Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supporting information

Near-Infrared Responsive Germanium Complex of Ge/GeO_2 for Targeted Tumor Phototherapy

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# Equal contribution from Y. Gao and S. Wang.

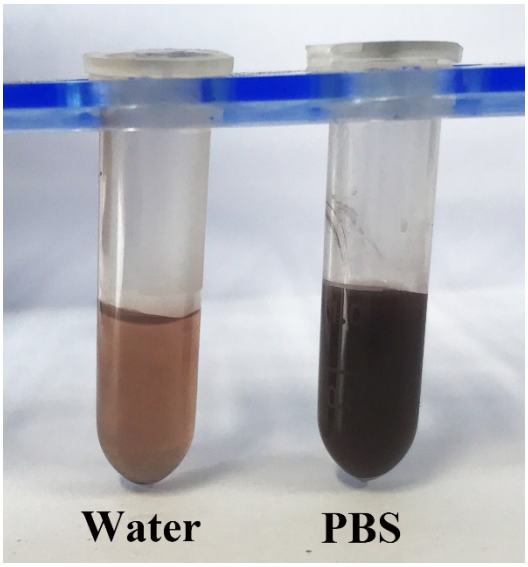

Figure S1 The photographs of Ge/GeO_2 dispersed in water and PBS

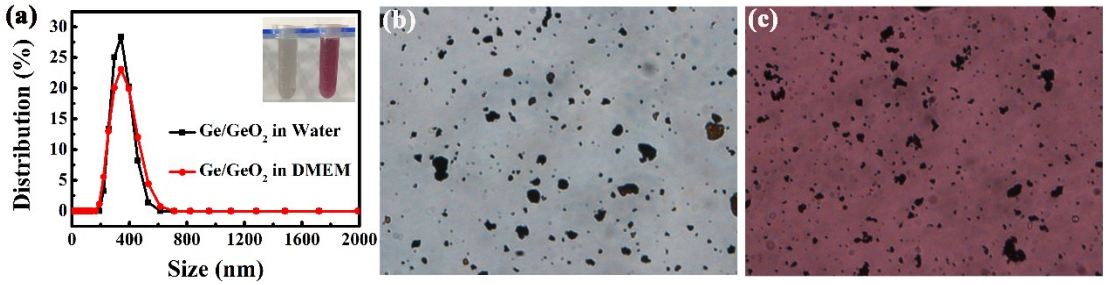

Figure S2 (a) Dynamic light scattering, (b) and (c) Electron microscope photos under the bright field of Ge/GeO_2 in water and DMEM.

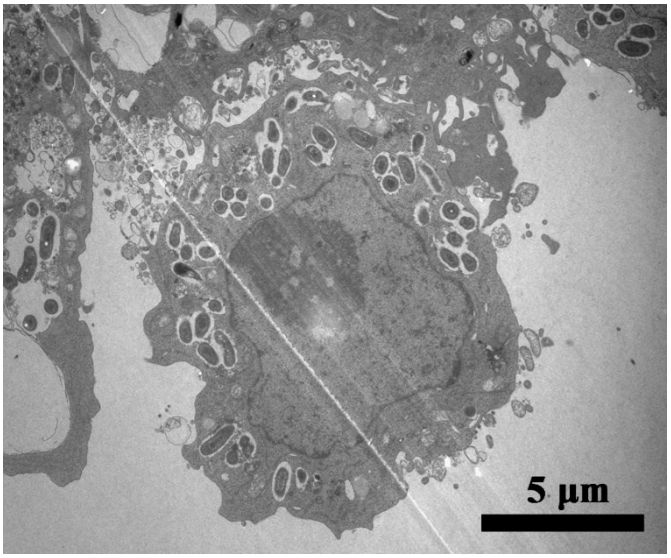

Figure S3 TEM image of the macrophages after cultured with Ge/GeO_2 (0.1 $mg \cdot mL^{-1}$) solution for 24 h.

