

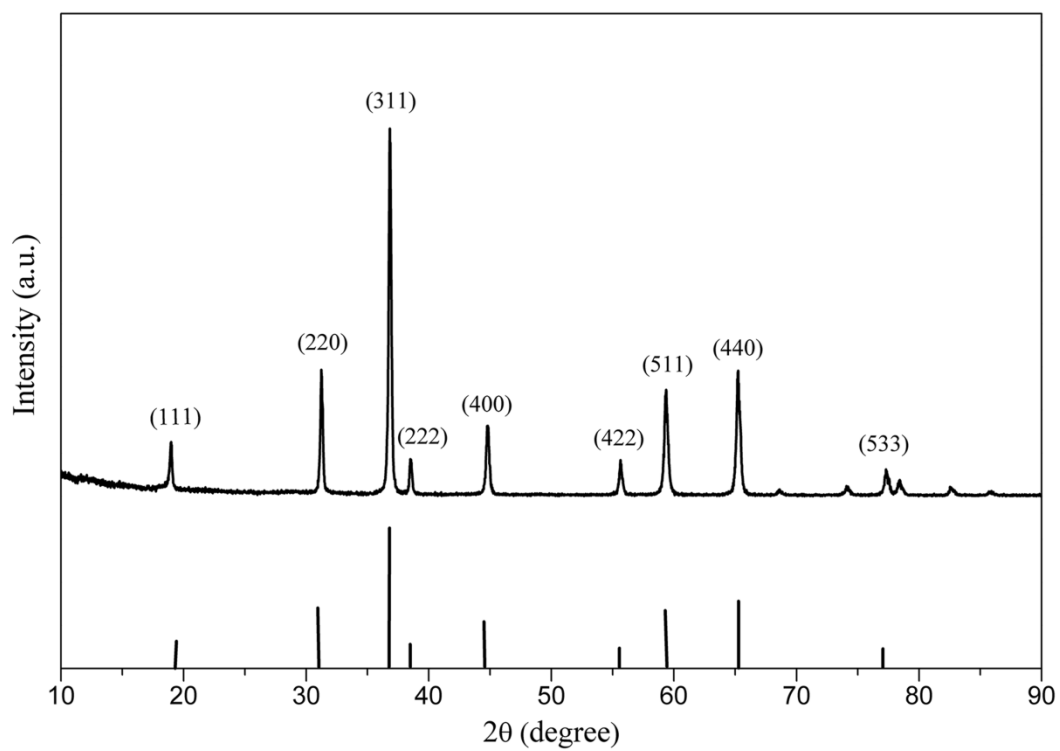
## **Electronic Supplementary Information**

### **Triple-enzyme mimetic activity of Co<sub>3</sub>O<sub>4</sub> nanotubes and their applications in colorimetric sensing of glutathione**

