

## *Electronic Supplementary Information*

### **Glucose Oxidase and Fe<sub>3</sub>O<sub>4</sub>/TiO<sub>2</sub>/Ag<sub>3</sub>PO<sub>4</sub> Co-Embedded Biomimetic Mineralization Hydrogels as Controllable ROS Generators for Accelerating Diabetic Wound Healing**

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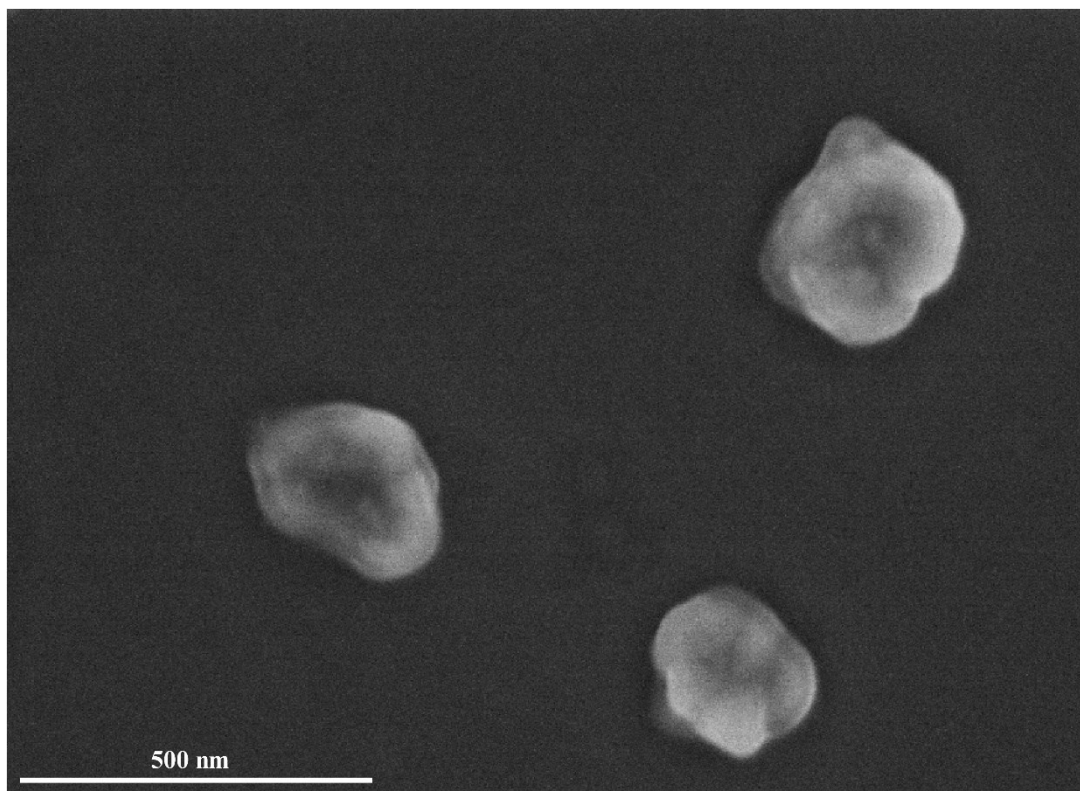
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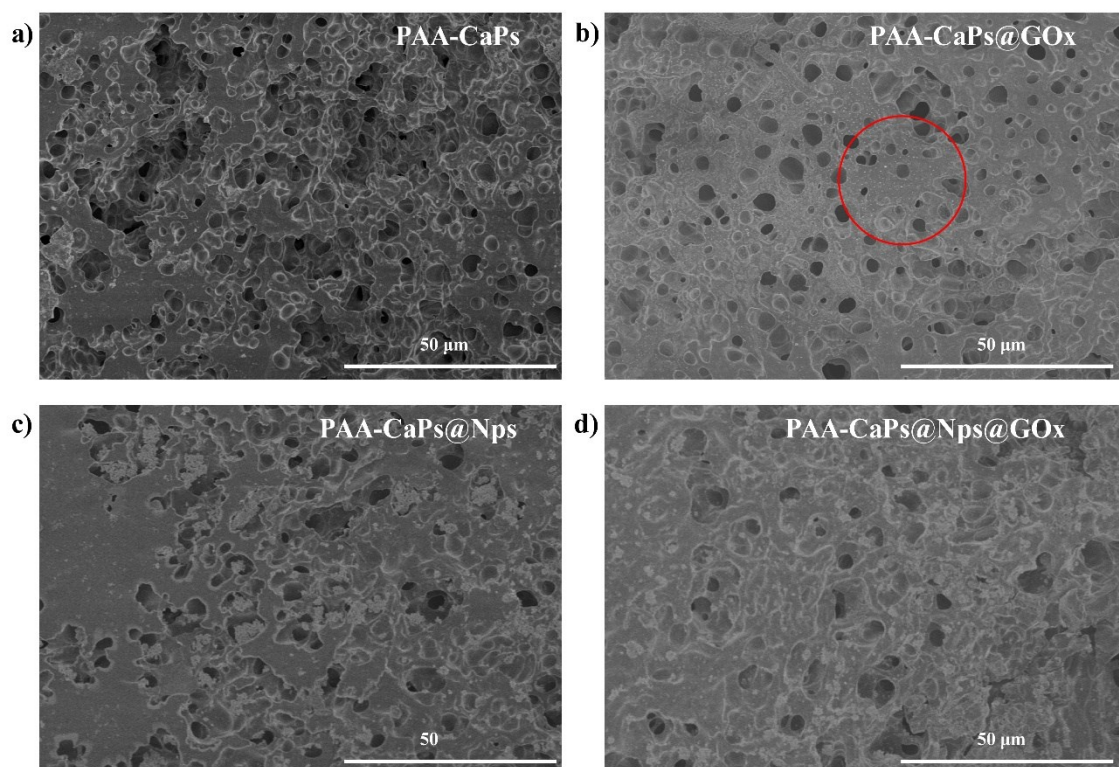
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**Fig. S1.** SEM image of  $\text{Fe}_3\text{O}_4/\text{TiO}_2/\text{Ag}_3\text{PO}_4$  nanoparticles



