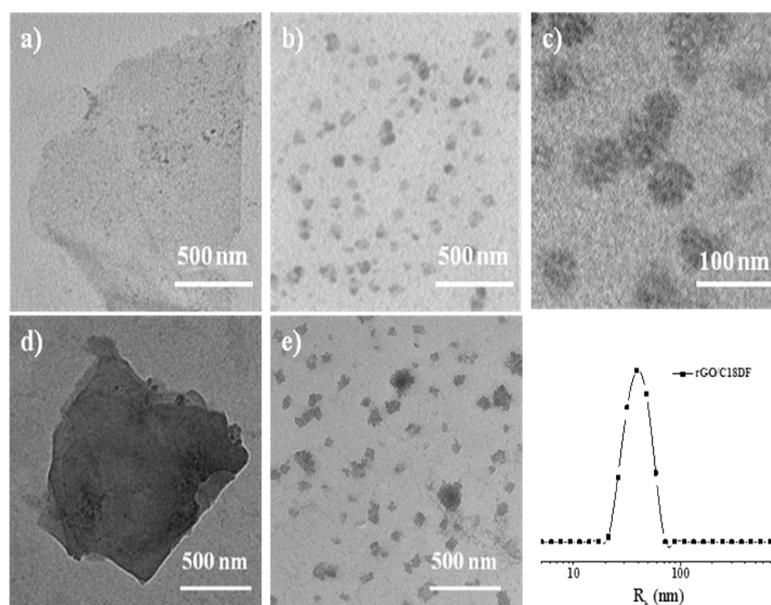


Fig. S6 TEM of the GO (a), rGO/C18D (b), the amplifying images of rGO/C18D (c), rGO (d) and C18DF (e). And the DLS of rGO/C18DF.

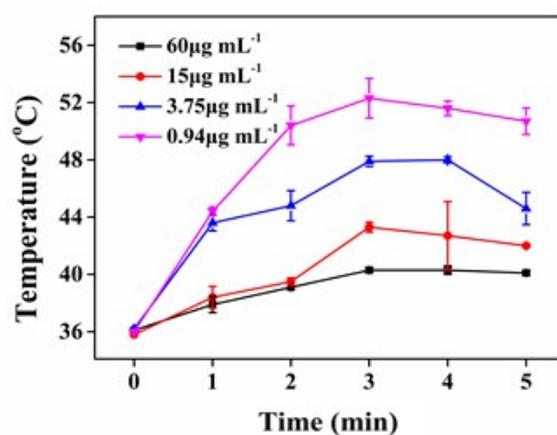


Fig. S7 Photothermal effect of rGO solution exposed to the 808 nm laser for different time periods at a power density of 2.2 W cm^{-2} .

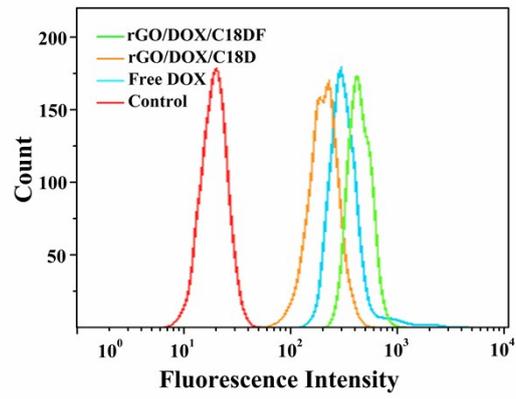


Fig. S8 Flow cytometric profiles of HeLa cells incubated with rGO/DOX/C18D (yellow), free DOX (blue) and rGO/DOX/C18DF (green) for 4 hours.