Electronic Supplementary Material (ESI) for Nanoscale.

Near infrared light-mediated enhancement of reactive oxygen species generation through electron transfer from graphene oxide to iron hydroxide/oxide

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1. Supporting Discussion

Characterization of graphene oxide

Graphene oxide (GO) was characterized and the results were shown in SI, Figure S1, Figure S2, Figure S5, and Figure S6. The formation of the single layer GO sheet is confirmed by atomic force microscopy (AFM) images (Figure S1). GO has lateral dimensions of 10–250 nm and a thickness of ~1.0 nm, which is characteristic of a fully exfoliated GO sheet[1]. The FT-IR spectra of GO was also performed to characterize the successfully synthesis of GO. As shown in Figure S2, several characteristic peaks of GO were observed in the FT-IR spectrum, including peaks at 3420, 1720, 1240 and 1080 cm^{-1}, which are attributed to O-H stretching vibration, C=O stretching vibration, C-OH stretching vibration, and C-O stretching vibration, respectively. Furthermore, Raman spectra (Figure S4) and X-ray diffraction (XRD) (Figure S5) were also used for the characterization of GO.

References:

1. Y. Si and E. T. Samulski, *Nano Letters*, 2008, 8, 1679-1682.

2. Supporting Figures 1-12 with legends

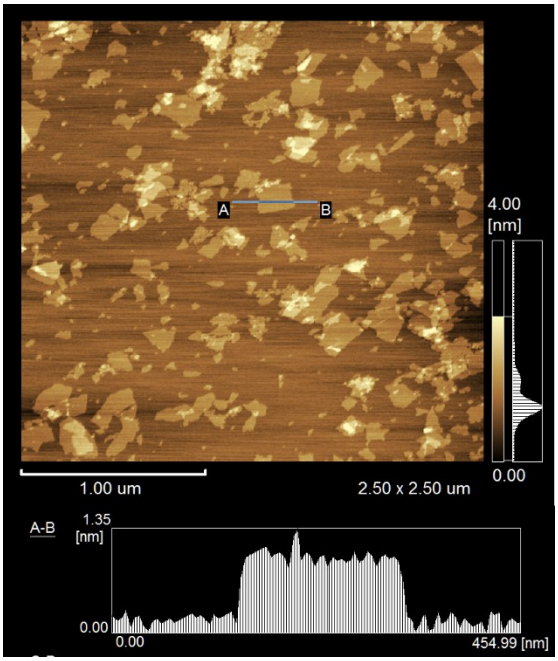


Figure S1. AFM image and height profile of GO.

