Supporting Information

NIR-Responsive Upconversion Nanoplatforms: an Anionic Drug Carrier for ROS Amplification Induced by β-amyloid Fibrils

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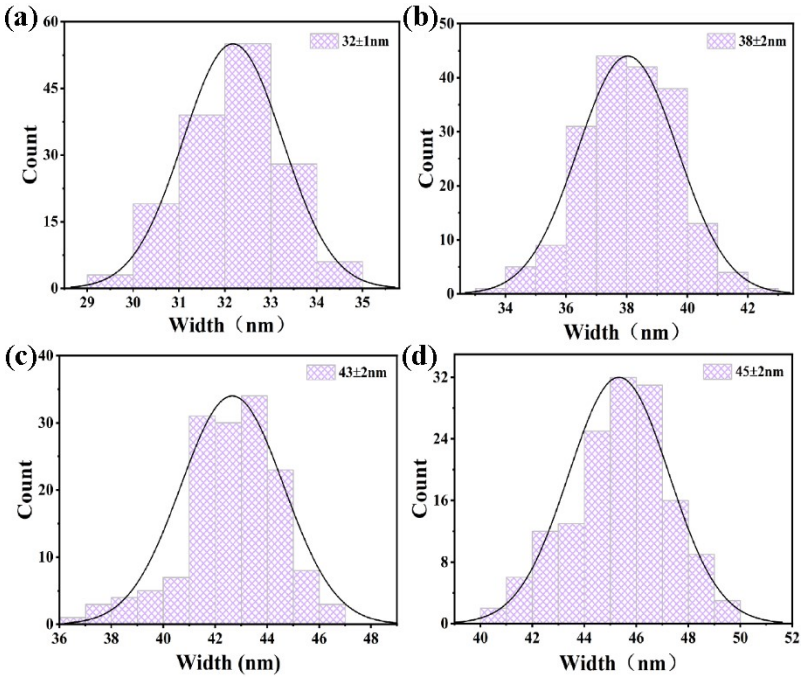

Figure S1 Particles width distribution of (a) β-$NaYF_4$:Yb/Tm, (b) β-$NaYF_4$:Yb/Tm@$NaYF_4$, (c) β-$NaYF_4$:Yb/Tm@$NaYF_4$@$NaYF_4$:Yb/Er, and (d) β-$NaYF_4$:Yb/Tm@$NaYF_4$@$NaYF_4$:Yb/Er@$NaYF_4$ (UCNPs(Tm/Er)).