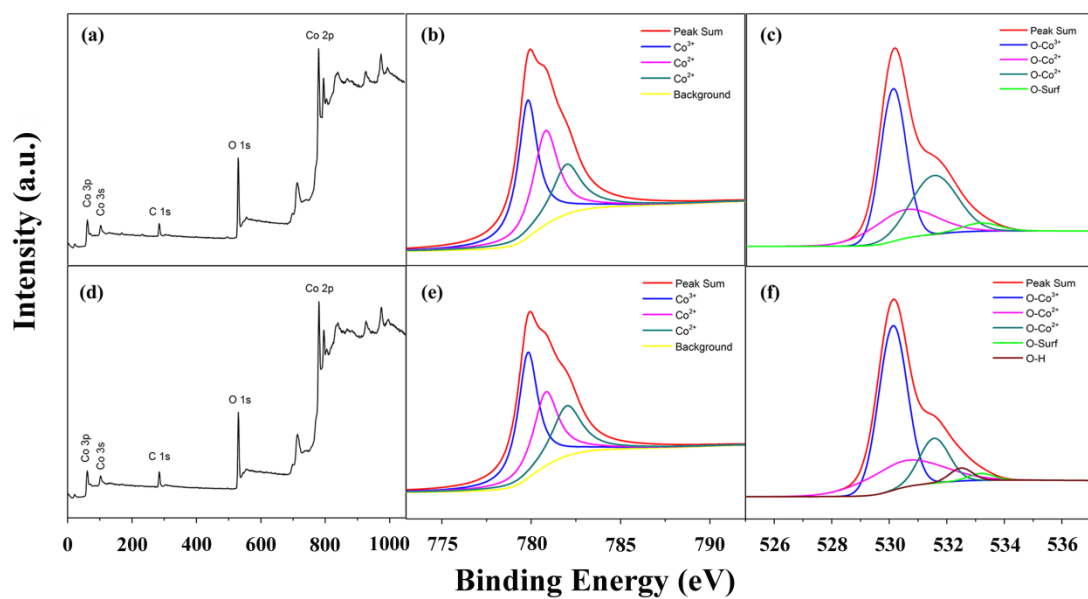
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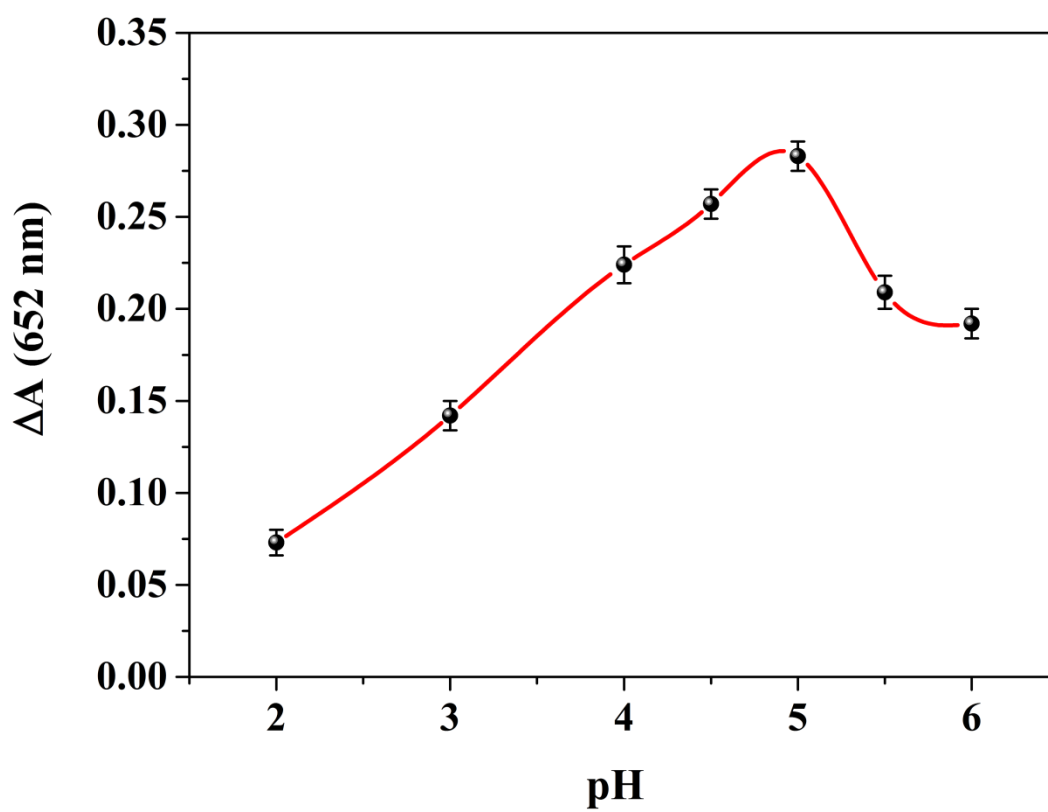
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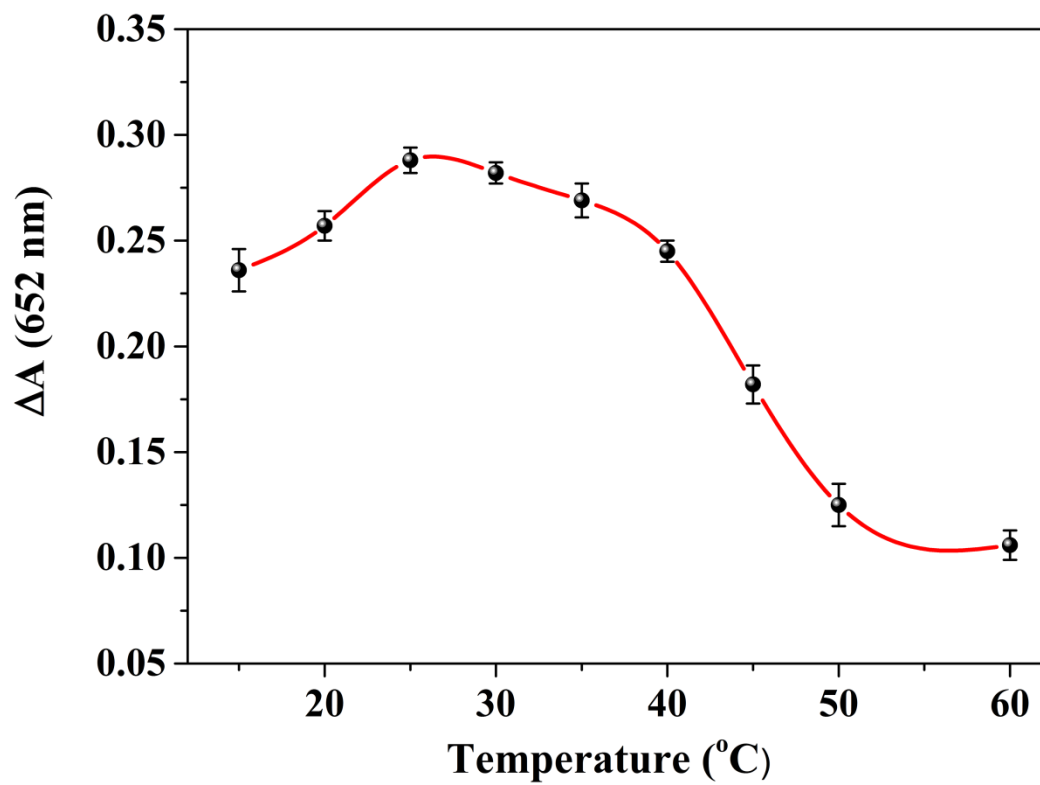
**Fig. S1** X-ray diffraction pattern of the  $\text{Co}_3\text{O}_4$  nanotubes.