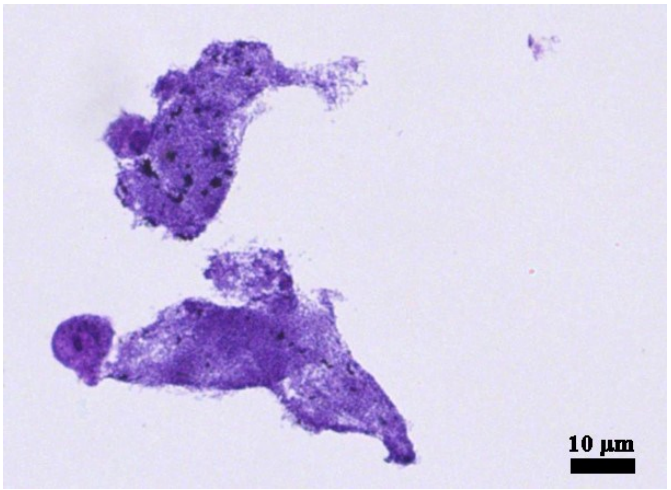

Figure S4 H&E Staining of thinprep cytologic test (TCT) slides of M-Ge/GeO_2.

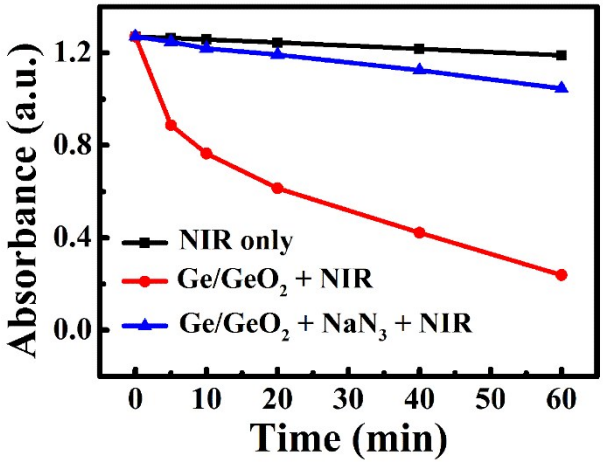

Figure S5 The degradation of DPBF under different conditions.

