

## Supporting Information

### Copper-Cobalt Peroxide Nanoparticles: A Biomimetic Cascade Reaction for Enhanced Fenton-Like Therapy at Physiologically Relevant pH

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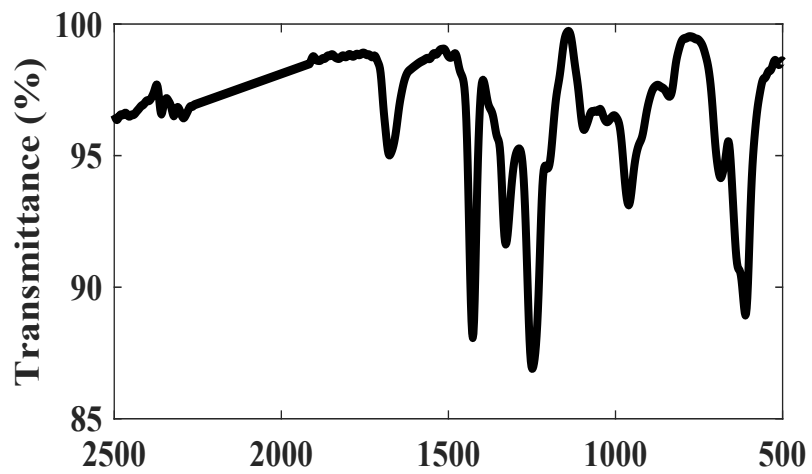
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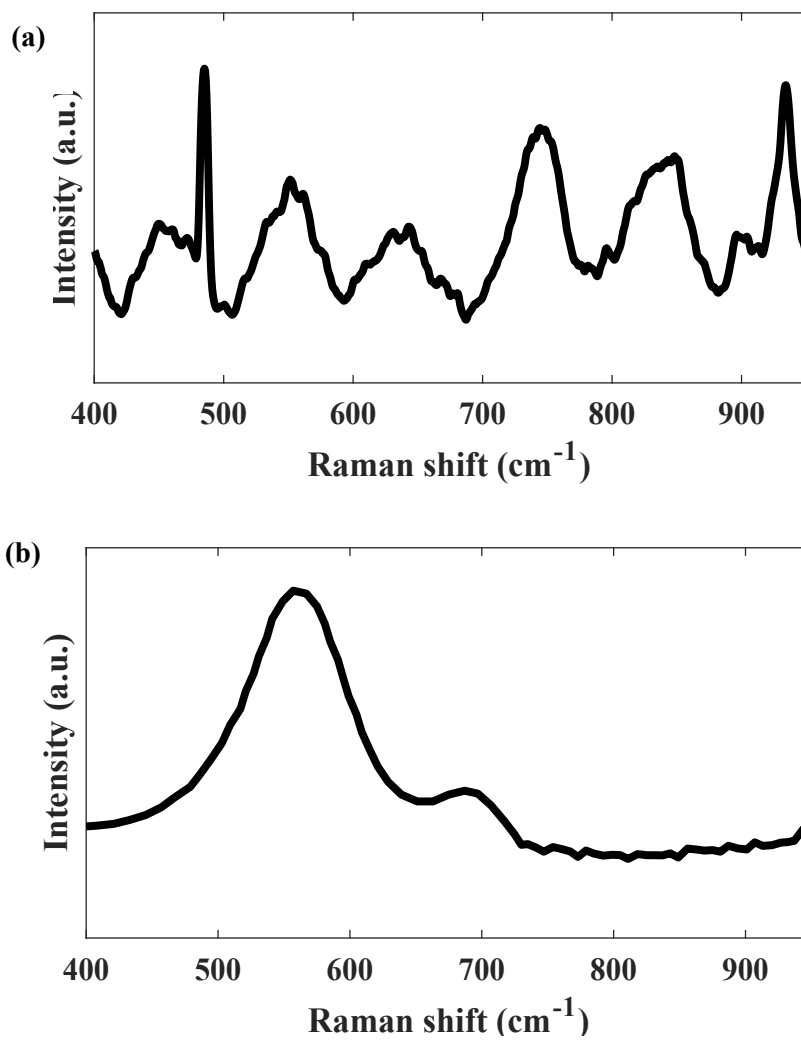
