Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

One-step synthesis of amino-functionalized ultrasmall near infrared-emitting persistent luminescence nanoparticles for *in vitro* and *in vivo* bioimaging

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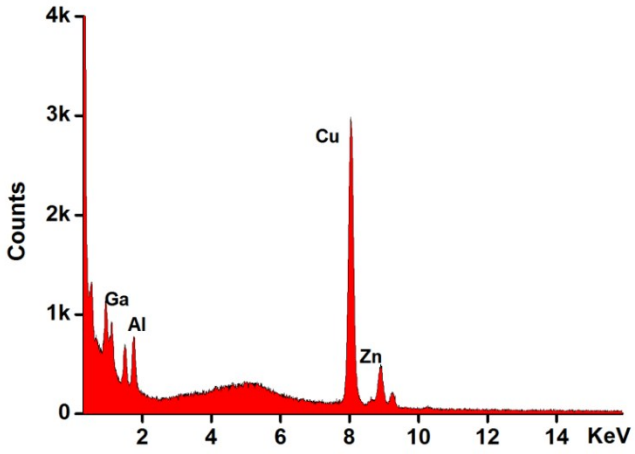


Fig. S1. EDS spectrum of the ZGO.

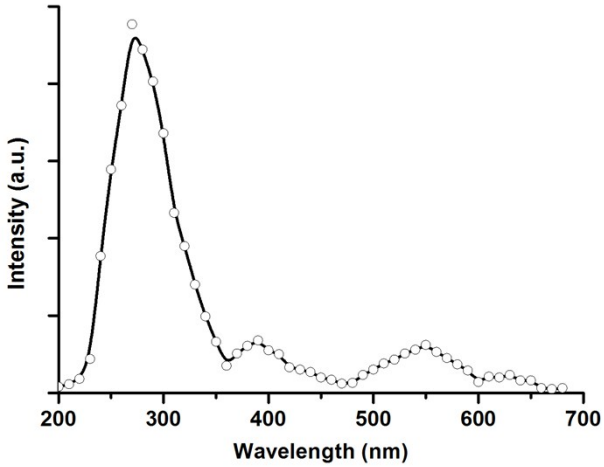


Fig. S2. Excitation wavelength dependence of the persistent luminescent intensity at 10 s after the removal of the excitation light. The electrons were emptied by thermal cleaning, then the sample was pre-irradiated for 3 min before experiment using a xenon lamp in a FLS920 spectrometer as different excitation wavelength lights source without any corrections.

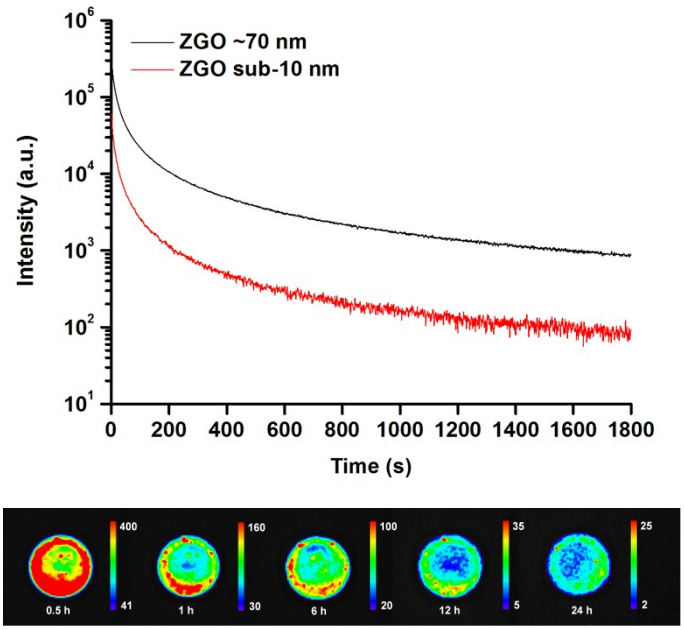


Fig. S3. NIR afterglow decay curve of the different size ZGO after 5 min of excitation at 254 nm.

