Supplementary information

FITC modification of CuS@DMSN

In detail, the CuS@DMSN-FITC was obtained as follows: 6 μL of APTES and 2 mg of FITC was added into 2 mL of DMSO. The reaction was carried out in the dark for 12 h at room temperature. Then, 40 mL of ethanol containing 50 mg CuS@DMSN mixtured with above reaction solution and refluxed at 80°C for 10 h. The final products were obtained by centrifugation (5,000 rpm, 3 min) and then washed three times with EtOH and deionized water to remove the residual reactants.

Calculation of the Photothermal Conversion Efficiency.

The CuS@DMSN-N=C-HA aqueous solution (0.5 mg·mL^{-1}) was illuminated by 980 nm laser (power density～2.0 W·cm^{-2}) for 10 min. Then turned off the NIR and the aqueous dispersion was cooled to naturally. We repeated three times to test the photostability.

The photothermal conversion efficiency (η) was acquired according to the equation (1):

$$\eta = (\frac{hA(T_{max} - T_{amb}) - hA(T_{max,water} - T_{amb})}{I(1 - 10^{-A\lambda})}$$

(1)

where the T$_{max}$ (46.4 °C) is the maximum temperature of CuS@DMSN-N=C-HA aqueous solutions; T$_{amb}$ and T$_{max,water}$ is the ambient temperature of ambient and deionized water, respectively; h is the heat transfer coefficient; A$_\lambda$ is the absorbance of the CuS@DMSN-N=C-HA aqueous solution at 980 nm; c$_0$ is 4.2 J (g °C)$^{-1}$;

the hA was calculated according to the equation (2):

$$hA = \frac{m_0 c_0}{\tau_s}$$

(2)

where the τ$_s$ (244.15 s) is the time constant obtained from Fig. S1; m$_0$ (1 g) is the weight of the CuS@DMSN-N=C-HA aqueous solution; Finally, the photothermal conversion efficiency of CSN was calculated to be ~19.57%.
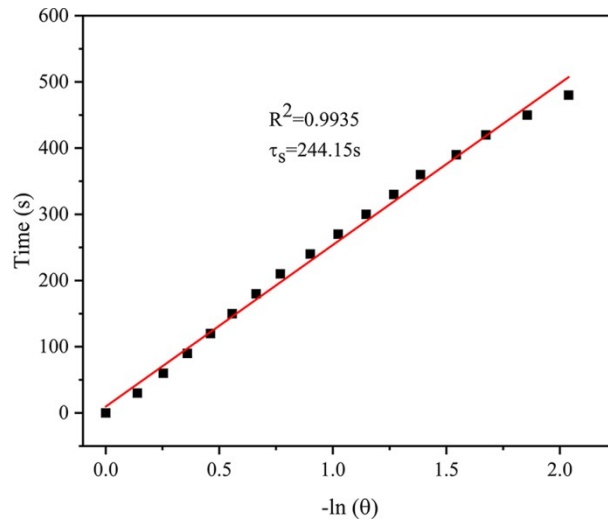
Fig. S1. The relationship between negative natural logarithm function of temperature at cooling stage and cooling time.
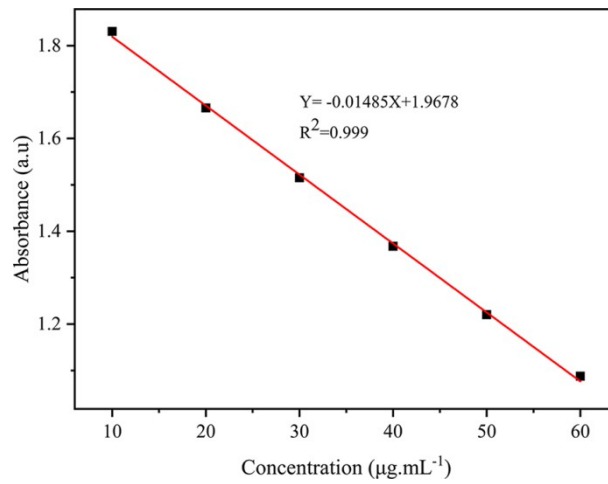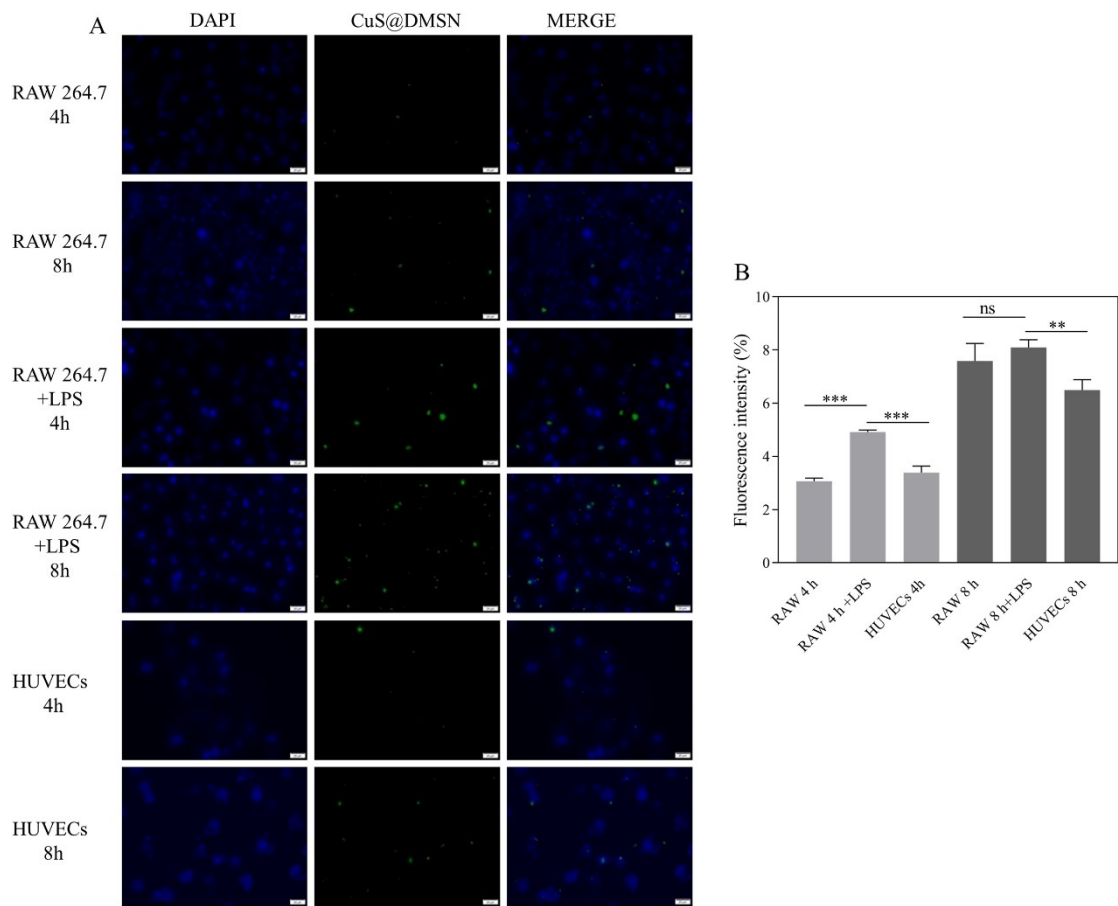

