## Supplementary Information Micromotor-assisted bifunctional platform for efficient detection and removal of aniline

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Fig. S1 SEM images of (a) Co-N/C and (b) CA@MnO<sub>2</sub>@Co-N/C.



Fig. S2 Movement photos of CA@ $MnO_2@Co-N/C$  micromotors in different concentrations of  $H_2O_2$ .



**Fig. S3** The effect of (a) pH, (b) incubation time, (c) incubation temperature, (d) concentration of TMB, (e) concentration of  $H_2O_2$  and (f) concentration of catalyst on the chromogenic system.



**Fig. S4** Michaelis-Menten curves of CA-MnO<sub>2</sub>@Co-N/C micromotors at fixed concentrations of (a)  $H_2O_2$  (50 mM) and (c) TMB (10 mM). Double-reciprocal Lineweaver-Burk plots of catalytic activity of CA-MnO<sub>2</sub>@Co-N/C micromotors with constant concentration of (b)  $H_2O_2$  (50 mM) and (d) TMB (10 mM).



Fig. S5 The leaching concentration of Mn (a) and Co (b) at different pH value.



Fig. S6 Consumption of  $H_2O_2$  by CA-MnO<sub>2</sub>@Co-N/C micromotors under Fenton-like reaction condition.



Fig. S7 Velocity of CA-MnO<sub>2</sub>@Co-N/C micromotors during aniline degradation process.



Fig. S8 (a) Reusability on the removal of aniline in the Fenton-like system catalyzed by CA- $MnO_2@Co-N/C$  micromotors. (b) XRD pattern of CA- $MnO_2@Co-N/C$  micromotors before and after degradation of aniline. (c) SEM image of CA- $MnO_2@Co-N/C$  micromotors after 5 cycles.

Table S1. Specific surface area and porosity properties of CA-MnO<sub>2</sub>@Co-N/C micromotors.

Materials	BET surface area (m <sup>2</sup> /g)	Total pore volume (cc/g)	Average pore size (nm)	
Co-N/C	72.81	0.17	3.67	
CA-MnO <sub>2</sub> @Co-N/C	158.72	0.35	7.96	

Table S2. Comparison of speed with other reported micromotors.

Micromotors	Concentration of H <sub>2</sub> O <sub>2</sub>	Velocity (µm/s)	Ref.	
CuS@Fe <sub>3</sub> O <sub>4</sub> /Pt	5%	423.8	1	
MnO <sub>2</sub> microparticles	5%	128	2	
Au/Ni/Pt	5%	37.57	3	
Fe-zeolite micromotors	10%	84.96	4	
rGO/ZnO/BiOI/Co-Pi/Pt	5%	63.1	5	
W <sub>5</sub> O <sub>14</sub> /PEDOT-Pt	3%	342	6	
MgAl-LDH/MFZ@HRP	5%	128.33	7	
C/Al <sub>2</sub> O <sub>3</sub> /MnO <sub>2</sub> /LDH/MIPs	7%	51.32	8	
CA-MnO <sub>2</sub> @Co-N/C	7%	398.88	This work	

**Table S3.** Comparison of the steady-state kinetic parameters of CA-MnO<sub>2</sub>@Co-N/C micromotors and HRP.

Nanozyme -	$K_{\rm m}$ (n	$K_{\rm m}({\rm mM})$		$V_{\rm max} (10^{-8}~{ m M~s^{-1}})$		$K_{cat}$ (s <sup>-1</sup> )	
	$H_2O_2$	TMB	$H_2O_2$	TMB	$H_2O_2$	TMB	
HRP	3.7	0.43	8.71	10	-	-	
CA-MnO <sub>2</sub> @Co-N/C	0.68	0.08	0.88	0.78	0.156	0.176	

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