# Supporting Information

# Cobalt oxyhydroxide nanoflakes-based nanoprobe for sensitive fluorescence detection of T4 polynucleotide kinase activity and inhibition

Yao Cen, Yuan Yang, Ru-Qin Yu, Ting-Ting Chen,* and Xia Chu*

State Key Laboratory of Chemo/Bio-Sensing and Chemometrics, College of Chemistry and Chemical Engineering, Hunan University, Changsha 410082, P. R. China

*Corresponding author. Tel.: 86-731-88821916; Fax: 86-731-88821916; E-mail: chenting1104@hnu.edu.cn; xiachu@hnu.edu.cn

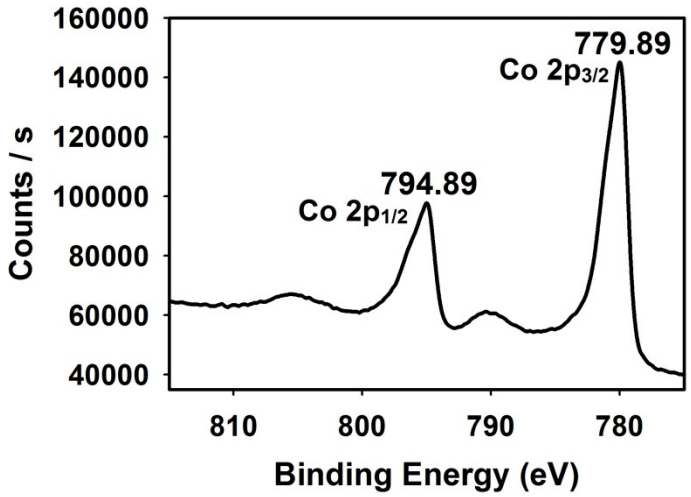


**Fig. S1.** X-ray photoelectron spectroscopy (XPS) spectrum of CoOOH nanoflakes.

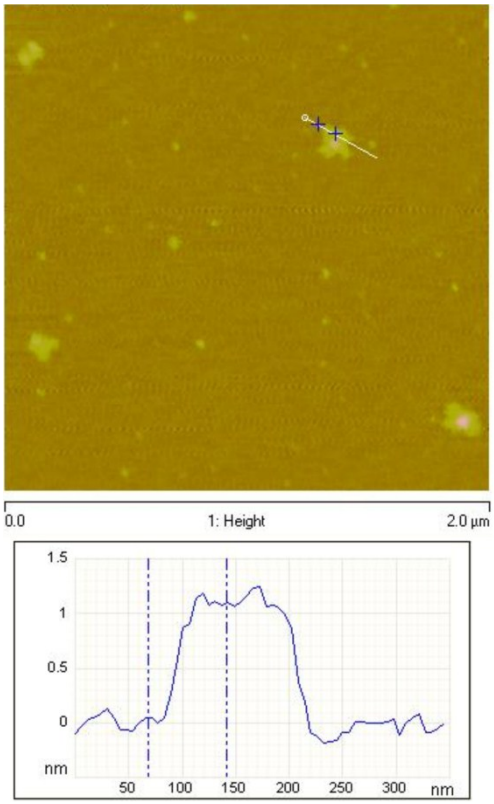