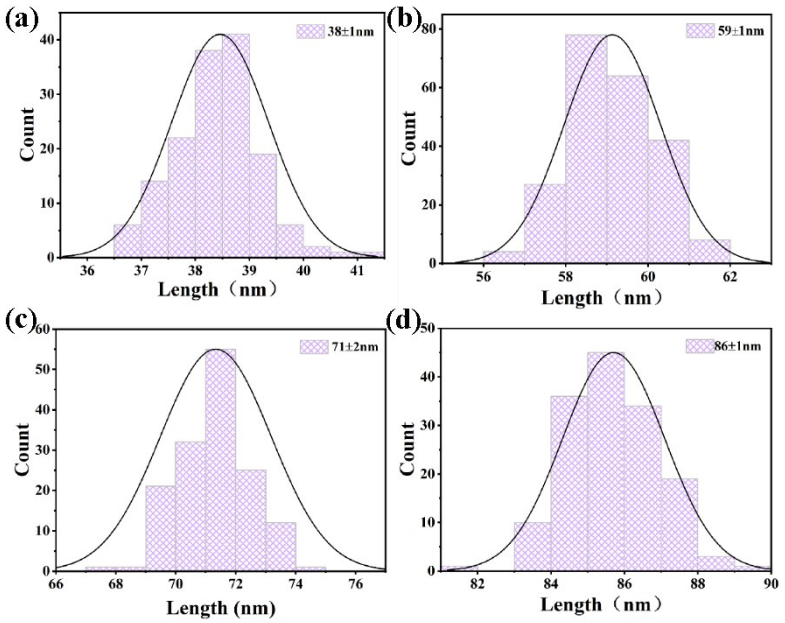

Figure S2 Particles length distribution of (a) β-$NaYF_4$:Yb/Tm, (b) β-$NaYF_4$:Yb/Tm@$NaYF_4$, (c) β-$NaYF_4$:Yb/Tm@$NaYF_4$@$NaYF_4$:Yb/Er, and (d) β-$NaYF_4$:Yb/Tm@$NaYF_4$@$NaYF_4$:Yb/Er@$NaYF_4$ (UCNPs(Tm/Er)).

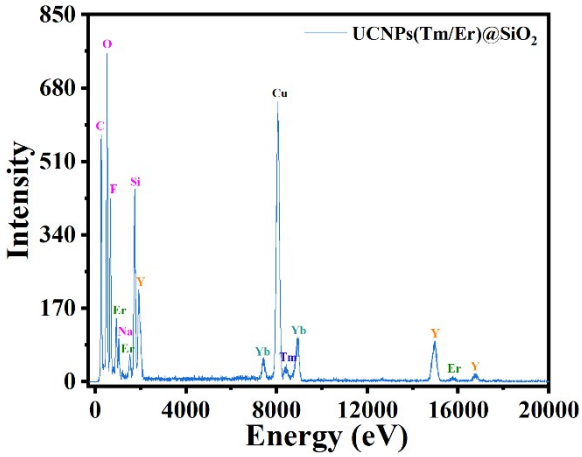

Figure S3 EDS elemental analysis of UCNPs(Tm/Er)@SiO_2

Table S1 Content of each element in UCNPs(Tm/Er)@SiO_2

Element	Mass fraction (%)	Mass error (%)
O	25.32	1.46
F	14.97	3.12
Na	3.05	0.63
Si	17.65	3.54
Y	22.1	3
Er	9.5	1.2
Tm	0.16	0.03
Yb	7.25	0.9