**Fig. S2.** SEM image of (a) PAA-CaPs; (b) PAA-CaPs@GOx; (c) PAA-CaPs@Nps and (d) PAA-CaPs@Nps@GOx hydrogel.

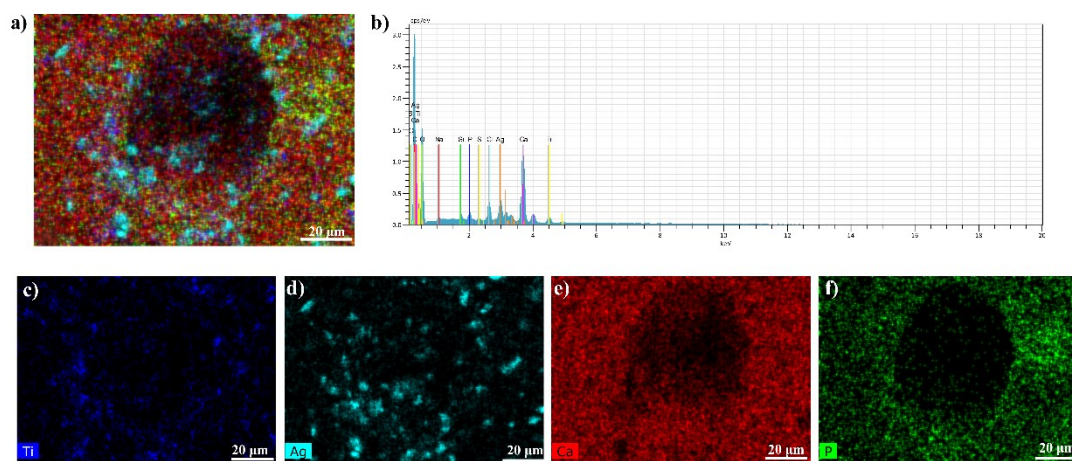
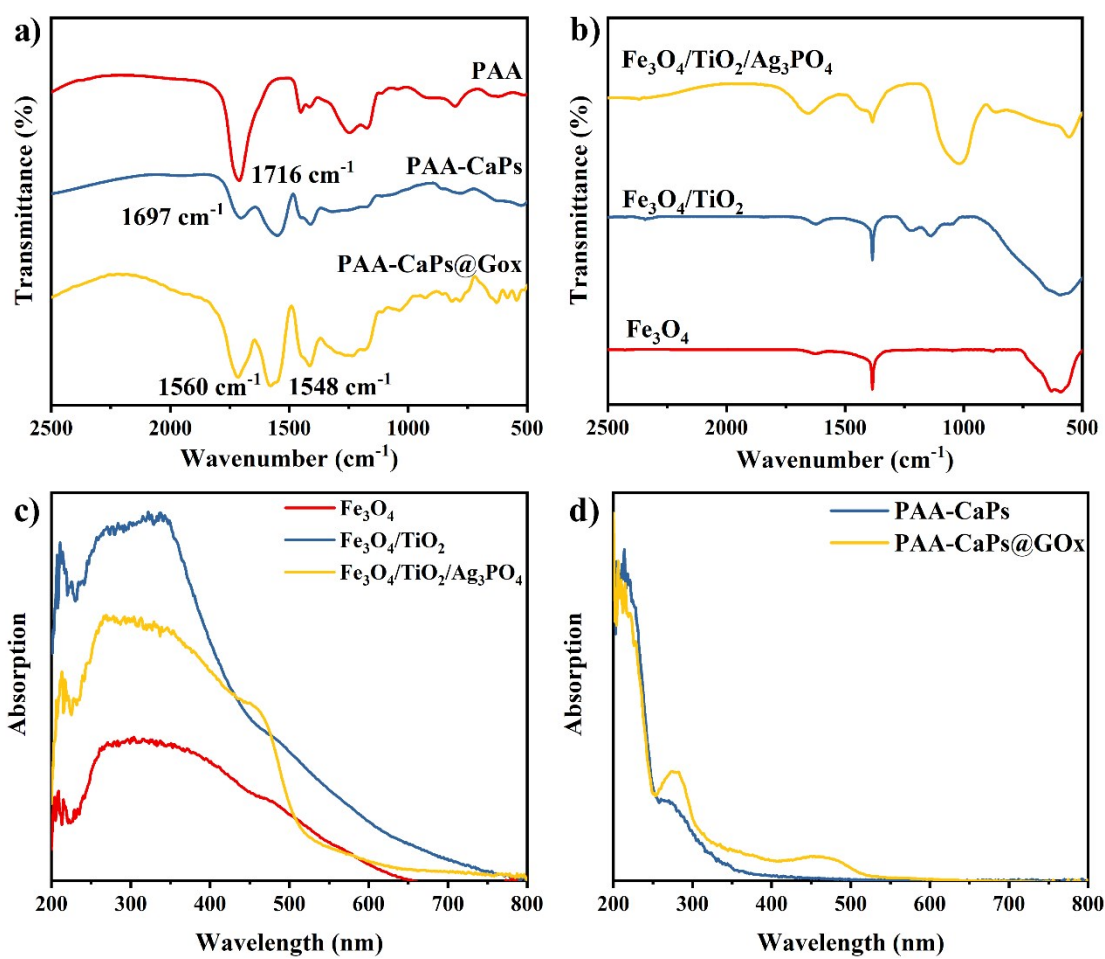