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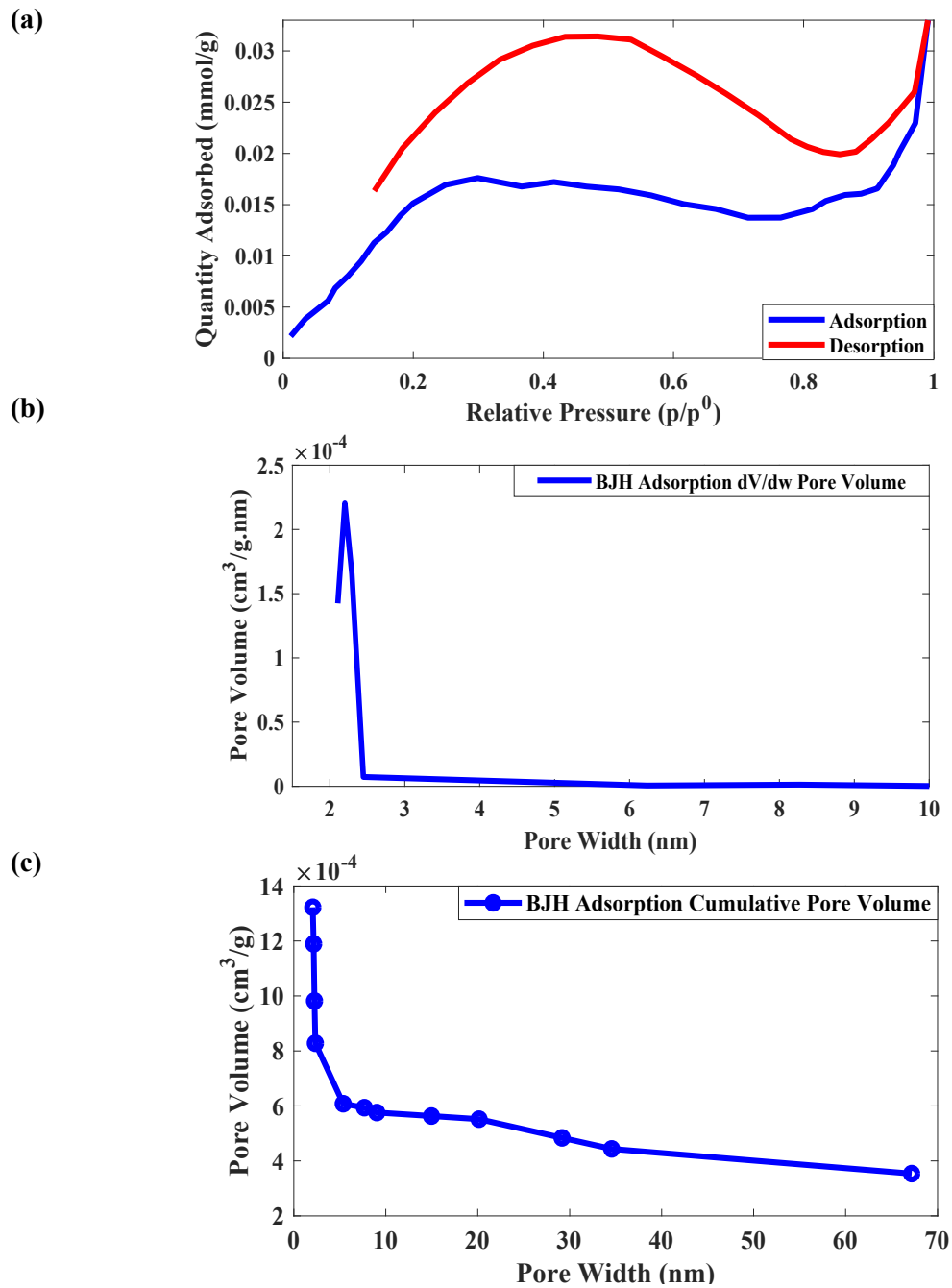
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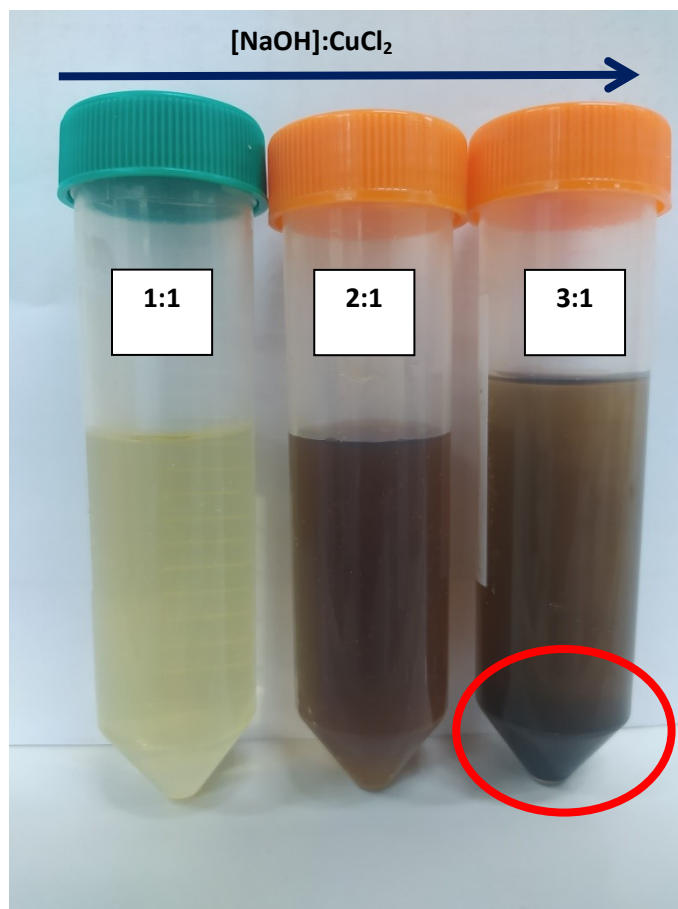
**Figure S1.** FTIR spectrum of PVP coated 7CCp NPs. The FTIR spectra was recorded in the wavenumber range of 500 to 2500  $\text{cm}^{-1}$  at room temperature