**Fig. S2.** AFM image for the prepared CoOOH nanoflakes on the mica substrate.

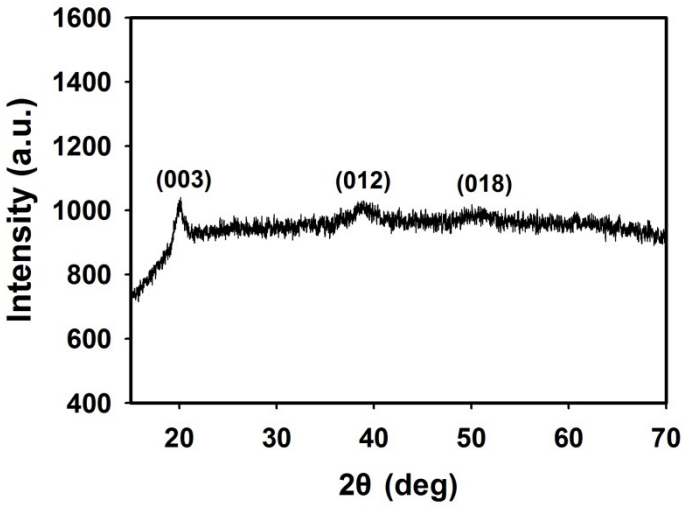


**Fig. S3.** The X-ray diffraction (XRD) pattern of CoOOH nanoflakes.

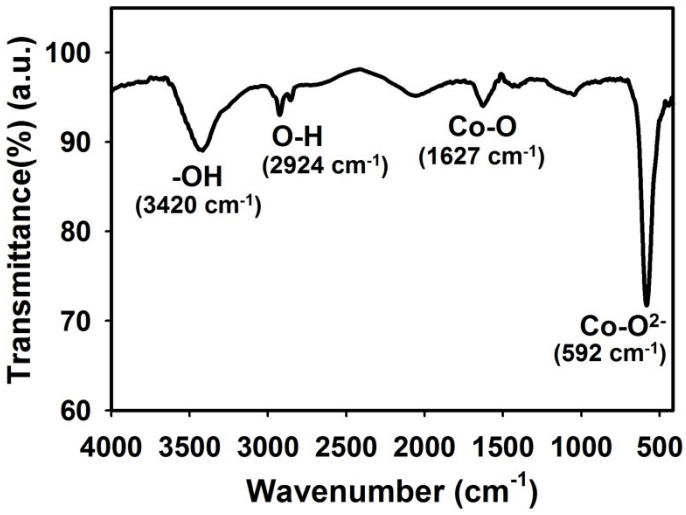


**Fig. S4.** Fourier transform infrared (FT-IR) spectrum of CoOOH nanoflakes.

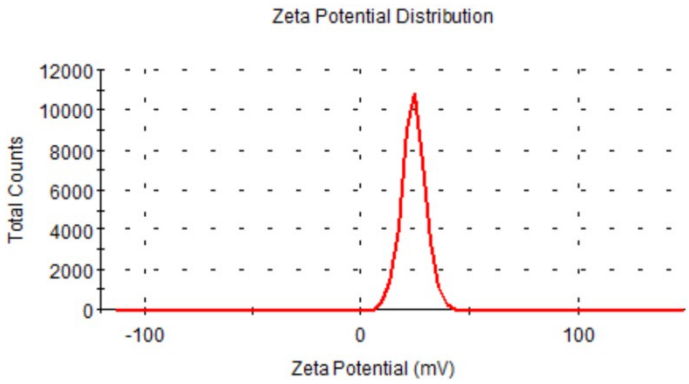


**Fig. S5.** Values of the ζ potential for CoOOH nanoflakes.

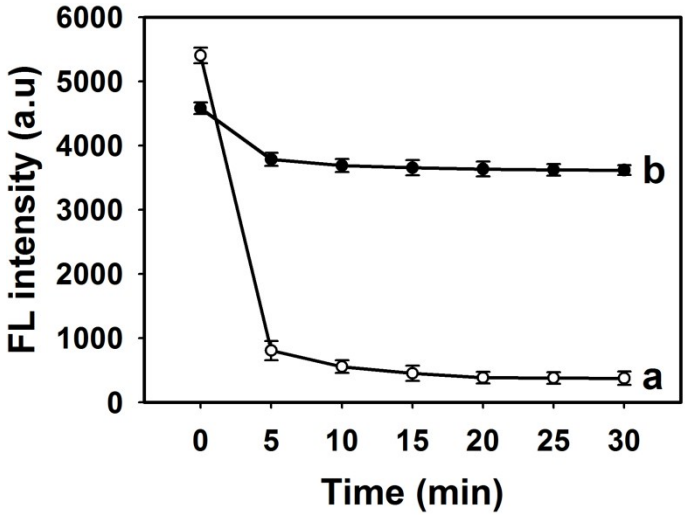


**Fig. S6.** Fluorescence intensities of (a) 100 nM P1-FAM and (b) 100 nM dsDNA-FAM via time in the presence of 16 μL of CoOOH nanoflakes (0.25 mg $mL^{-1}$). The assays were all carried out in the Tris-HCl buffer (P1-FAM 100 nM, dsDNA-FAM 100 nM, ATP 0.5 mM, λ exonuclease 10 units).