Fig. S3. EDS mapping of PAA-CaPs@Nps hydrogel.



**Fig. S4.** (a) FT-IR spectra of hydrogel. The peak shift from 1716  $\text{cm}^{-1}$  ( $\nu(\text{COOH})$ ) to 1697  $\text{cm}^{-1}$  ( $\nu(\text{COO}^-)$ ) indicates the chelation between  $\text{COO}^-$  and  $\text{Ca}^{2+}$ ; (b) FT-IR spectra; (c) UV-vis absorption spectra of  $\text{Fe}_3\text{O}_4$ ,  $\text{Fe}_3\text{O}_4/\text{TiO}_2$  and  $\text{Fe}_3\text{O}_4/\text{TiO}_2/\text{Ag}_3\text{PO}_4$  nanoparticles and (d) UV-vis absorption spectra of hydrogel.

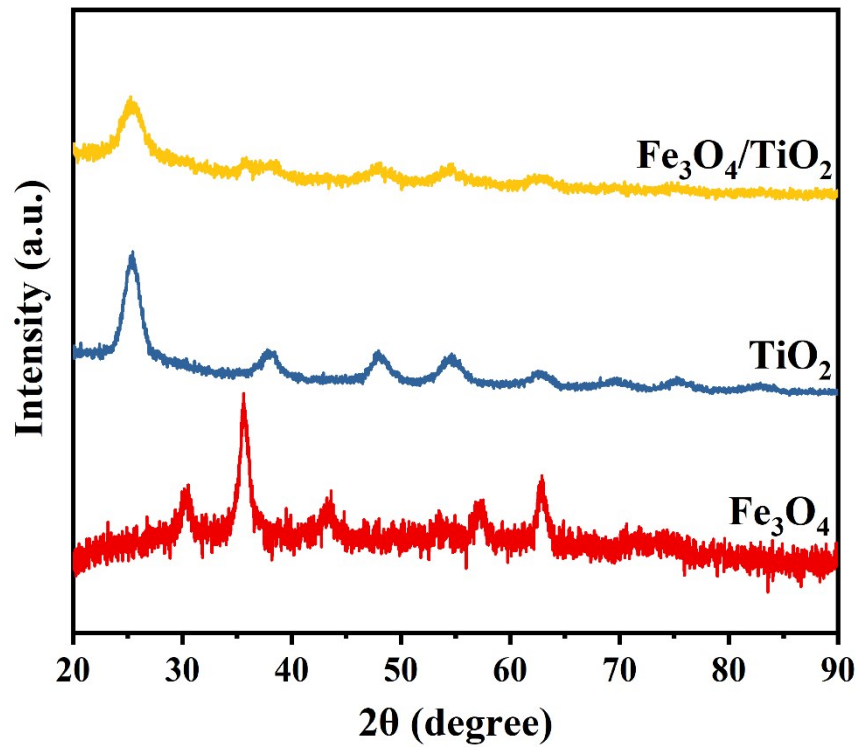


Fig. S5. XRD patterns of Fe<sub>3</sub>O<sub>4</sub>, TiO<sub>2</sub>, Fe<sub>3</sub>O<sub>4</sub>/TiO<sub>2</sub> nanoparticles.