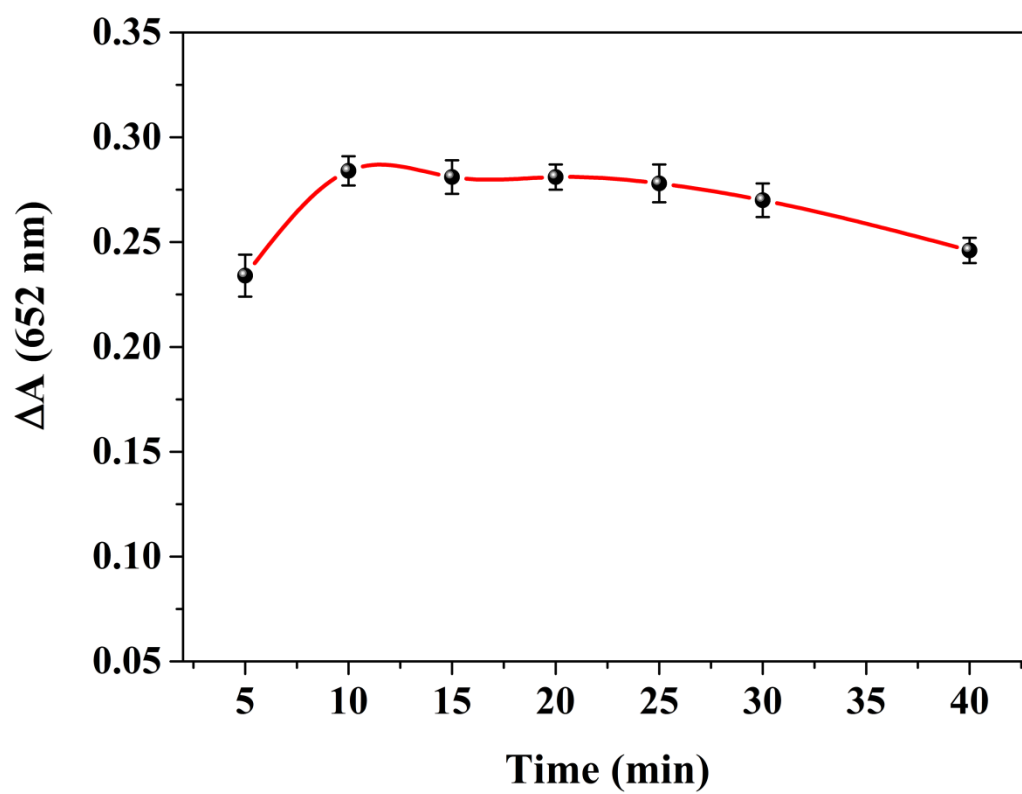
**Fig. S2** X-ray photoelectron spectra of  $\text{Co}_3\text{O}_4$  nanotubes before the reaction (a: survey, b:  $\text{Co } 2p_{3/2}$ , c:  $\text{O } 1s$ ) and after the reaction (d: survey, e:  $\text{Co } 2p_{3/2}$ , e:  $\text{O } 1s$ ).