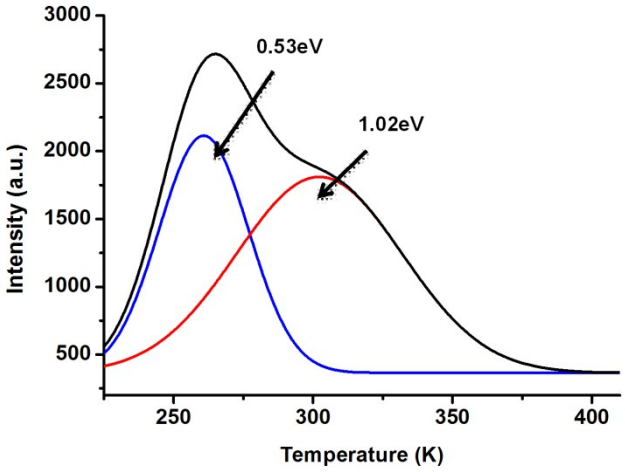


Fig. S4. Thermo-luminescent curves of the ZGO 5 min after stopping the excitation.

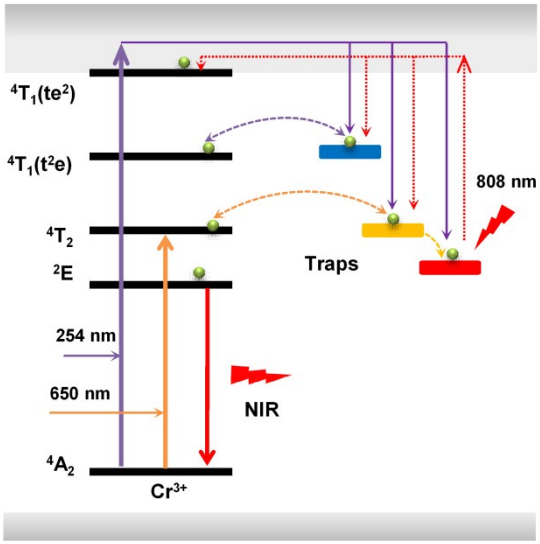


Fig. S5. Schematic representation of the persistent NIR luminescent mechanism.

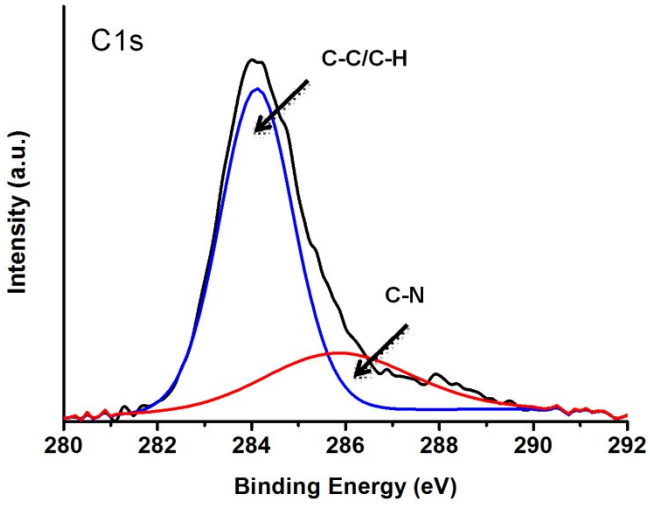


Fig. S6. C1s XPS spectrum of the ZGO.

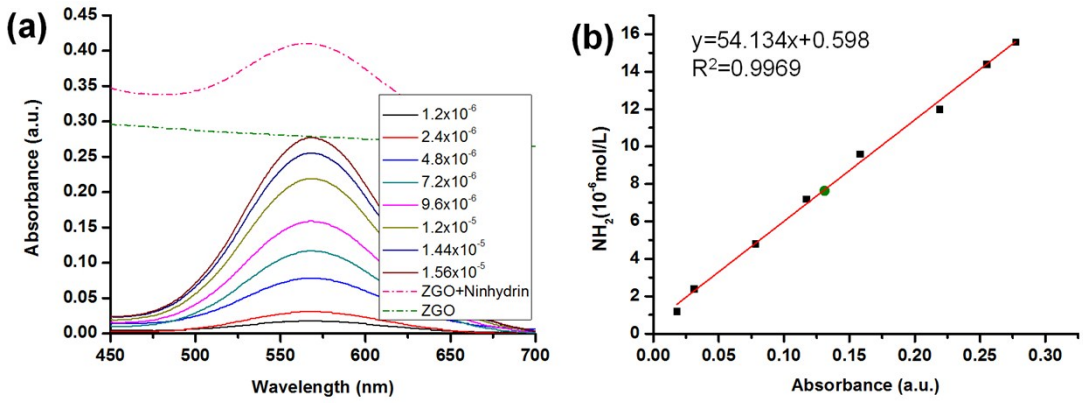


Fig. S7. Absorption spectra (a) of sample and standard solutions containing different concentration of NH_2. (b) NH_2 concentration vs absorption at λ = 570 nm.