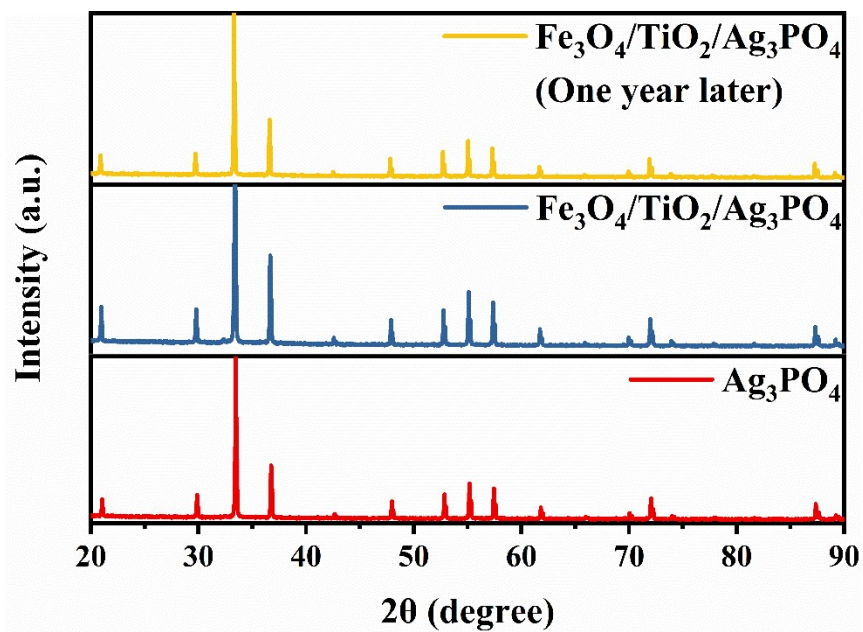
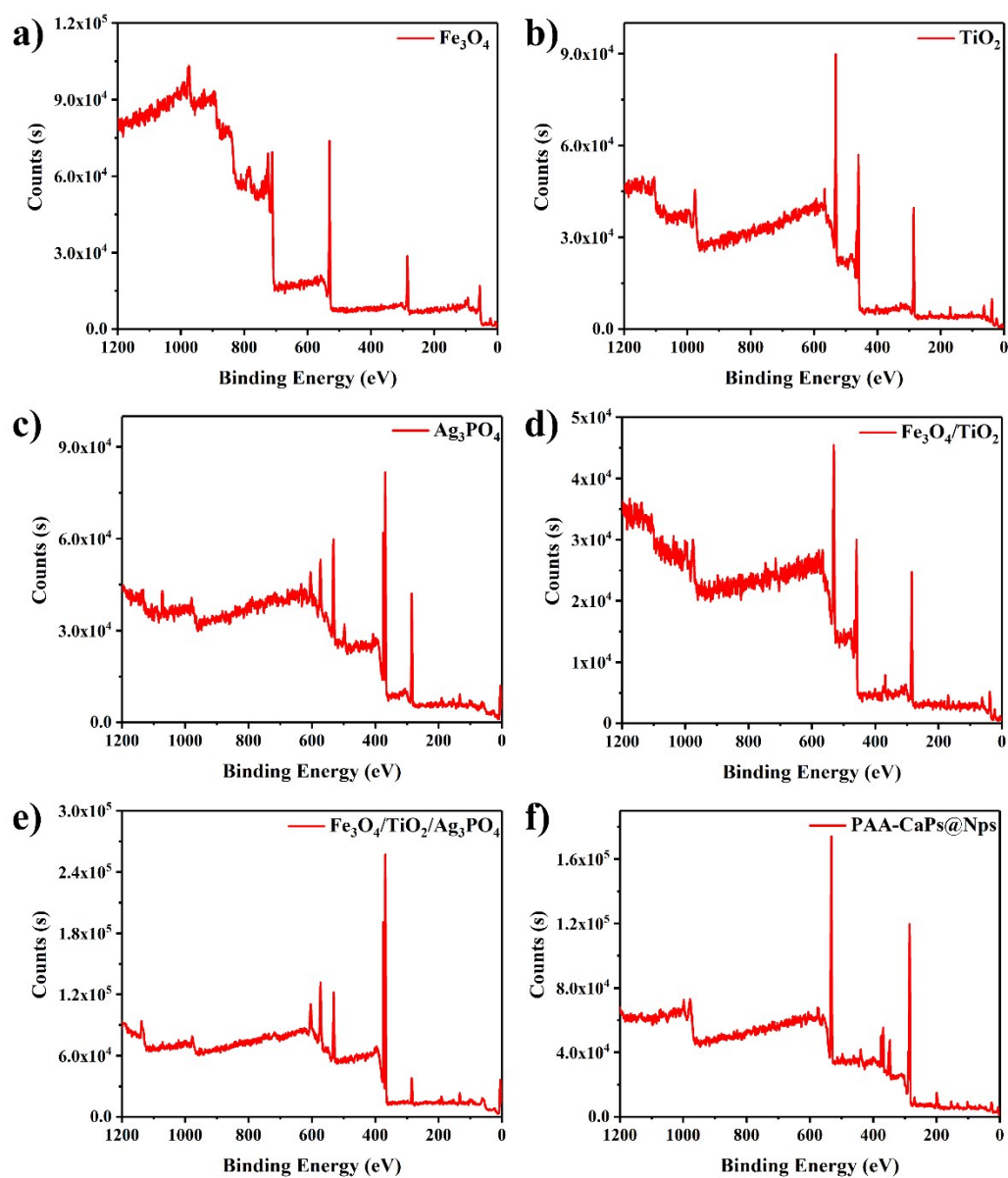


Fig. S6. XRD patterns of  $\text{Ag}_3\text{PO}_4$ ,  $\text{Fe}_3\text{O}_4/\text{TiO}_2/\text{Ag}_3\text{PO}_4$ , and  $\text{Fe}_3\text{O}_4/\text{TiO}_2/\text{Ag}_3\text{PO}_4$  nanoparticles after one year.