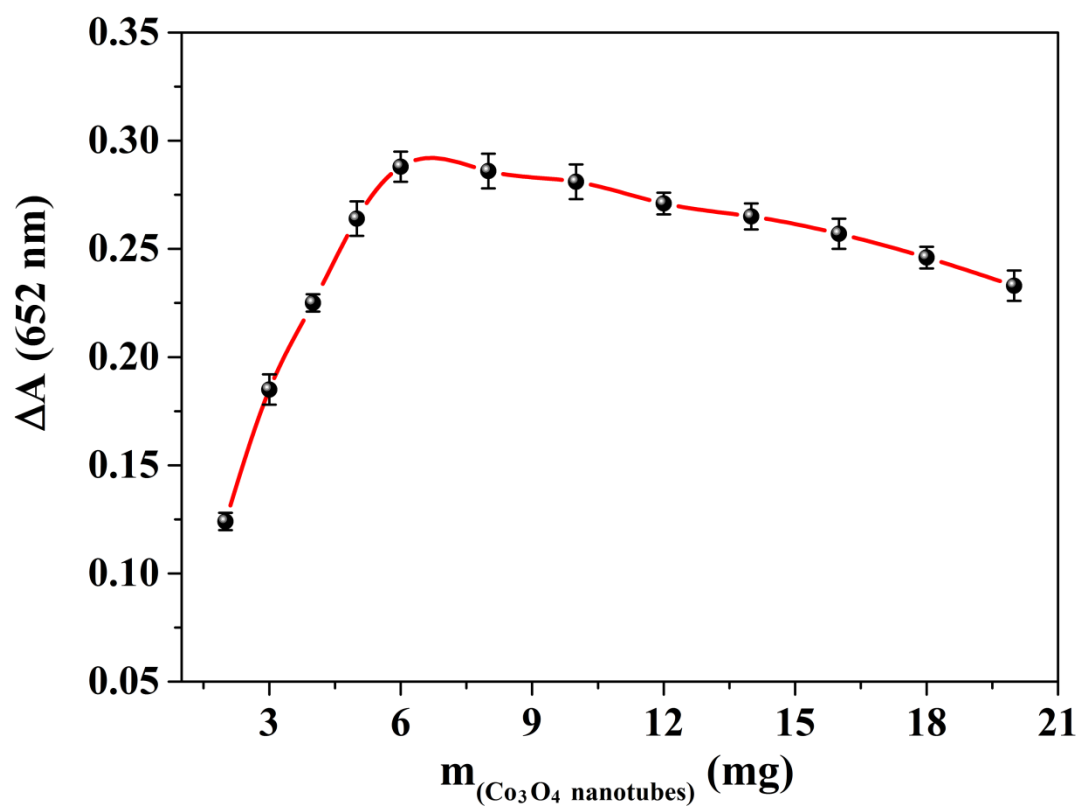
**Fig. S3** pH- $\Delta A$  curve for the detection of GSH in acetate buffer. The error bars represent the standard deviation values of three measurements.