Absorption of sample=$(ZGO+Ninhydrin)_{570\ nm}$-$ZGO_{570nm}$

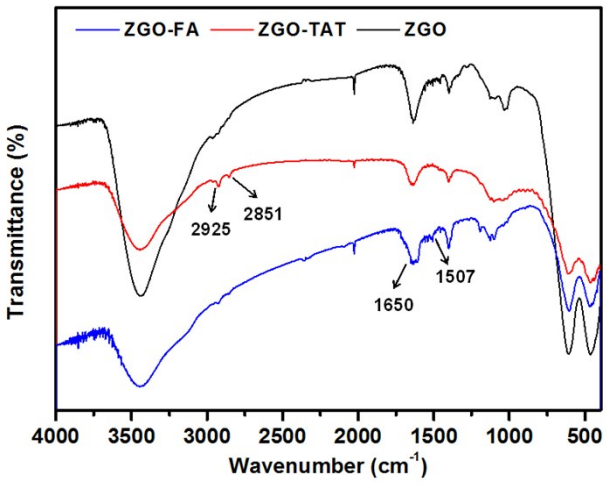


Fig. S8. FTIR spectra of ZGO-TAT and ZGO-FA. The FTIR absorption bands at 2925 cm^{-1} and 2851 cm^{-1} (-CH_2 stretching vibration) confirmed the successful conjugation of the TAT peptide to the ZGO surface. The appearance of the absorption bands at 1650 cm^{-1} (C=O stretching bands) and 1507 cm^{-1} (C=N or C=C stretching bands) are characteristic of FA.

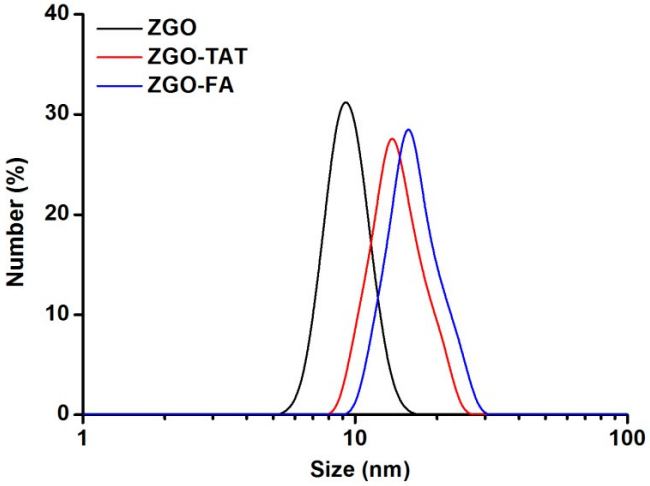


Fig. S9. Dynamic light scattering spectra of the ZGO, ZGO-TAT and ZGO-FA.

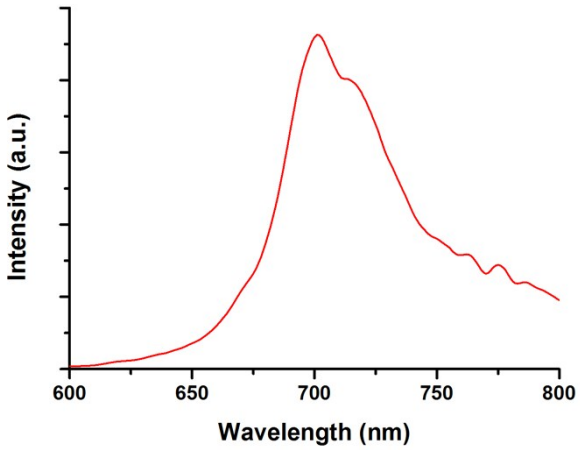


Fig. S10. The afterglow spectrum of ZGO-FA after 5 min of excitation at 254 nm.