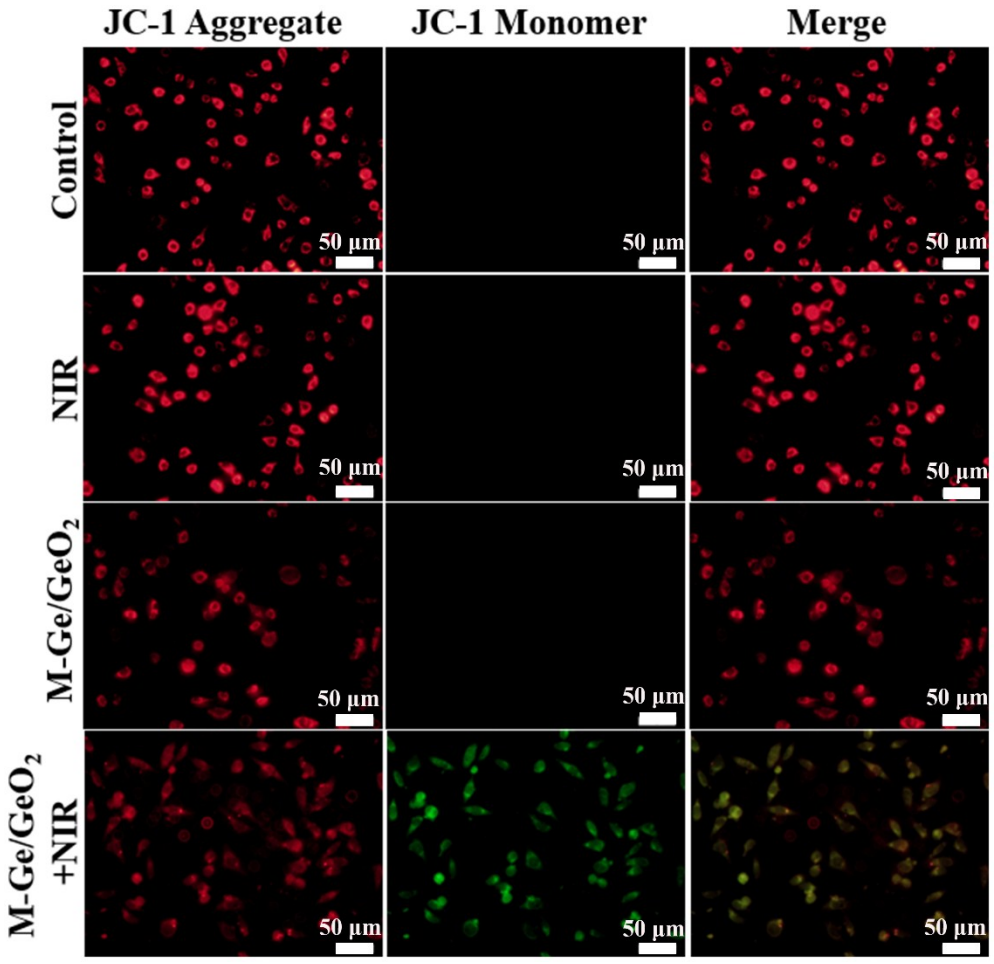

Figure S6 The detection of mitochondria membrane potential changes by JC-1 staining. (Scale bar: 50 μm).

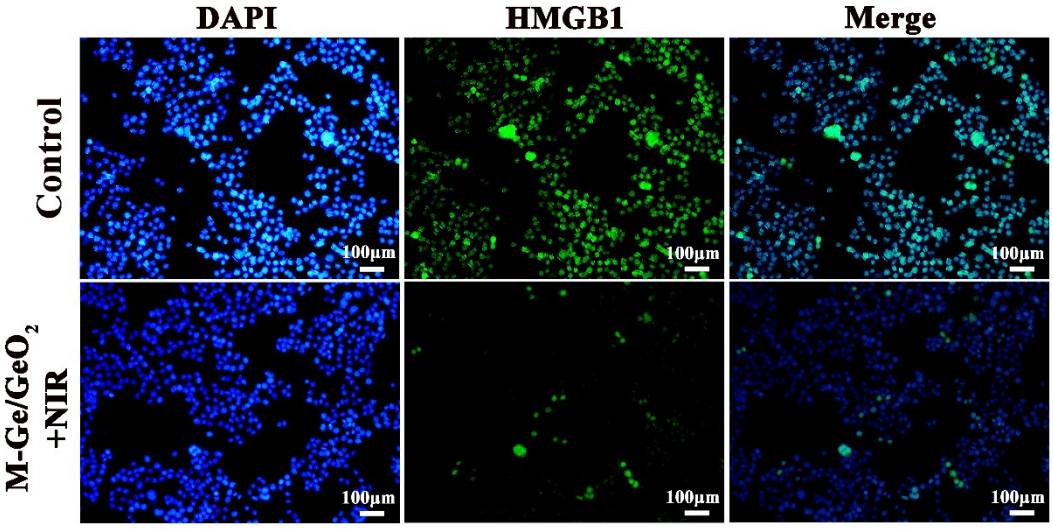

Figure S7 HMGB1 release test in HepG2 cells. (The nucleus was stained with DAPI with a blue color; The HMGB1 was stained with green color).

(**HMGB1 release test**: HepG2 cells seeded into 24-well plates were divided into the control group and M-Ge/GeO_2 + NIR group. The M-Ge/GeO_2 + NIR group was incubated with M-Ge/GeO_2 (0.25 mg/mL) for 6 h and then irradiated with 880 nm laser (1 W cm^{-2}) for 10 min. After that, the cells were washed with PBS, fixed with 4% paraformaldehyde for 20 min. After rinsing with PBS twice, cells were treated with 0.1% Triton X-100 for another 10 min and finally blocked with 10% FBS. Next, the cells were incubated with HMGB1 antibody (GeneTex, North America) for 30 min, washed with PBS for two times. For the nucleus staining, cells were stained with DAPI for 20 min. Finally, cells were washed with PBS for three times and imaged on a fluorescence microscope (DP80, Olympus).)

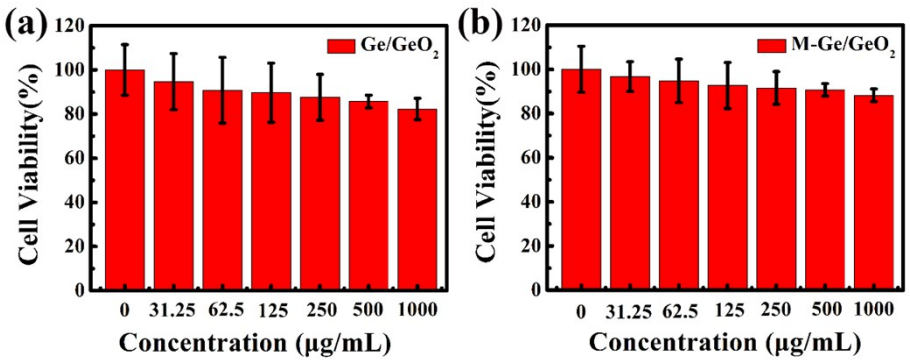

Figure S8 MTT results of HepG2 cells after incubation with Ge/GeO_2 or M-Ge/GeO_2 for 24h.