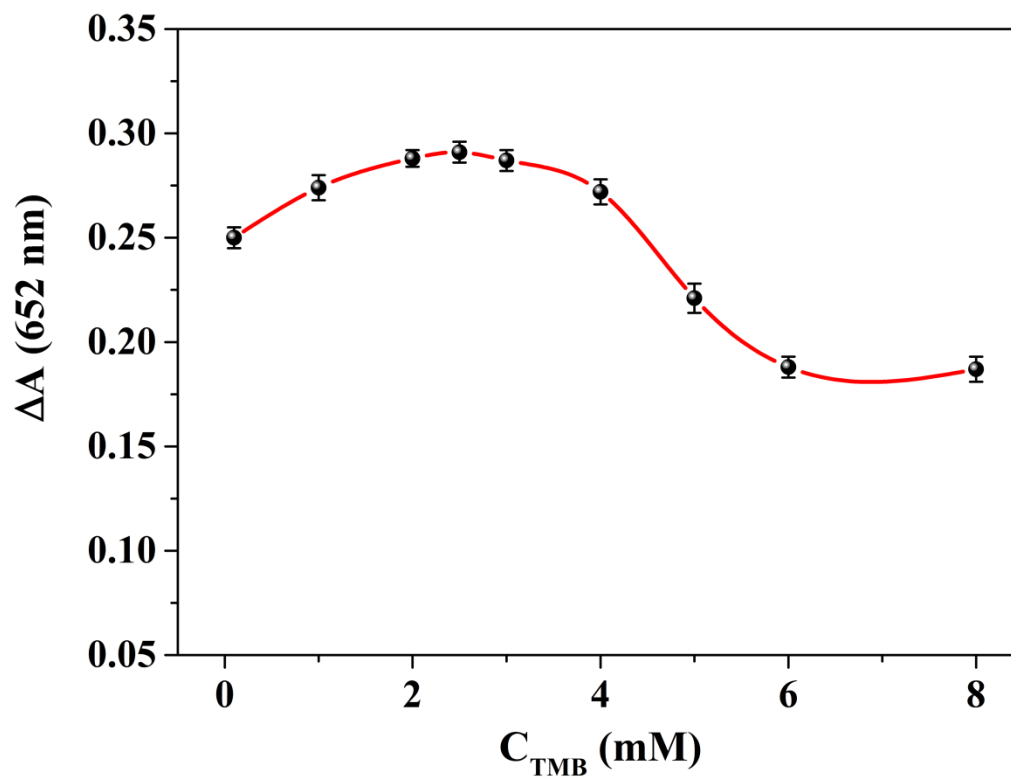
**Fig. S4** Temperature- $\Delta A$  curve for the detection of GSH in acetate buffer. The error bars represent the standard deviation values of three measurements.



**Fig. S5** Time- $\Delta A$  curve for the detection of GSH in acetate buffer. The error bars represent the standard deviation values of three measurements.

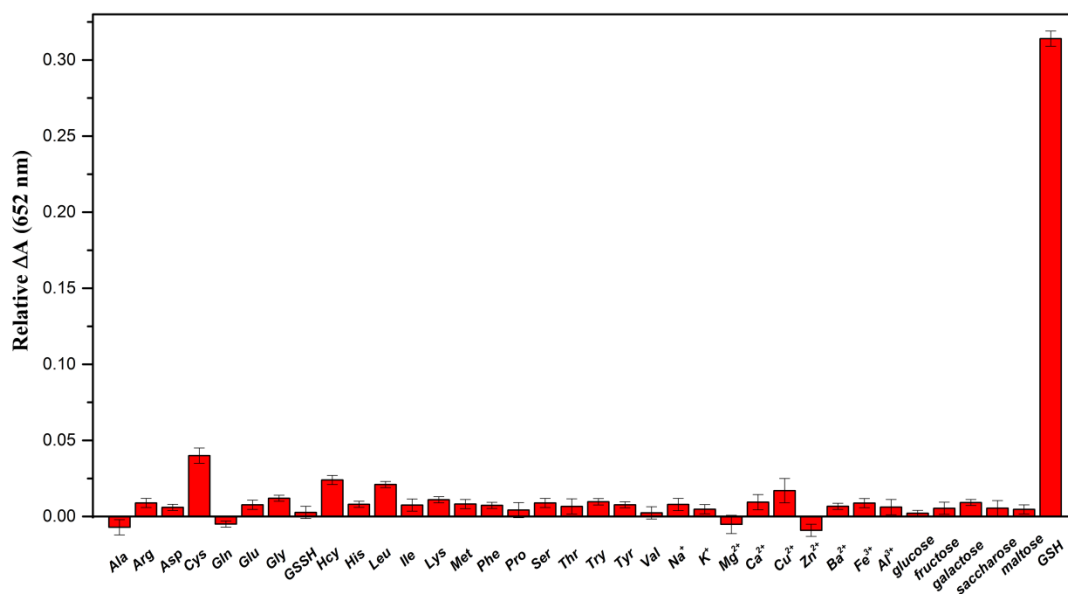


**Fig. S6** Amount of  $\text{Co}_3\text{O}_4$  nanotubes- $\Delta A$  curve for the detection of GSH in acetate buffer. The error bars represent the standard deviation values of three measurements.



**Fig. S7** TMB concentration- $\Delta A$  curve for the detection of GSH in acetate buffer. The error bars represent the standard deviation values of three measurements.





**Fig. S8** Determination of the selectivity of GSH detection. The concentrations of each interference ions in the system are 50 mM. The error bars represent the standard deviation values of three measurements.