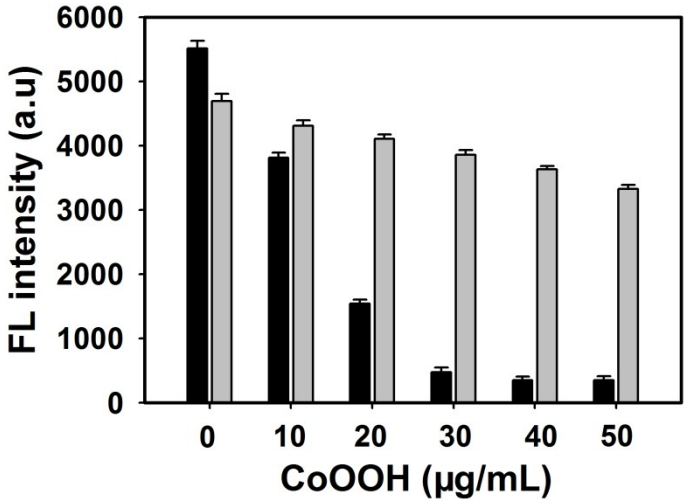


**Fig. S7.** Fluorescence intensity histogram of P1-FAM + CoOOH nanoflakes (black histogram) and dsDNA-FAM + CoOOH nanoflakes (gray histogram) in the presence of 0, 10, 20, 30, 40, and 50 μg $mL^{-1}$ CoOOH nanoflakes (P1-FAM 100 nM, dsDNA-FAM 100 nM, λ exonuclease 10 units).

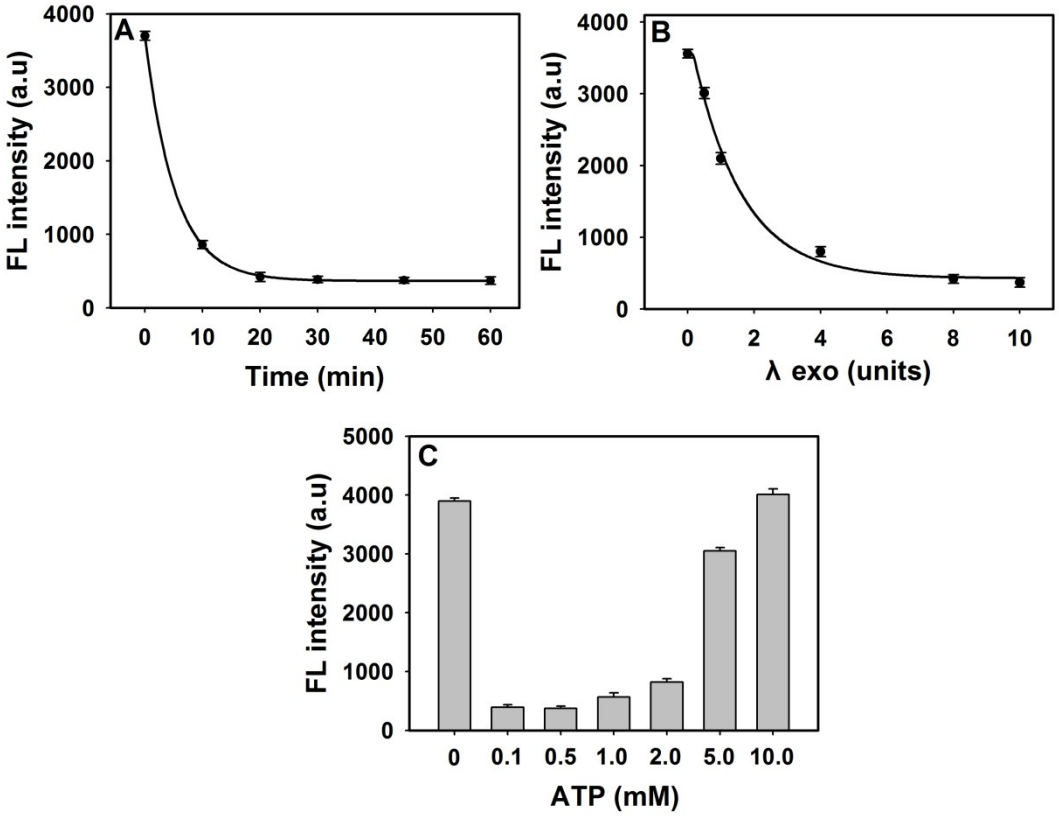


**Fig. S8.** (A) Optimization of the reaction time. The concentrations of ATP and λ exonuclease were 0.5 mM and 10 units, respectively. (B) Optimization of λ exonuclease concentration. The concentration of ATP was 0.5 mM. (C) Optimization of ATP concentration. The concentration of λ exonuclease was 10 units (dsDNA-FAM 100 nM, T4 PNK 10 U $mL^{-1}$, CoOOH nanoflakes 40 μg $mL^{-1}$).