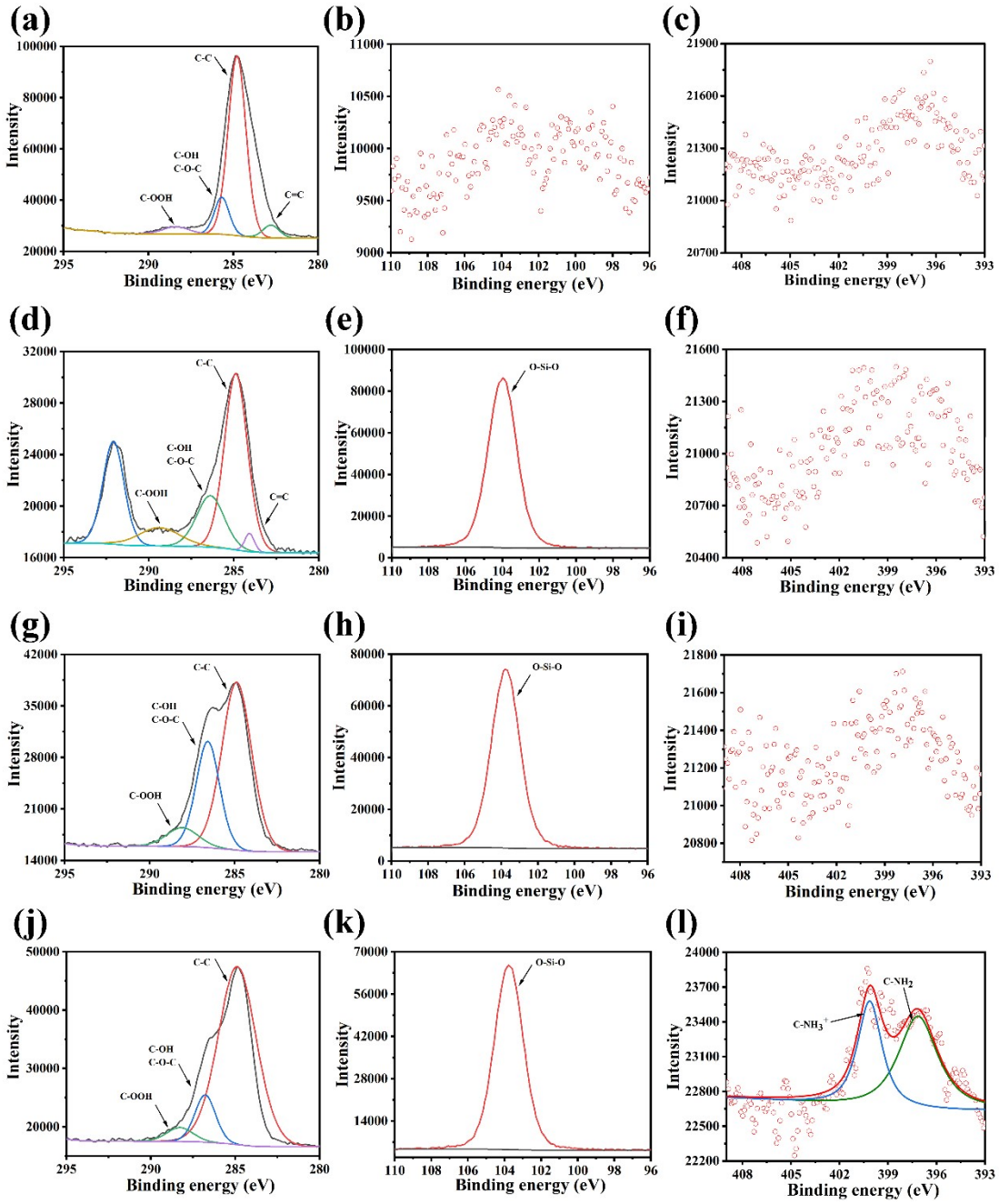

Figure S4 High resolution XPS spectra of C_{1s} (a, d, g, j), Si_{2p} (b, e, h, k) and N_{1s} (c, f, i, l) measured on UCNPs(Tm/Er) (a-c), UCNPs(Tm/Er)@SiO_2 (d-f), UCNPs(Tm/Er)@SiO_2@GPS (g-i) and UCNPs(Tm/Er)@SiO_2@GPS@CH (j-l) samples.