Fig. S2. Heparin sodium drug standard curve

Fig. S3. (A) Confocal laser scanning microscopy image of RAW 264.7 and HUVECs cells after incubation with CuS@DMSN-FITC for 4 h and 8 h. (B) Fluorescence intensities of CuS@DMSN-FITC. Scale bars ：20 μm. Data in (B) are expressed as mean ± SD (n = 3).
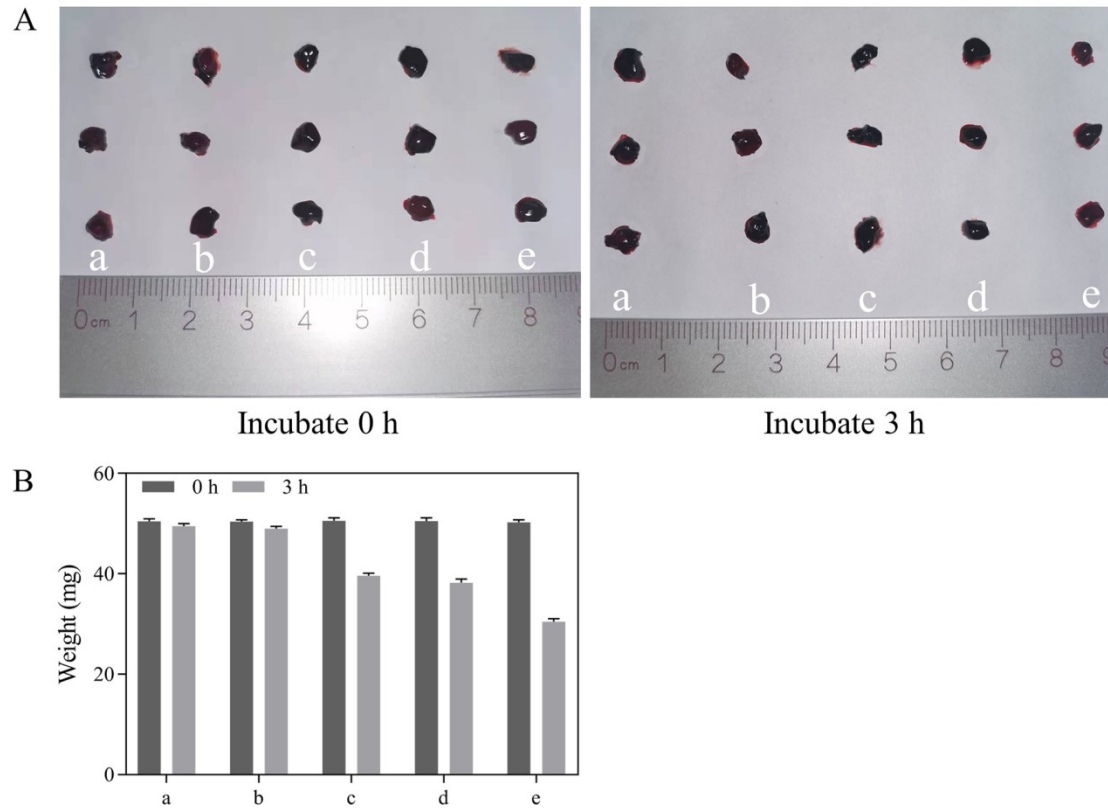
Fig. S4. The thrombus without 980 NIR laser irradiate and moved to 37°C for 0 h or 3h (a:PBS, b:CuS@DMSN, c:Hep, d:H-CuS@DMSN, e:H-CuS@DMSN-N=C-HA). (B) The weight loss of thrombus in thrombolysis model (a:PBS, b:CuS@DMSN, c:Hep, d:H-CuS@DMSN, e:H-CuS@DMSN-N=C-HA). Data in (B) are expressed as mean ± SD (n = 3).