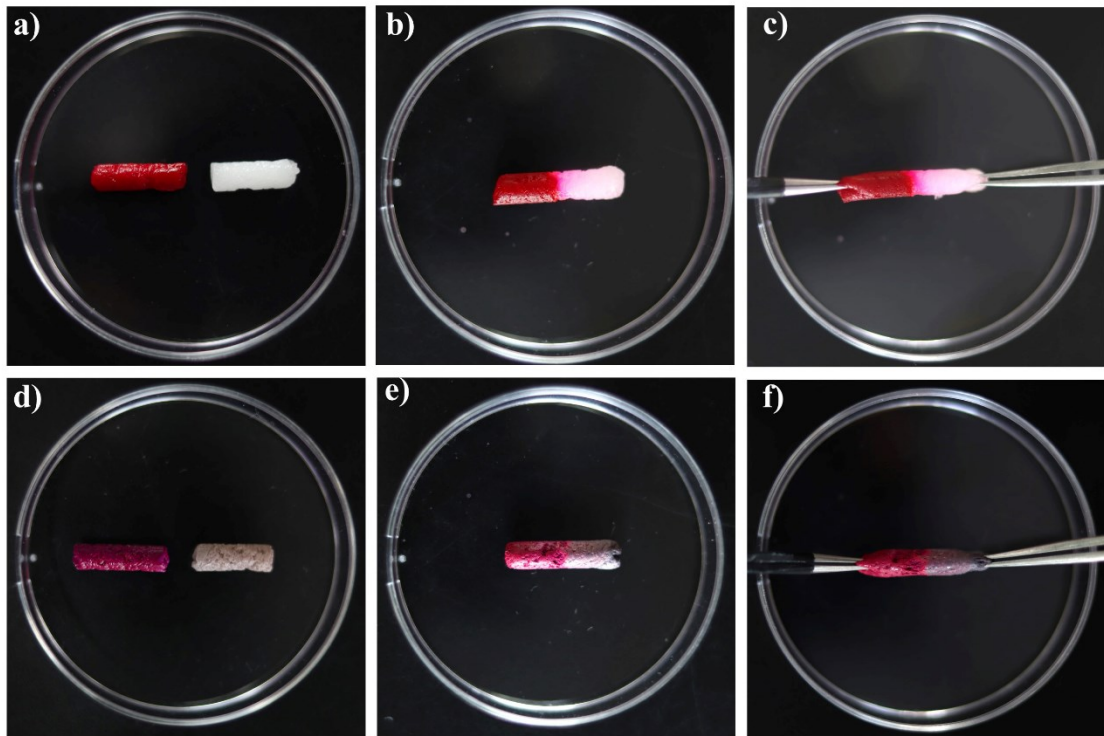
**Fig. S7.** XPS patterns of (a)  $\text{Fe}_3\text{O}_4$ ; (b)  $\text{TiO}_2$ ; (c)  $\text{Ag}_3\text{PO}_4$ ; (d)  $\text{Fe}_3\text{O}_4/\text{TiO}_2$ ; (e)  $\text{Fe}_3\text{O}_4/\text{TiO}_2/\text{Ag}_3\text{PO}_4$

nanoparticles and (f) PAA-CaPs@Nps hydrogel.