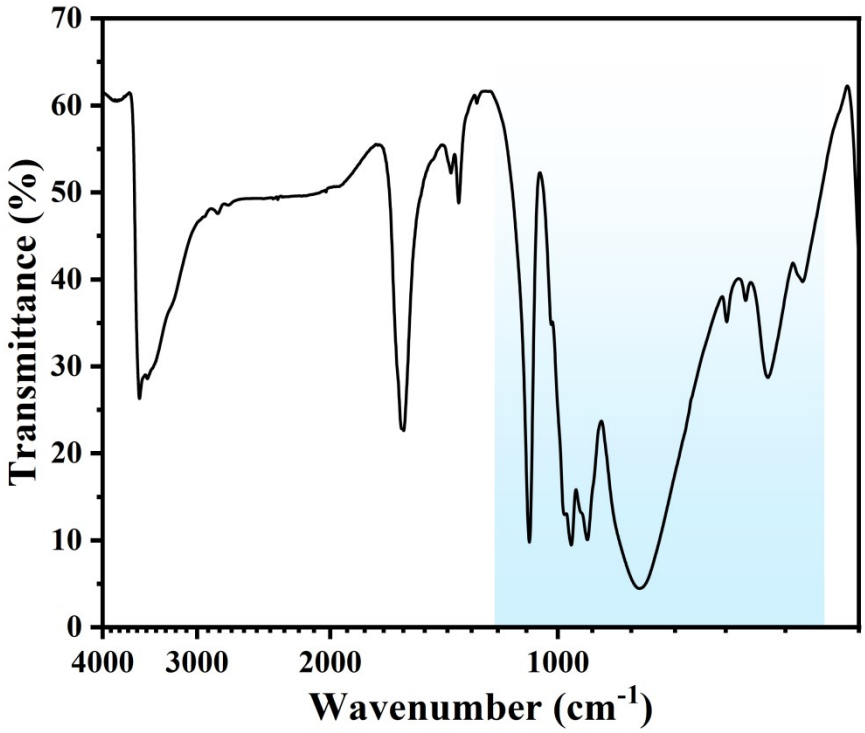

Figure S5 FTIR spectrum of α-$K_6P_2W_{18}O_{62}\cdot 14H_2O$

Table S2 α-$K_6P_2W_{18}O_{62}\cdot 14H_2O$ main infrared absorption peak

Compound	IR bands (cm^{-1})	Reference
α-$K_6P_2W_{18}O_{62}\cdot 14H_2O$	1091(s); 1021(w); 961(s); 913(s); 783(vs); 598(w); 565(vw); 528(w); 475(vw)	[S1]
α-$K_6P_2W_{18}O_{62}\cdot 14H_2O$	1091(vs); 1020(w); 960(s); 915(s); 780(s); 598(w); 565(w); 528(w); 475(vw)	This study