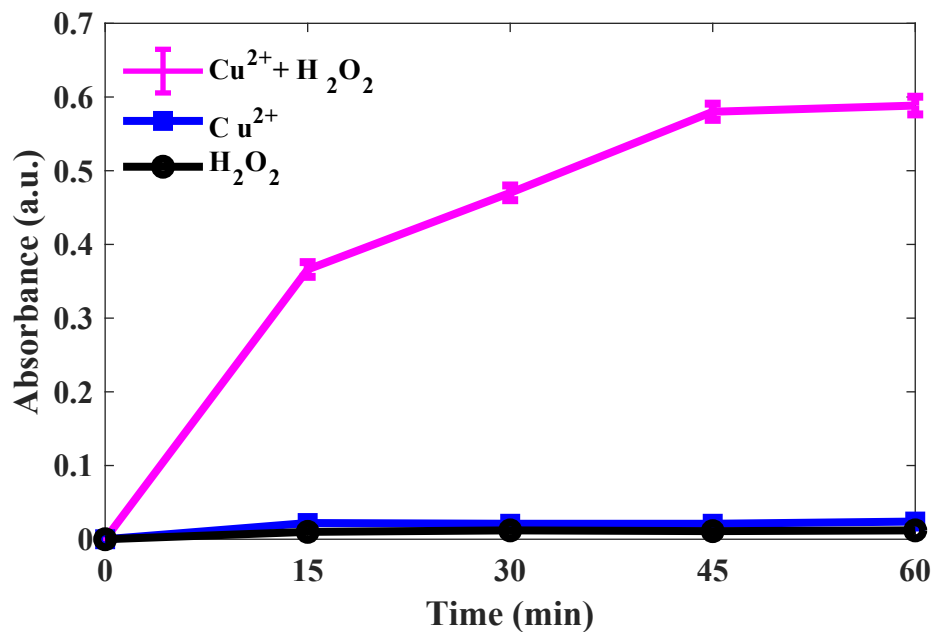
**Figure S2.** Raman spectrum of (a) PVP coated 7CCp NPs (b) Cobalt oxide. The Raman shift was recorded in the range of 400 to 950 cm<sup>-1</sup> at room temperature