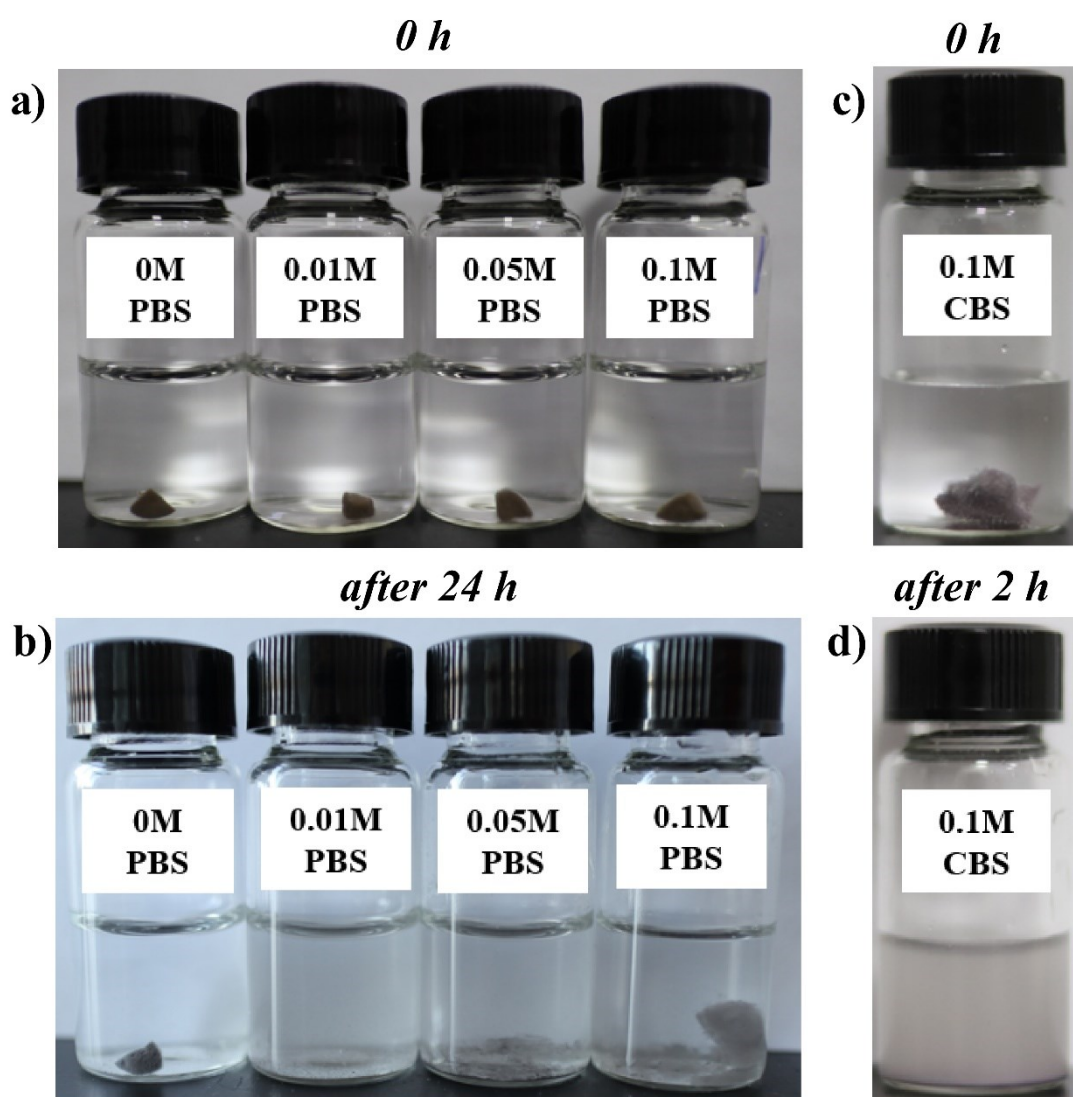


**Table S1.** Encapsulation efficiency and enzyme loading of PAA-CaPs@GOx and PAA-CaPs@Nps@GOx. Data were expressed as mean value  $\pm$  SD of three experiments.

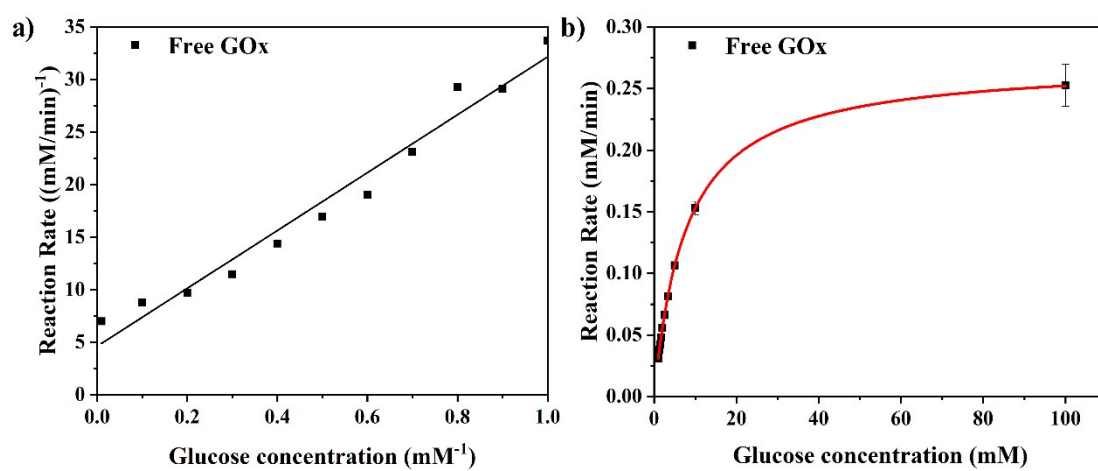
<b>Sample</b>	<b>Encapsulation efficiency (%)</b>	<b>Enzyme loading (mg/g)</b>
PAA-CaPs@GOx	96.36	52.0
PAA-CaPs@Nps@GOx	96.75	42.0



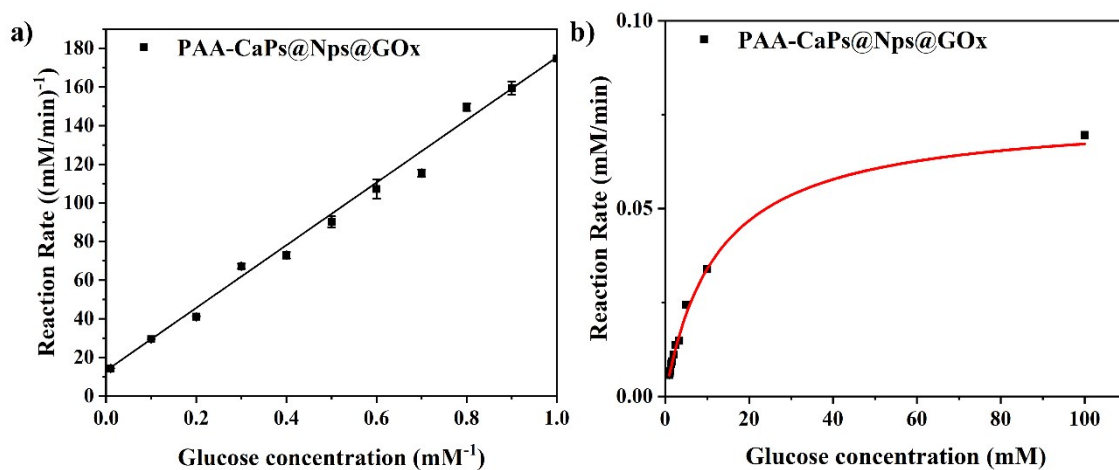
**Fig. S8.** Self-repairing hydrogel stress-strain curve (a-c) PAA-CaPs hydrogel; (d-f) PAA-CaPs@Nps hydrogel.