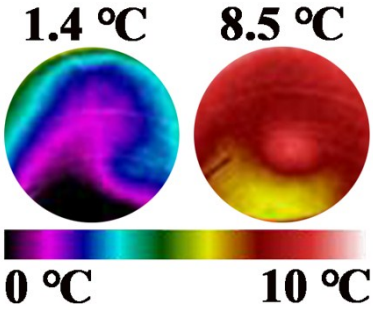

Figure S9 Temperature profile of irradiated area before PTT effect evaluation and after 10 min irradiation. (The experimental was performed under ice bath).

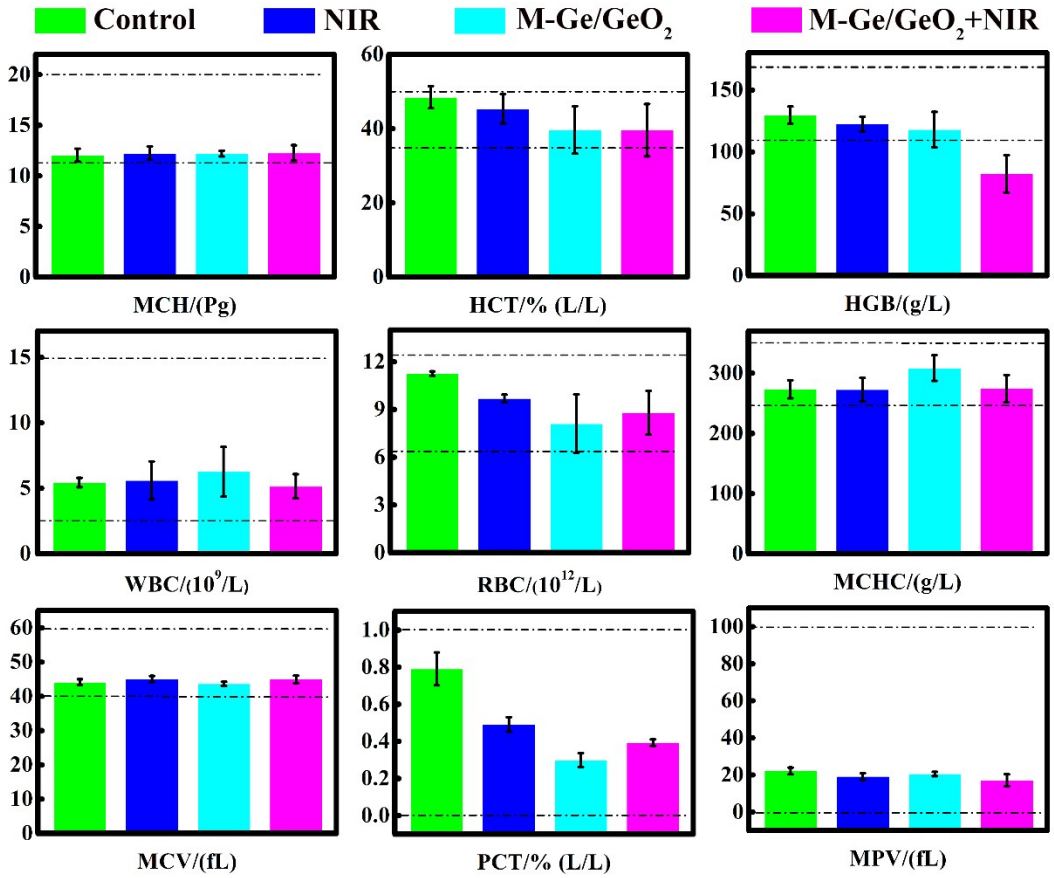

Figure S10 Hematological analysis. Data were collected from the mice at 14th days after different treatments. (MCH: mean corpuscular hemoglobin; HCT: hematocrit; HGB: hemoglobin; WBC: white blood cells; RBC: red blood cells; MCHC: mean corpuscular hemoglobin concentration; MCV: mean corpuscular volume; PCT: plateletcrit; MPV: mean platelet volume;). The dash lines in the figures indicate the normal range of blood indicators.