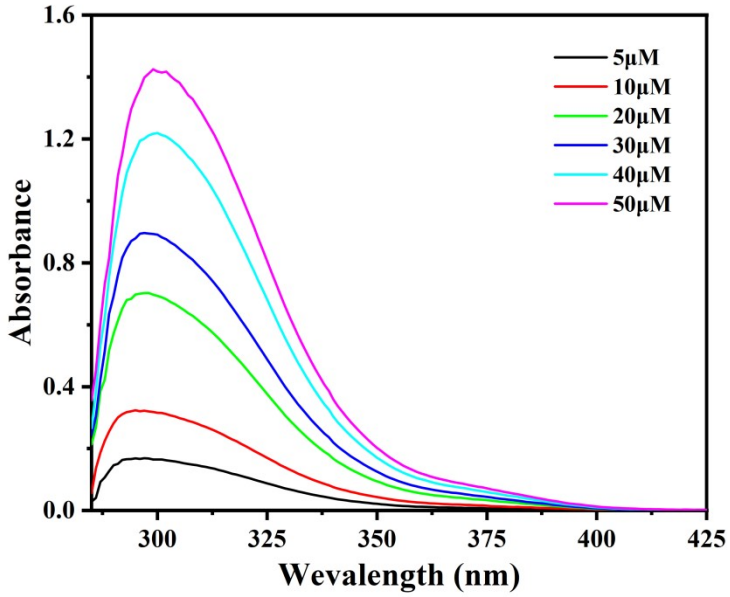

Figure S6 UV-Vis absorption spectrum of POMs in deionized water

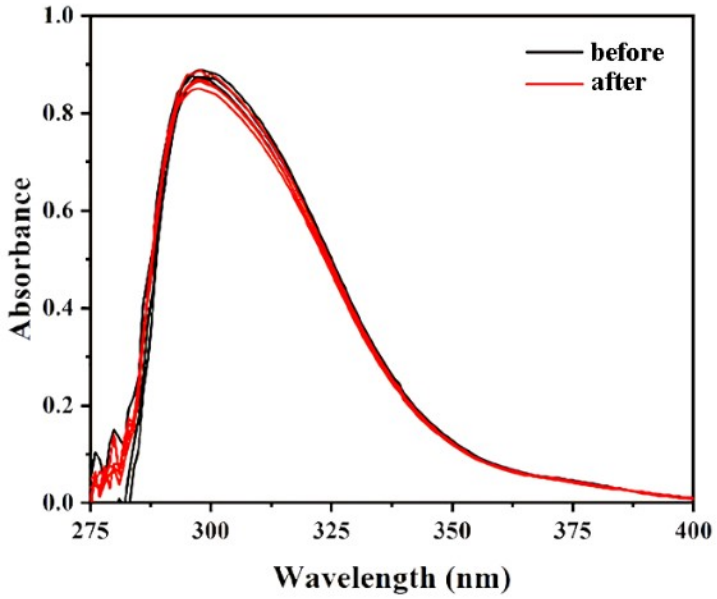

Figure S7 The UV-Vis absorption spectra of the supernatant before and after the drug-loading process. In the loading process, the concentration of POMs is 1 mg/mL, and the concentration of UCNPs@CH is 0.03 mg/mL.

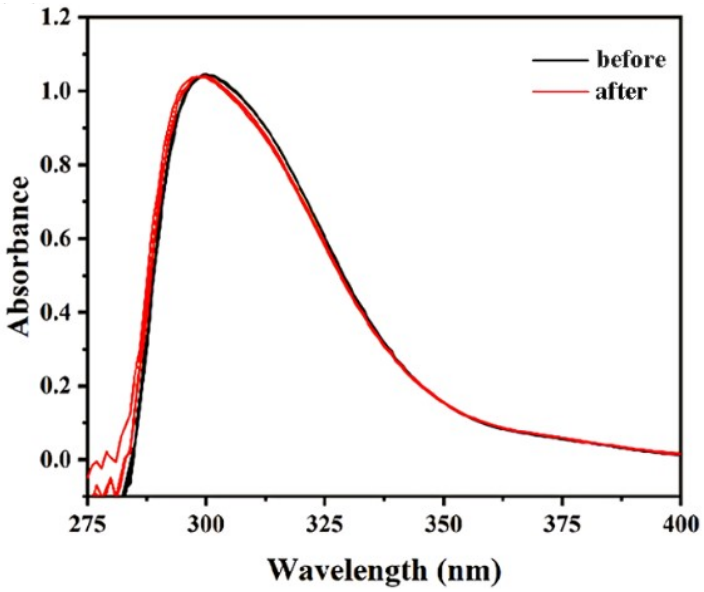

Figure S8 The UV-Vis absorption spectra of the supernatant before and after the drug-loading process. In the loading process, the concentration of POMs is 6 mg/mL, and the concentration of UCNPs@CH is 2 mg/mL.