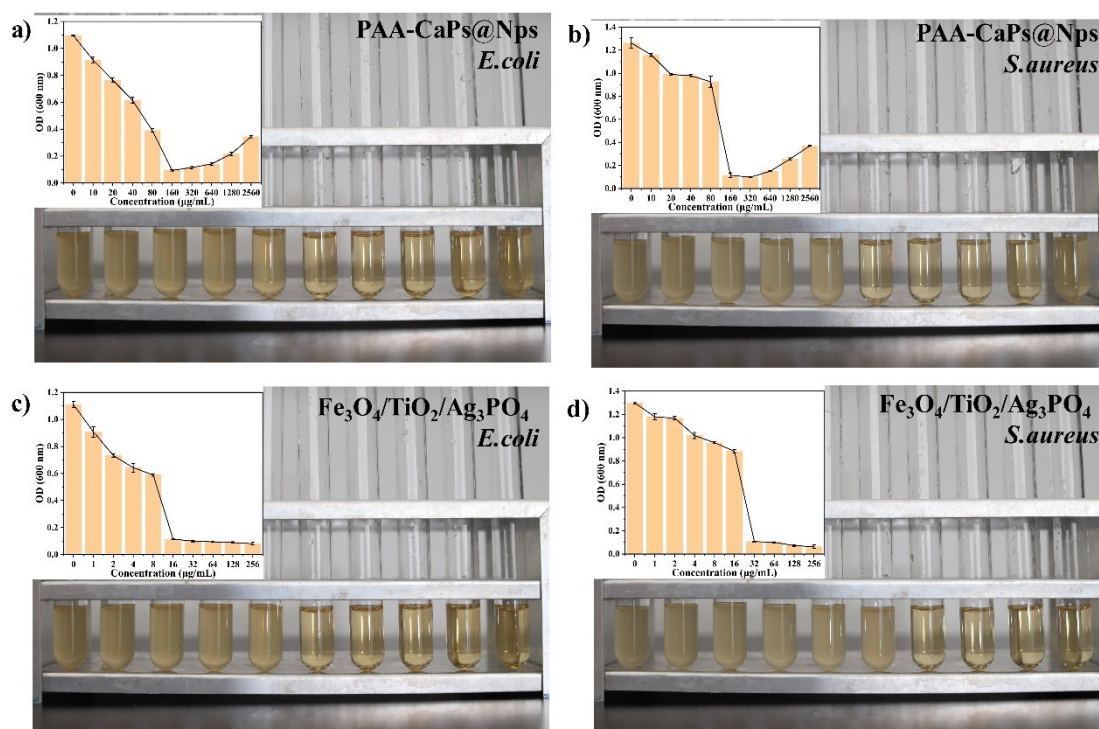
**Fig. S9.** Optical picture of mineralized hydrogel in response to phosphate and carbonate.



**Fig. S10.** (a) The Lineweaver–Burke plots and (b) Michaelis-Menten curve for free GOx. The error bars indicate means  $\pm$  SD ( $n = 3$ ).

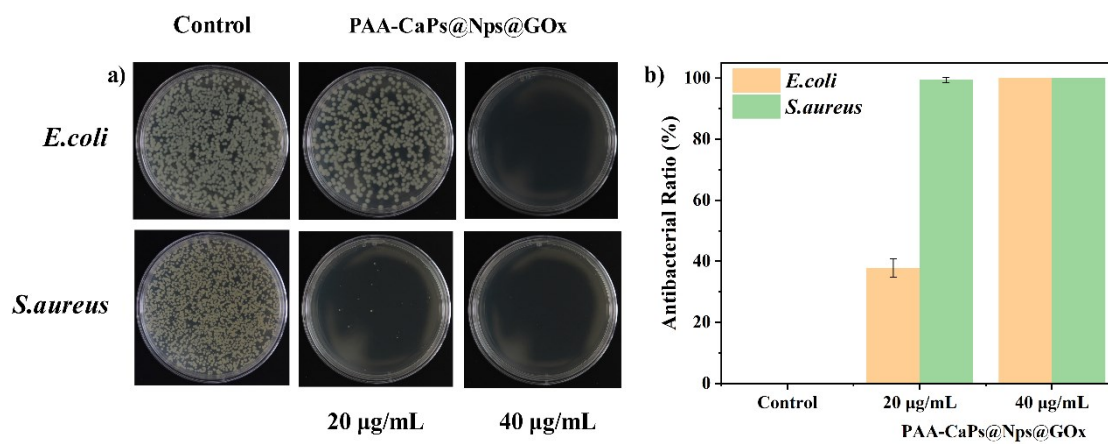


**Fig. S11.** (a) The Lineweaver–Burke plots and (b) Michaelis-Menten curve for PAA-CaPs@Nps@GOx hydrogel. The error bars indicate means  $\pm$  SD ( $n = 3$ ).