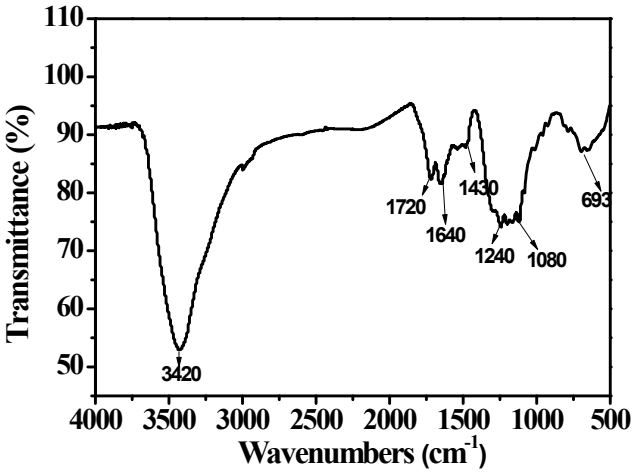
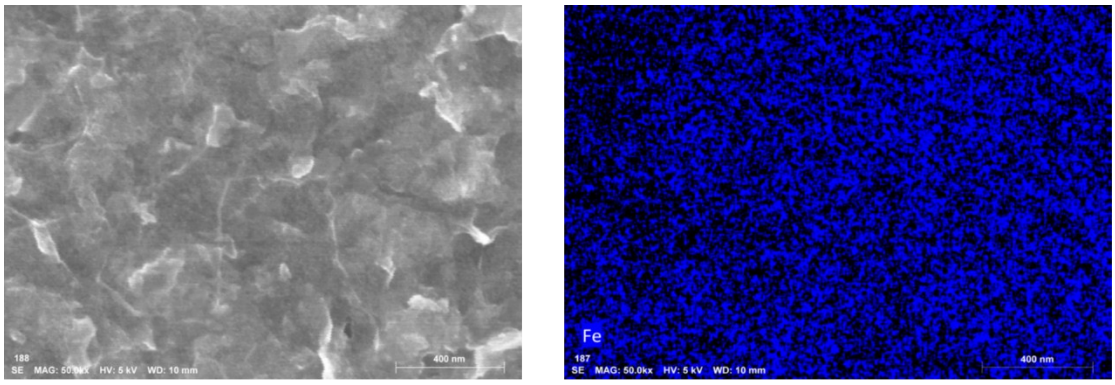
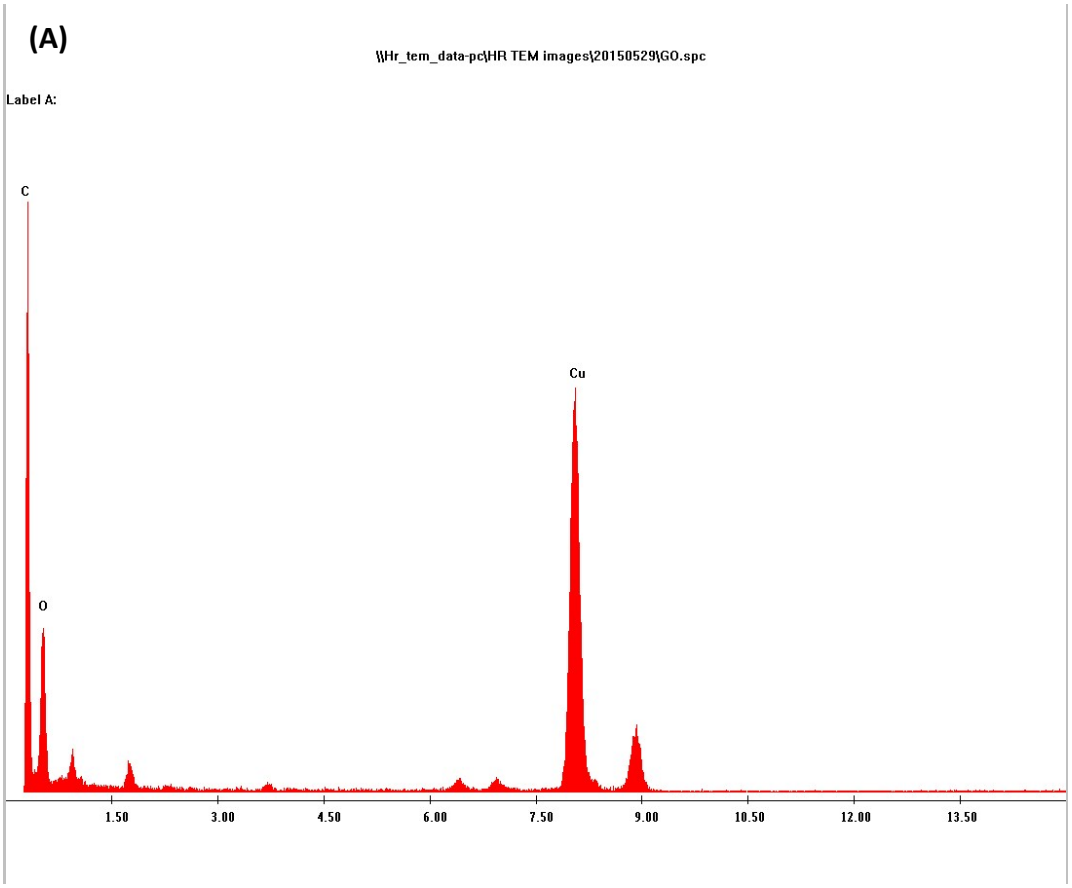


Figure S2. FT-IR spectrum of GO.