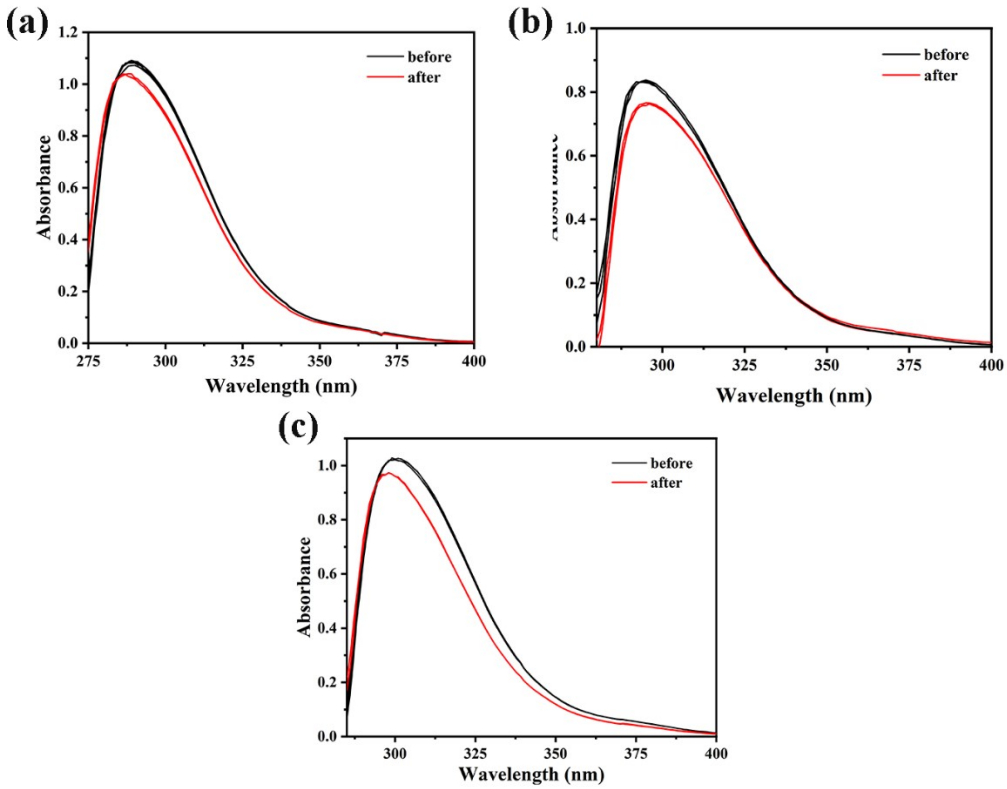

Figure S9 UV-Vis absorption spectra of supernatant before and after POMs loading (Weakly alkaline pH-adjusted system): (a) 3.0 mg/mL, (b) 1.5 mg/mL, (c) 1.0 mg/mL POMs.