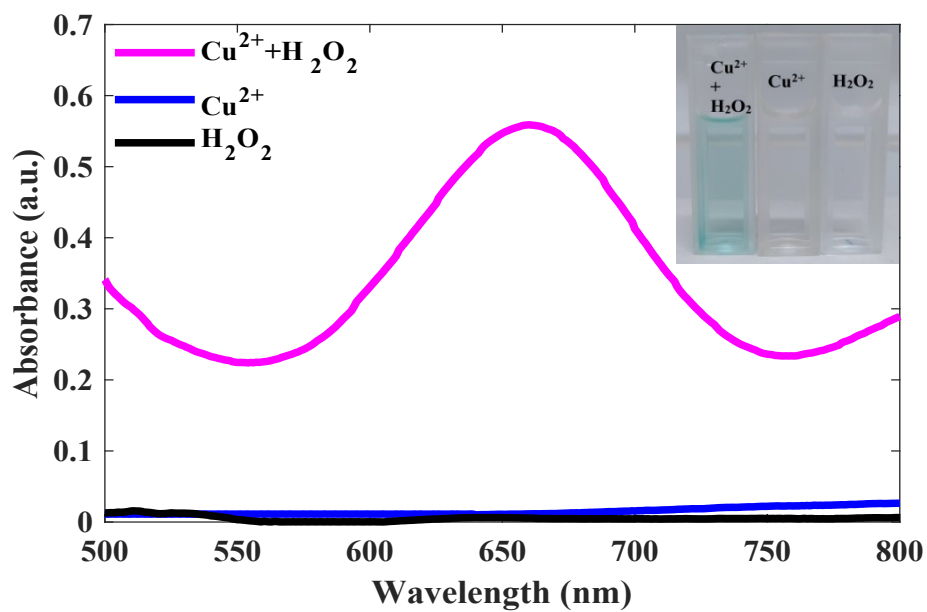
**Figure S3.** (a) BET nitrogen adsorption/desorption isotherms of 7CCp (b) BJH Adsorption dV/dw pore volume (c) BJH Adsorption cumulative pore volume



**Figure S4.** Photograph of 7CCp -NPs obtained in the presence of PVP at different molar ratios of NaOH to CuCl<sub>2</sub>. Unexpected precipitation (red circle) was observed during the synthetic process when the ratio was too high (3:1).

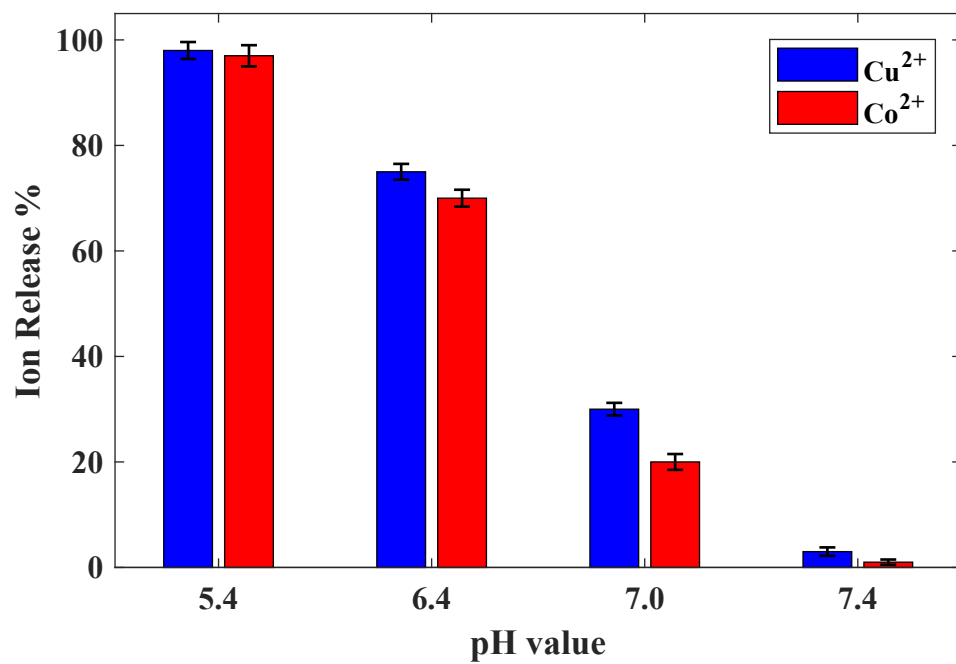


**Figure S5.** Absorbance intensity of TMB aqueous solution at 650 nm as a function of time  $[\text{Cu}^{2+}] = [\text{H}_2\text{O}_2] = 1 \text{ mM}$  and  $0.3 \text{ mg/mL}$  TMB at pH 5.4