SEM **Fe**

Figure S3. Scanning electron microscopy (SEM) image and EDX mapping of GO-FeO_xH.


(A)
\\Hr_tem_data-pc\HR TEM images\20150529\GO.spc
Label A:
C
O
Cu
1.50
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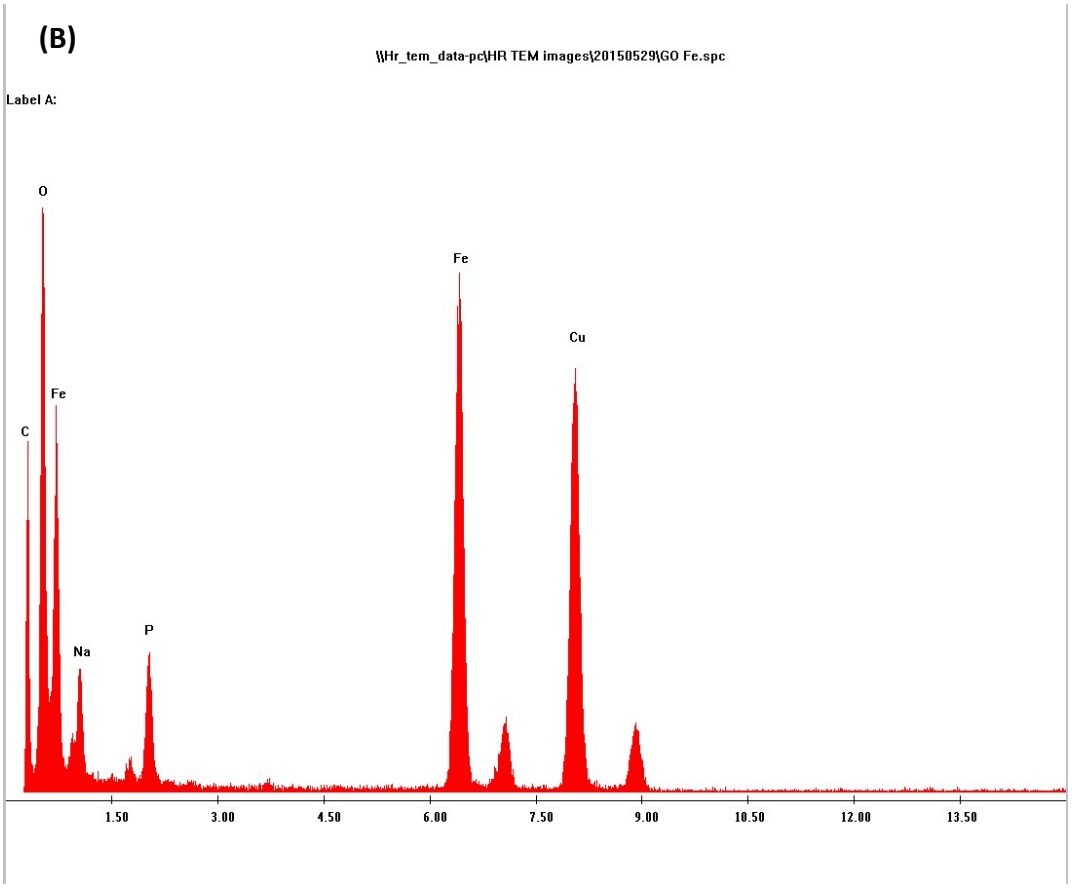

Figure S4. Energy-dispersive X-ray spectroscopy (EDX) mapping (elemental distribution images) of GO (A) and GO-FeO_xH (B).