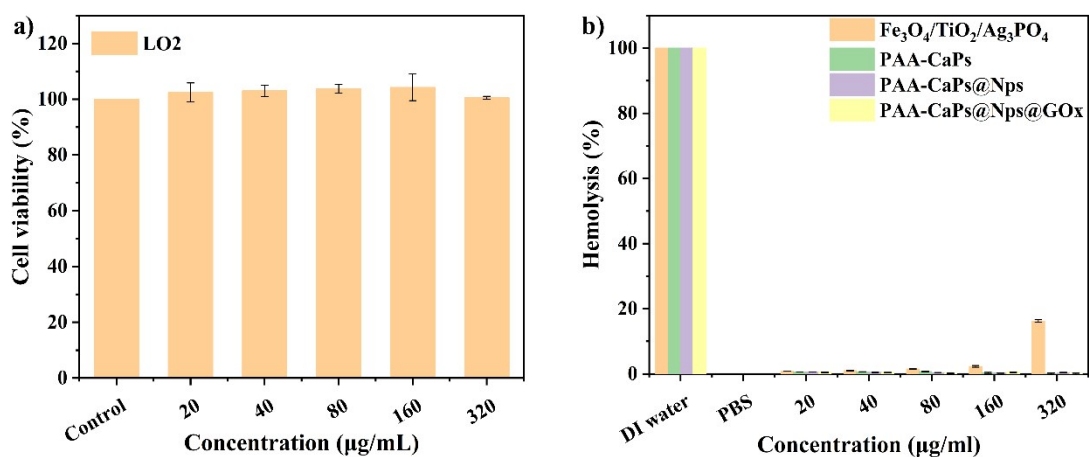
**Fig. S12.** MIC results (a) and (b) for PAA-CaPs@Nps hydrogel; (c) and (d) for Fe<sub>3</sub>O<sub>4</sub>/ TiO<sub>2</sub>/Ag<sub>3</sub>PO<sub>4</sub>

nanoparticles against *E. coli* and *S. aureus*. The error bars indicate means ± SD (n = 3).



**Fig. S13.** (a) Bactericidal effect of PAA-CaPs@Nps@GOx nanocomposite hydrogel against *E. coli* and *S. aureus* under different concentration. (b) Summary in antibacterial ratio of the PAA-CaPs@Nps@GOx nanocomposite hydrogel. The error bars indicate means  $\pm$  SD (n = 3).



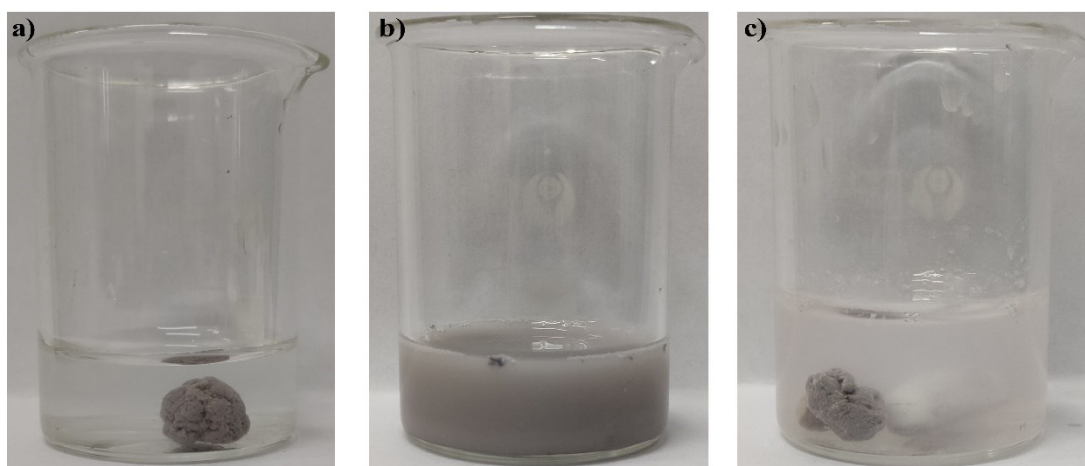


**Fig. S14.** (a) Cell viability of LO2 cells after incubation with different concentrations of PAA-CaPs

hydrogel. (b) Blood compatibility (hemolytic assay) after 30 min treatment of RBCs with

Fe<sub>3</sub>O<sub>4</sub>/TiO<sub>2</sub>/Ag<sub>3</sub>PO<sub>4</sub>, PAA-CaPs, PAA-CaPs@Nps and PAA-CaPs@Nps@GOx at 37°C. The error bars

indicate means ± SD (n = 3).



**Fig. S15.** PAA-CaPs@Nps@GOx hydrogel in 0.01 M PBS (a) 0 h, (b) 12 h, and (c) The re-established hydrogel after 0.1 M CaCl<sub>2</sub> was injected.