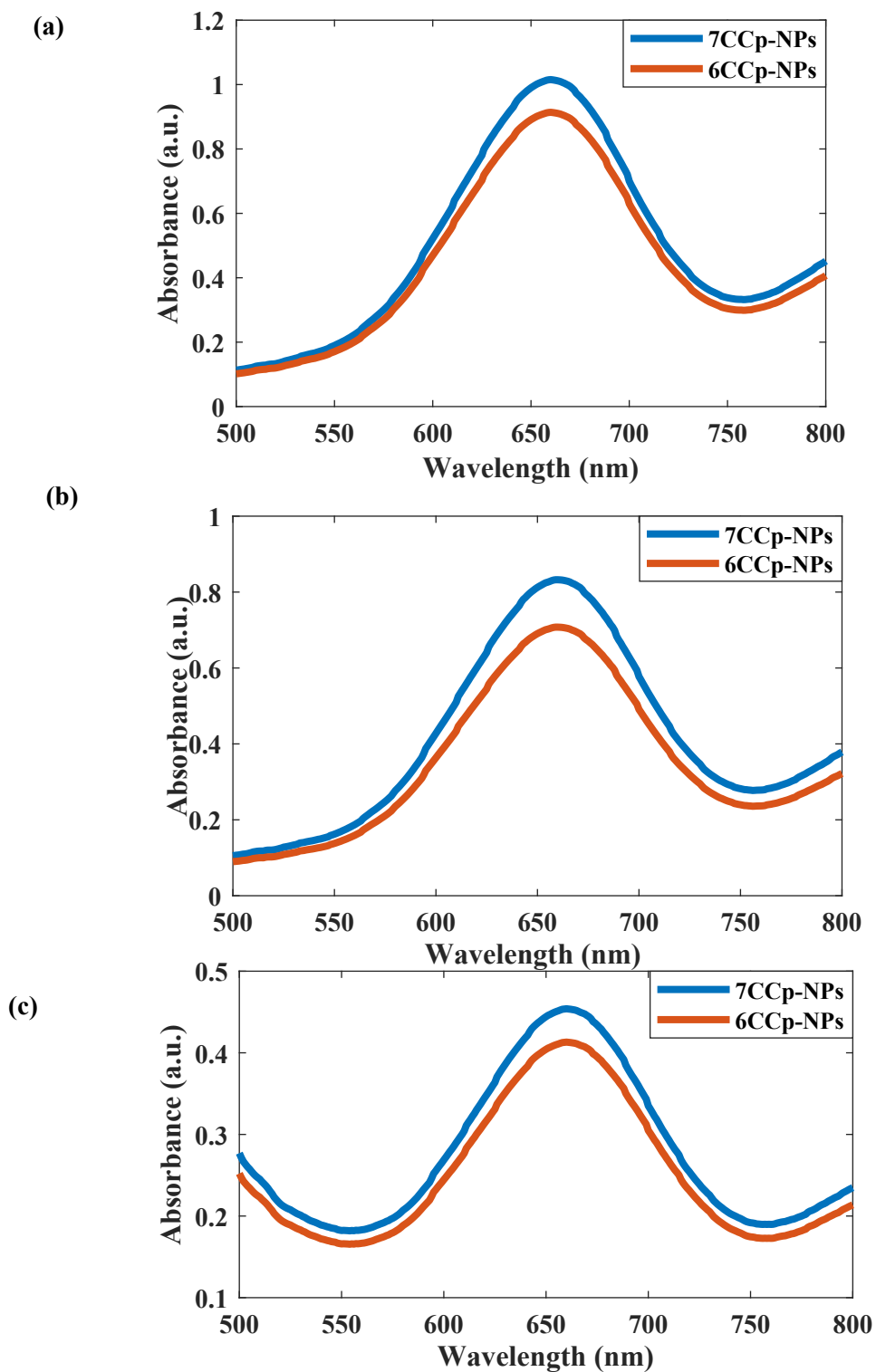
**Figure S6.** UV-vis spectra

and photographs (inset) of TMB aqueous solution treated with  $\text{H}_2\text{O}_2$ ,  $\text{Cu}^{2+}$ , and  $\text{Cu}^{2+}$  plus  $\text{H}_2\text{O}_2$  for 45 min. Note that the weak absorption between 500-800 nm at  $\text{Cu}^{2+}$ -treated group is from the  $\text{CuCl}_2$ .  $[\text{Cu}^{2+}] = [\text{H}_2\text{O}_2] = 1 \text{ mM}$  and  $0.3 \text{ mg/mL}$  TMB at pH 5.4