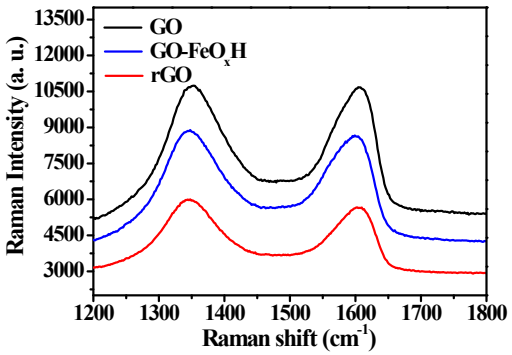

Figure S5. Raman spectrum of GO, rGO, and synthesized GO-FeO_xH.

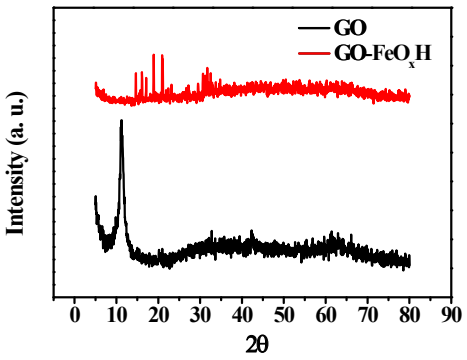

Figure S6. XRD patterns of GO and synthesized GO-FeO_xH.

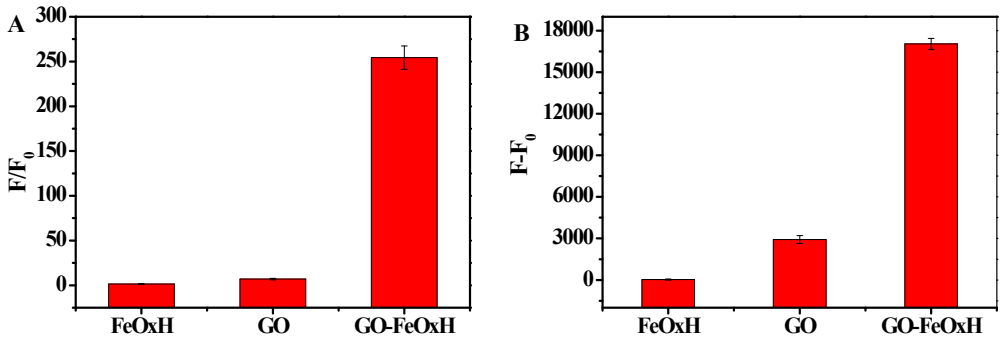

Figure S7. Fluorescence intensity changes (F/F_0) (A) and ($F - F_0$) (B) of AUR in the presence of FeO_xH, GO and GO-FeO_xH.

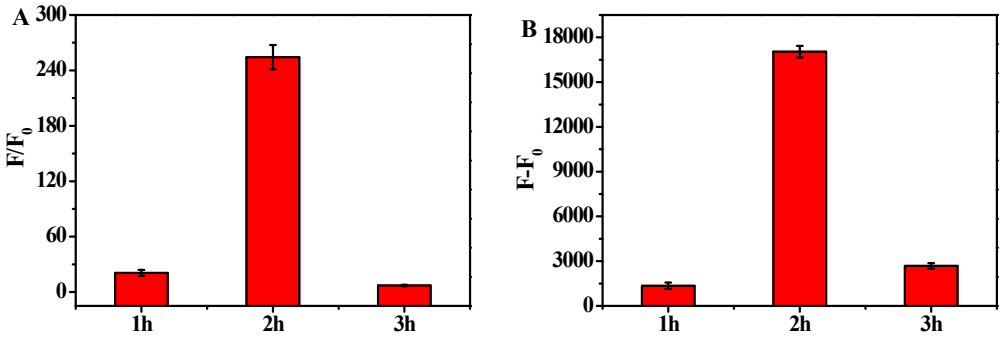

Figure S8. Fluorescence intensity changes (F/F_0) (A) and ($F - F_0$) (B) of AUR in the presence of GO-FeO_xH following different electrodeposition times.

