Supporting Information

Glucose Oxidase-Instructed Traceable Self-Oxygenation/Hyperthermia Dually Enhanced Cancer Starvation Therapy

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Figure S1 Particle size distribution of MNS.

Figure S2 HRTEM images (A) and SAED pattern (B) of MNS.

Figure S3 XRD pattern of MNS (JCPDS Card 80-1089).
Figure S4 (A) EDX spectra of MNS. EDX elemental mapping of MNS (B) and the corresponding elements: Mn (C), O (D).

Figure S5 AFM image and its thickness of MNS.
Figure S6 Optical density (OD) of MNS at 808 nm as a function of concentration, described by
\[ Y = 0.003X - 0.0102 \quad \text{(R}^2 = 0.9736) \]

Figure S7 (A) The 808 nm laser-induced heat generation of PBS, 25, 50, 100, 200 µg/mL MNS aqueous solution with laser power density of 1 W/cm². (B) The temperature of 200 µg/mL MNS solution irradiated with 0.5, 1, 1.5 W/cm² 808 nm laser. (C) Thermal images of PBS, 25, 50, 100, 200 µg/mL MNS after 3 min exposed to 1 W/cm² 808 nm laser. (D) The temperature of 200 µg/mL MNS solution irradiated by an 808 nm laser (1 W/cm³) for four on/off cycles (on: 2 min, off: 6 min).
**Figure S8** Digital photos of MNS (A) and MNS-GOX (B) in 5 mM glucose PBS pH=7.4

**Figure S9** Glucose reaction rate of MNS-GOX before and after 808 nm laser (1 W/cm², 5 min) irradiation at 30°C.

**Figure S10** PA images of mice treated with MNS and MNS-GOX, the images were recorded at 0, 1, 2, 4, 8, 12, 24, 48, 72, 96 h.
**Figure S11** Thermal images of tumor irradiation by an 808 nm laser (1 W/cm²) after different treatments at a series of time points.

**Figure S12** Hemolysis analysis of MNS solution at various concentrations. The mixtures were centrifuged after kept standing for 4 h, then the absorbance of supernatant was measured to detect the hemoglobin.
Figure S13 Blood biochemistry results of nude mice before (0 day) and after (14 day) injection of MNS-GOx: ALT (A), AST (B), BUN (C) and CREA (D).

Figure S14 H&E staining images of main organs after 30 d of treatment with different treatments. Scale bar:100 µm.