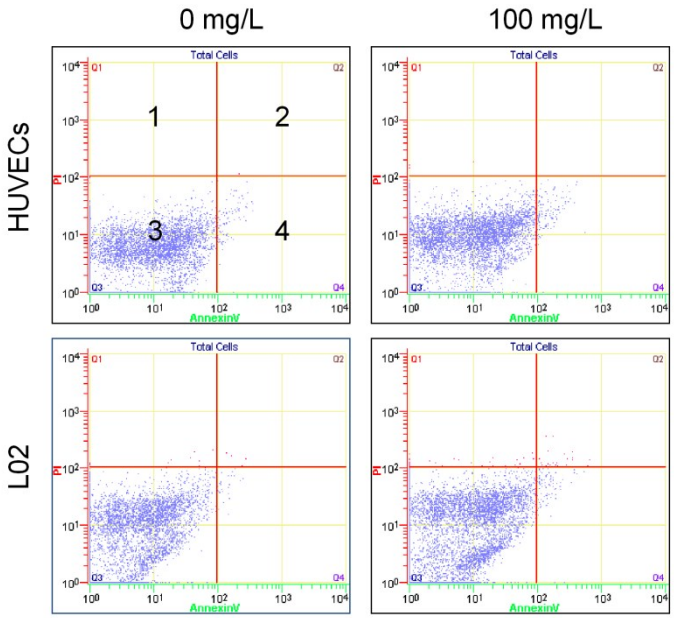


Fig. S11. Cell apoptosis assay of the ZGO, where 1-4 represent the distribution of necrotic, apoptotic, viable and early apoptotic cells, respectively.

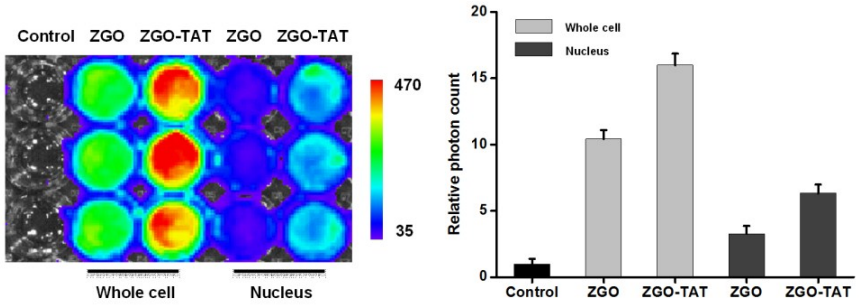


Fig. S12. Luminescent images of subcellular distribution of ZGO and ZGO-TAT.

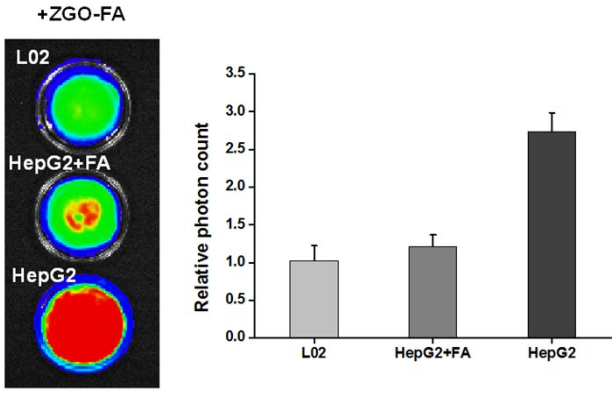


Fig. S13. Luminescent images of the L02 and HepG2 cells incubated with ZGO-FA for 1 h.

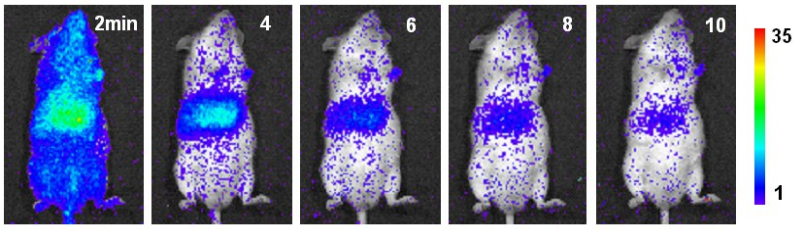
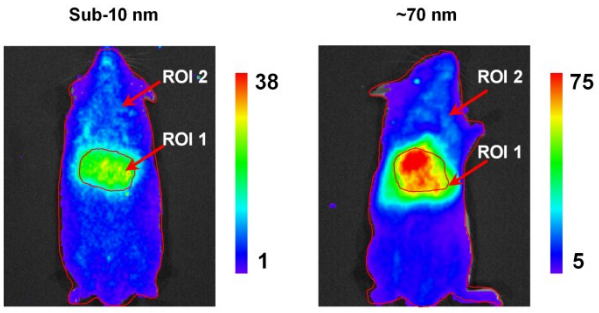


Fig. S14. *In vivo* luminescent images of normal mice after intravenous injection of ZGO-FA.



	Sub-10 nm	~70 nm
ROI 1/ROI 2 (%)	21.5	38.3

Fig. S15. Semiquantitative image-based evaluation of the amount of ZGO located within RES organs. ROI 1 represent major RES organ (liver), ROI2 represent the whole body. Liver uptake rate=ROI 1/ROI 2.