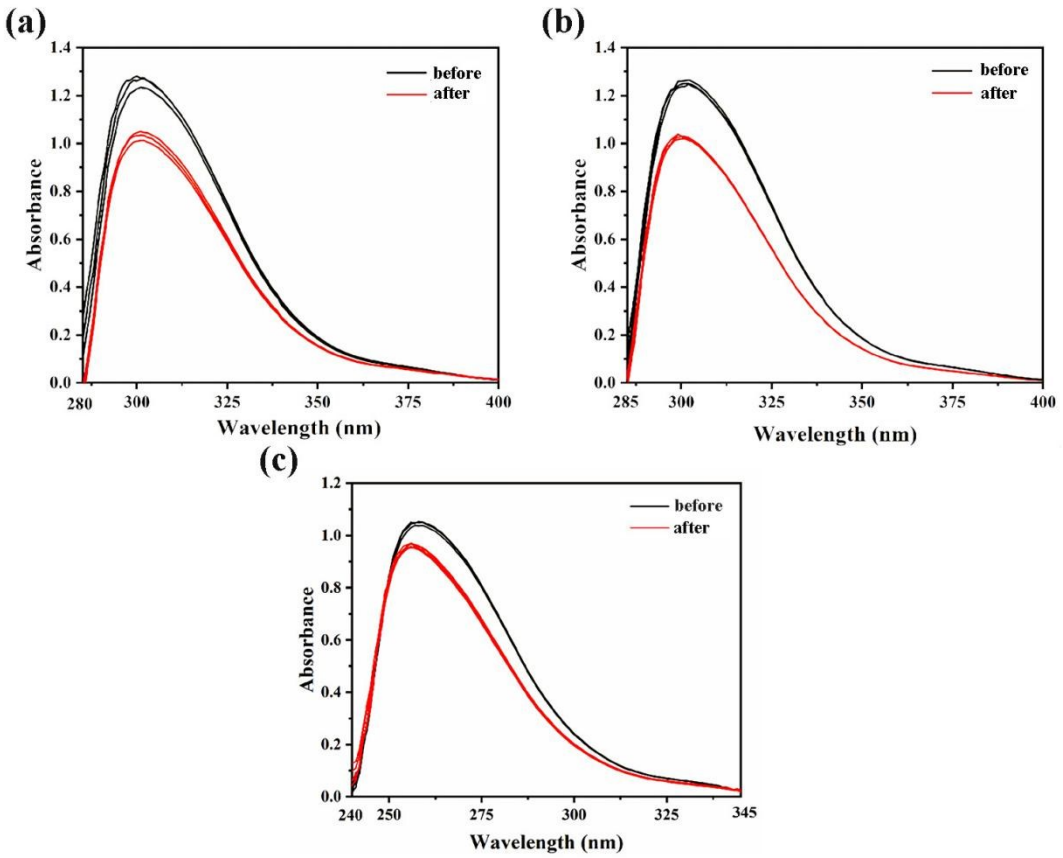

Figure S10 UV-Vis absorption spectra of supernatant before and after drug loading reaction of (a) 3.0 mg/mL, (b) 1.5 mg/mL, (c) 1.0 mg/mL POMs drug loading system after connecting CH twice.

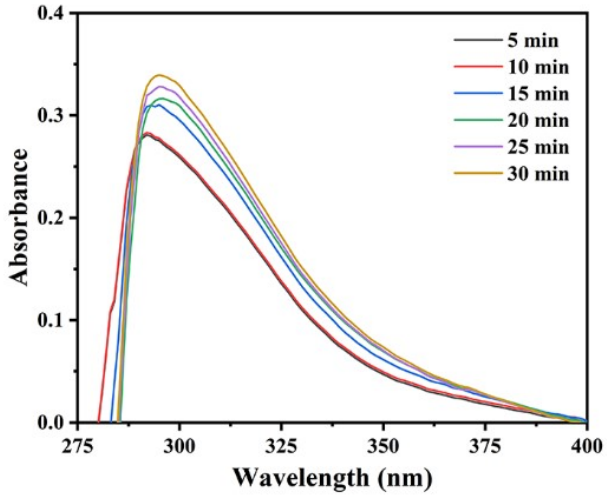

Figure S11 UV-Vis absorption spectra of 3.0 mg/mL POMs prepared by UCNPs@CH-POMs after cumulative release.

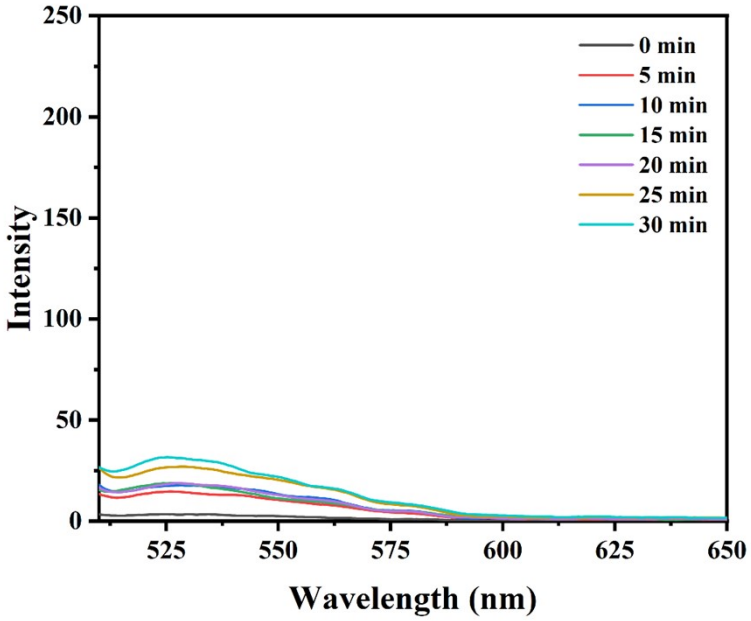

Figure S12 Fluorescence spectra of DCF in the solution of UCNPs@CH-POMs+DCFH-DA without the irradiation of NIR light.

Reference

[S1] I-M Mbomekalle, Lu Y-W, Keita B, et al. Simple, high yield and reagent-saving synthesis of pure α-$K_6P_2W_{18}O_{62}\cdot 14H_2O$. Inorganic Chemistry Communications, 2004, 7(1): 5.