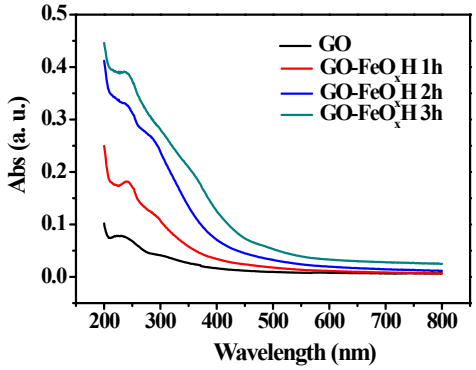

Figure S9. UV-visible absorption spectra of GO and GO-FeO_xH following different electrodeposition times.

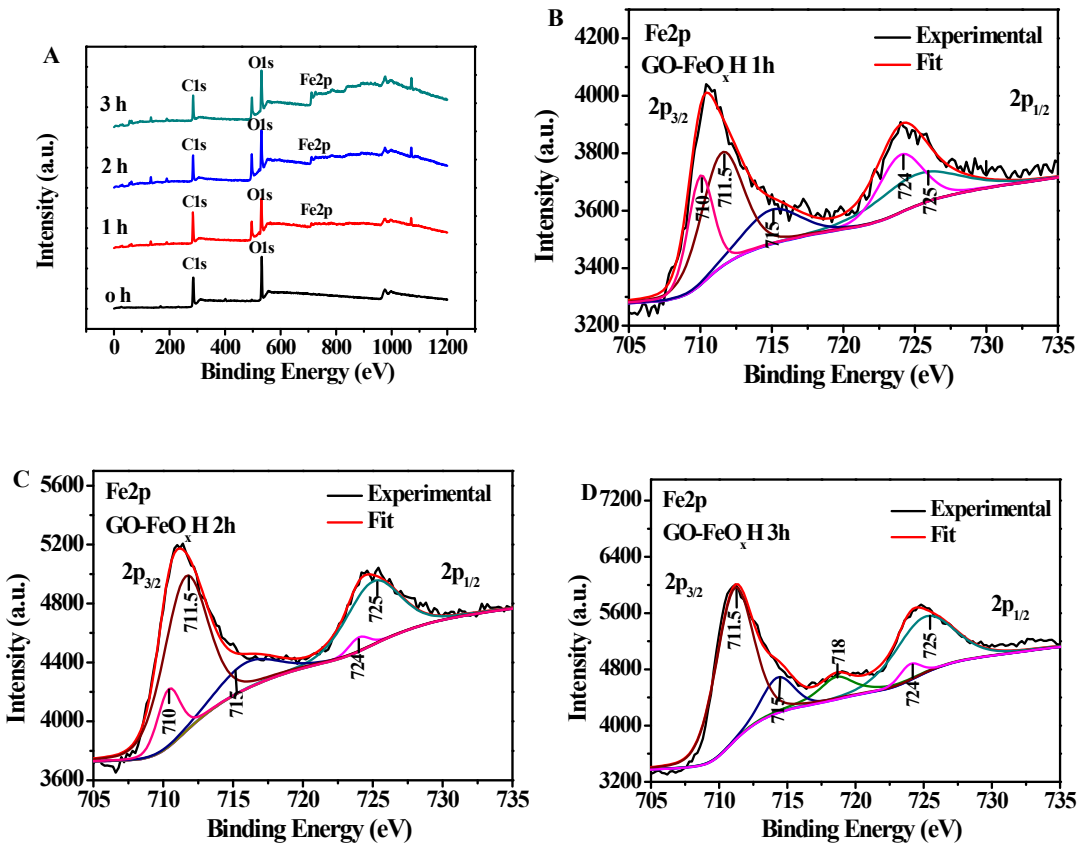

Figure S10. XPS spectra of GO-FeO$_x$H following different electrodeposition times. (A) wide scan, (B) Fe 2p spectra of GO-FeO$_x$H after 1 h of electro-deposition, (C) Fe 2p spectra of GO-FeO$_x$H after 2 h of electro-deposition, and (D) Fe 2p spectra of GO-FeO$_x$H after 3 h of electro-deposition.