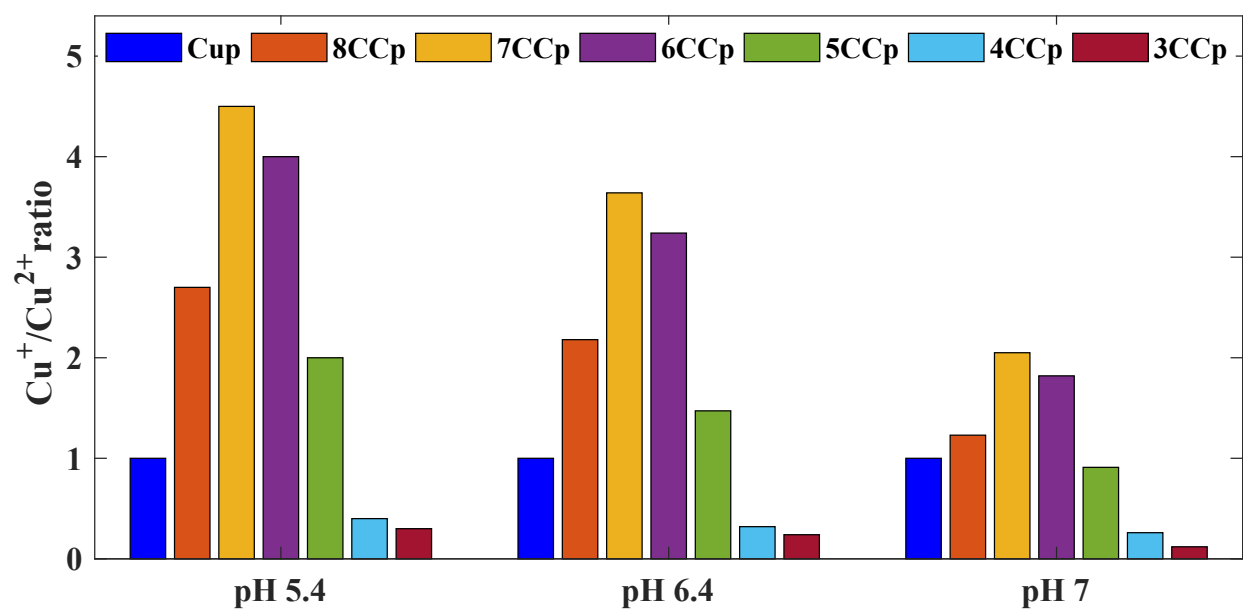


**Figure (S7).** The ion release of 7CCp-NPs under buffer solutions at varied pH values

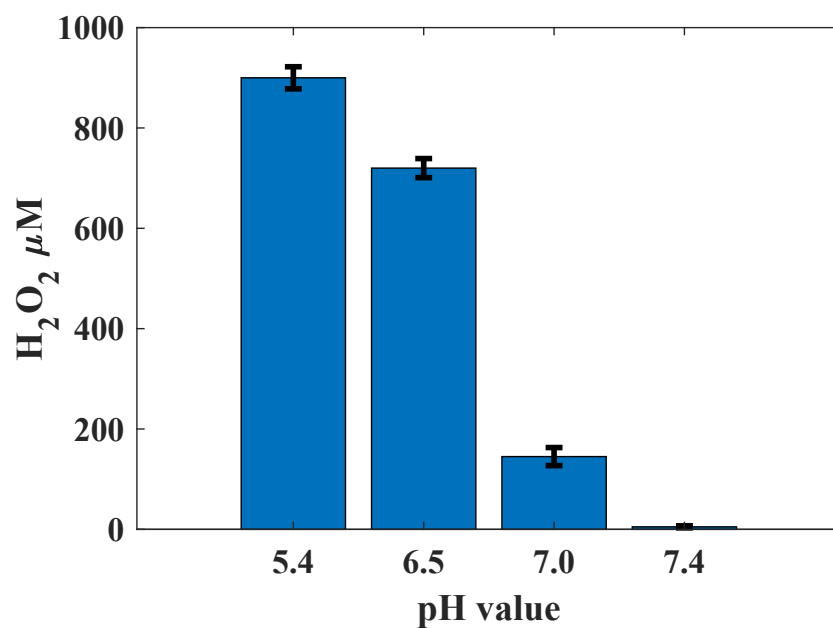




**Figure S8.** Comparison of the catalytic activity between 7CCp and 6CCp-NPs for oxidizing the TMB probe in different pH environments (a) pH 5.4 (b) pH 6.6 (c) pH 7.0



**Figure (S9).** The ratio of reduced Cu ions at different pH condition. All the data were normalized with respect to the ratios of Cup



**Figure (S10).** The variations in H<sub>2</sub>O<sub>2</sub> generation in different pH values using Ti(SO<sub>4</sub>)<sub>2</sub>-Based colorimetric test.