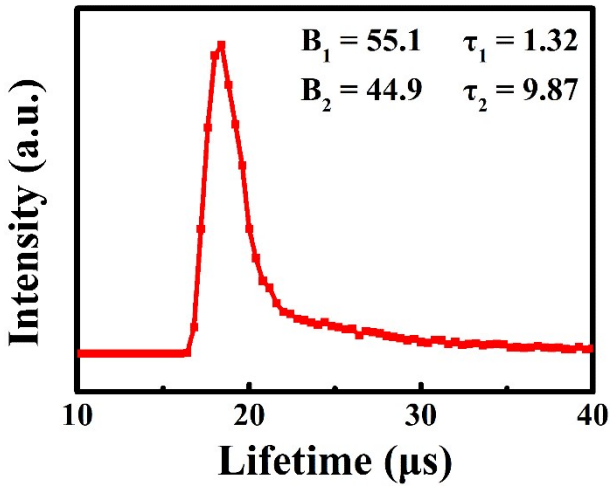

Figure S11 The time-resolved transient PL (TRPL) spectra of the Ge/GeO_2.

(To obtain more information about the photogenerated charges, the time-resolved transient PL (TRPL) decay curves of the Ge/GeO_2 were measured by fluorescence spectrophotometer (FLS980), and the excitation wavelength and emission wavelength are 350 nm and 700 nm, respectively. As shown in Figure R5, the date can be calculated by the following equation (*J. Phys. Chem. C,* 2013, **117**, 10716):

$R_{(t)}=B_1e^{(-t/\tau1)} + B_2e^{(-t/\tau2)}$ (1)

where B_1 and B_2 are the weight factor, which are 55.9 and 44.1, respectively. τ_1 and τ_2 are the corresponding fluorescent lifetime, which are 1.32 μs and 9.87 μs, respectively, Therefore, the average fluorescent lifetime of Ge/GeO_2 can be obtained by the following equation (*J. Phys. Chem. C,* 2013, **117**, 10716):

$$\tau_A = \frac{A_1{\tau_1}^2 + A_2{\tau_2}^2}{A_1\tau_1 + A_2\tau_2} \quad (2)$$

The average fluorescent lifetime of Ge/GeO_2 was 8.66 μs.)

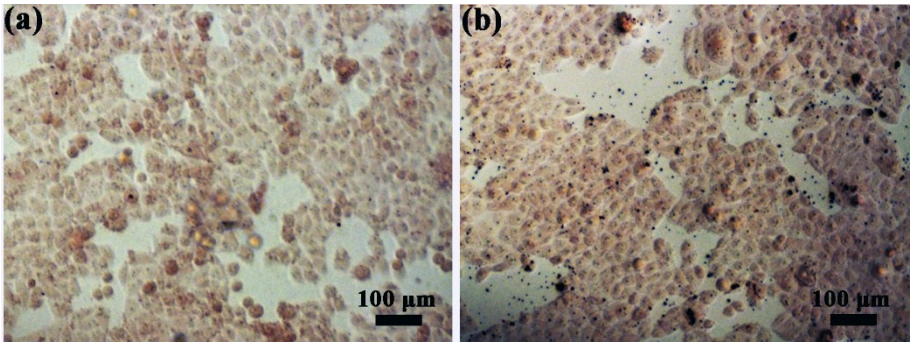

Figure S12 Oil Red O staining of HepG2 cells (a) before and (b) after phototherapy.

(**Experimental details for lipid droplets check**: HepG2 cells (24-well plates) were washed two times with PBS, fixed in ORO Fixative (Solarbio, Beijing, China) for 30 min, washed with distilled water for two times again, added 60 % isopropanol standing for 5 min and removed the solution, then stained for 500 μL Oil Red O Stain (Solarbio, Beijing, China) solution containing ORO StainA and ORO StainB (3:2) and filtrated, washed three times with distilled water, and then analyzed using a fluorescence microscope (DP80, Olympus).)