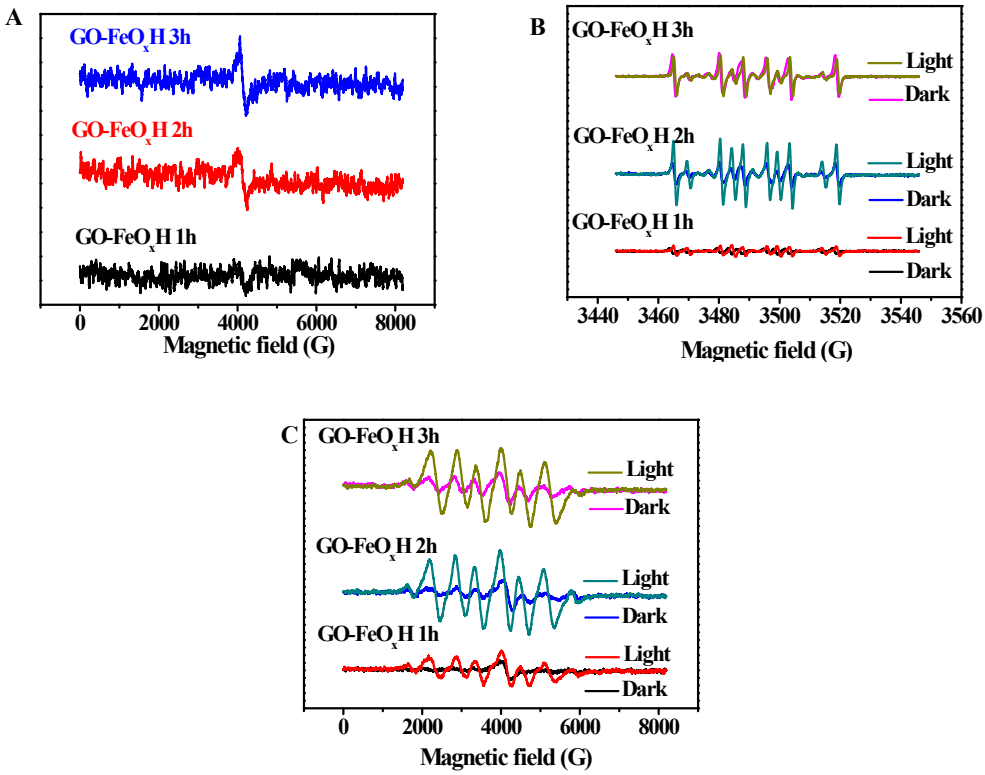

Figure S11. EPR spectra of GO-FeO_xH following different electrodeposition times in aqueous solution (A), with DMPO in aqueous solution (B), and with DMPO in methanol solution (C).

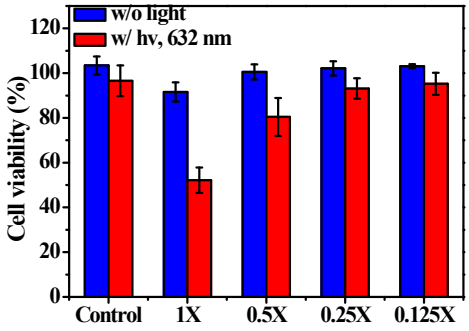

Figure S12. MTT assay of Tramp C1 cells incubated with a serial concentration of GO-FeO_xH in DMEM (10% FBS) at 37°C and 5% CO_2 for 2 h, respectively. After GO-FeO_xH treatments, cells were washed twice and PBS 1X was added. Cells were then irradiated with red light (632 nm, 15 mW) for 1 h and subsequently incubated in fresh DMEM medium (10% FBS) for 48 h. The cytotoxicity was measured using an alamar blue assay. The GO-FeO_xH nanomaterial concentration denoted as 1X corresponds to 12.5 µg/mL.