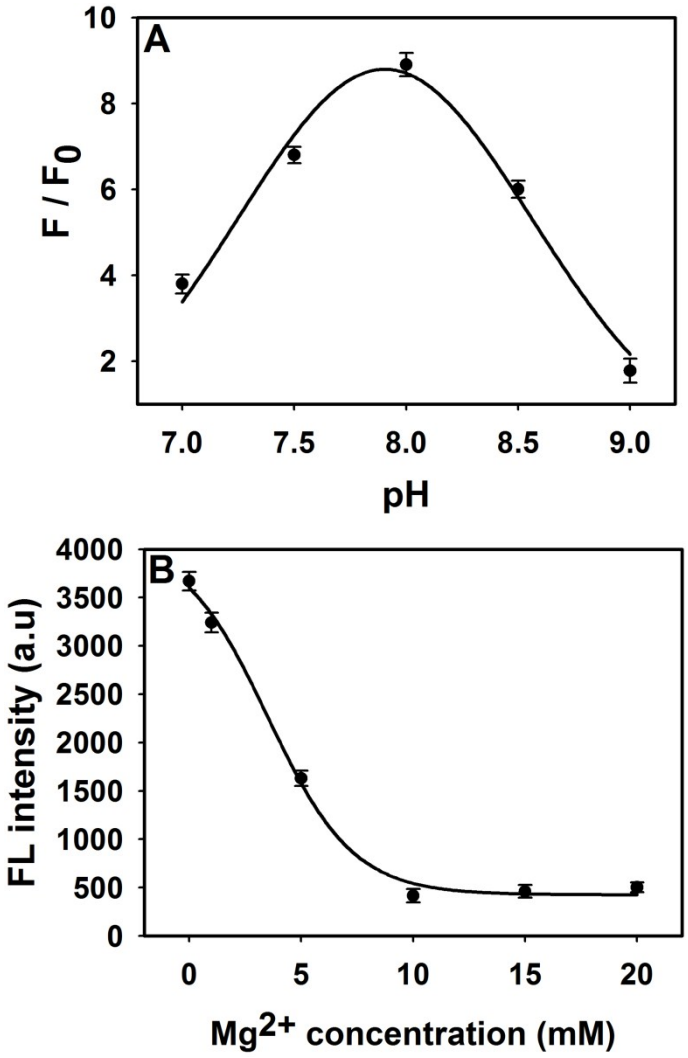


**Fig. S9.** Optimization of pH (A) and $Mg^{2+}$ concentration (B). The concentrations of dsDNA-FAM, T4 PNK, ATP, λ exonuclease and CoOOH nanoflakes were 100 nM, 10 U $mL^{-1}$, 0.5 mM, 10 units and 40 μg $mL^{-1}$, respectively.

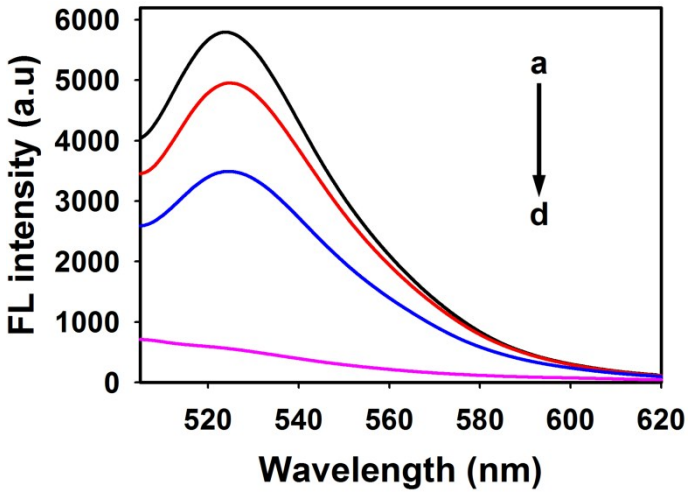


**Fig. S10.** Fluorescence spectra of P1-FAM without (a) and with (d) incubation with 40 μg $mL^{-1}$ CoOOH nanoflakes. Fluorescence spectra of dsDNA-FAM after incubation without (b) and with (c) 40 μg $mL^{-1}$ CoOOH nanoflakes. The assays were all carried out in the reaction buffer containing 1% (v/v) cell extracts (P1-FAM 100 nM, dsDNA-FAM 100 nM, λ exonuclease 10 units, CoOOH nanoflakes 40 μg $mL^{-1}$).