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Supplementary information file

Synthesis of Dual Function Fe_3O_4@MnO_2 @HKUST-1 Magnetic Micromotors for Efficient Colorimetric Detection and Degradation of Hydroquinone

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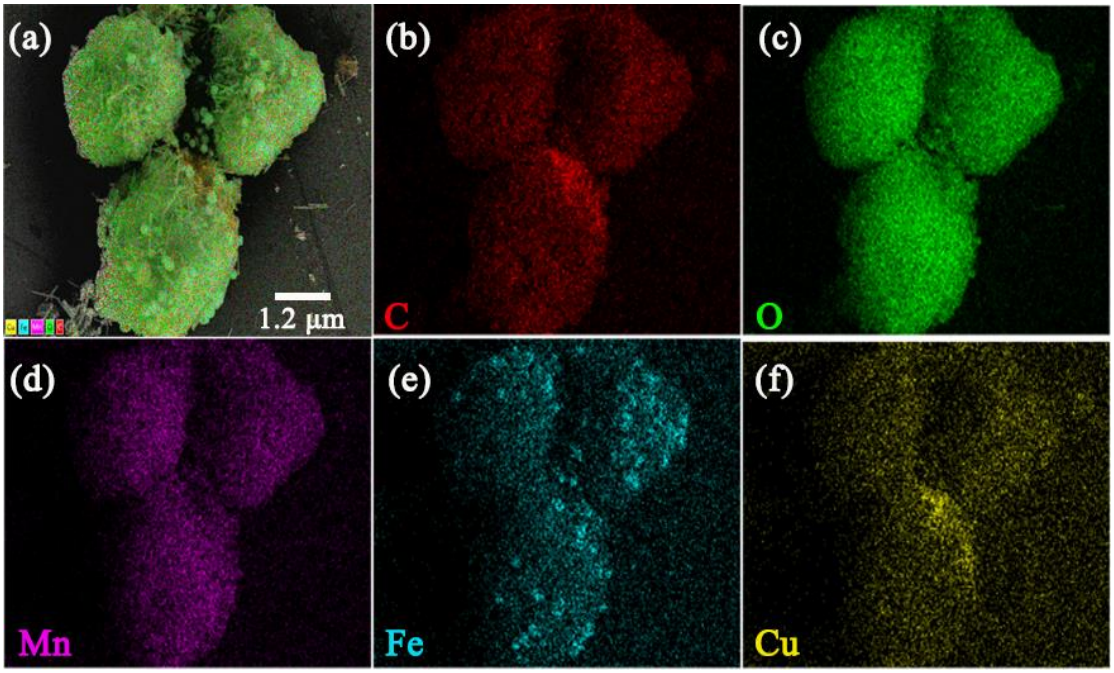

Fig. S1 EDS mappings of multiple Fe_3O_4@MnO_2@HKUST-1 particles.

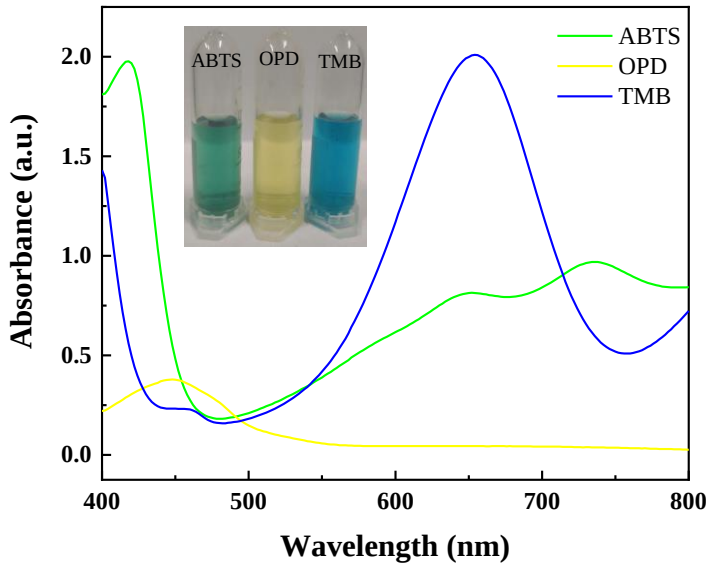

Fig. S2 UV−vis spectra of the Fe_3O_4@MnO_2@HKUST-1 (50 μL 1 mg mL^{-1}) + ABTS (100 μL 10 mM), OPD (100 μL 10 mM), or TMB (100 μL 10 mM) in presence of H_2O_2 (100 μL 10 mM).

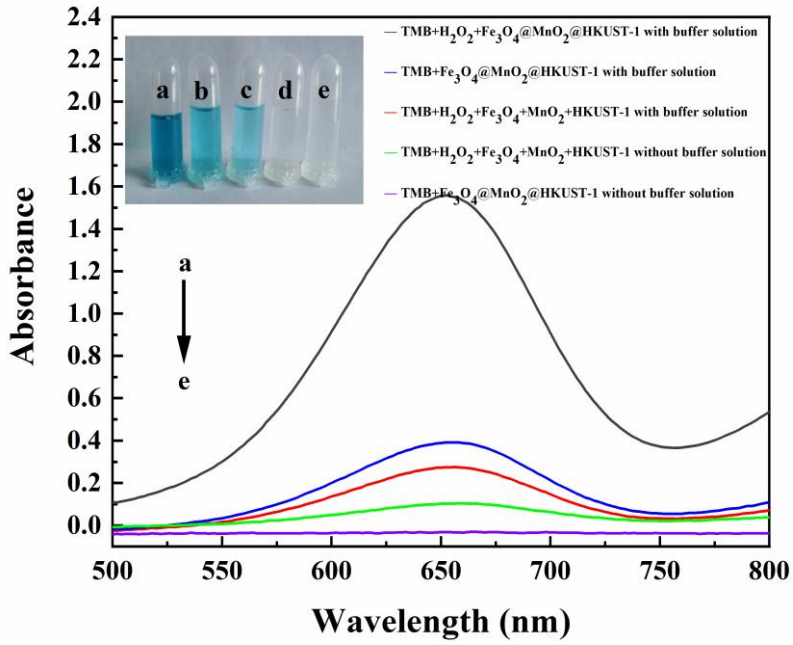

Fig. S3 The absorption spectrum of TMB+H_2O_2+ Fe_3O_4@MnO_2@HKUST-1, TMB + Fe_3O_4@MnO_2@HKUST-1, TMB+H_2O_2+Fe_3O_4+MnO_2+HKUST-1 with and without buffer solution.

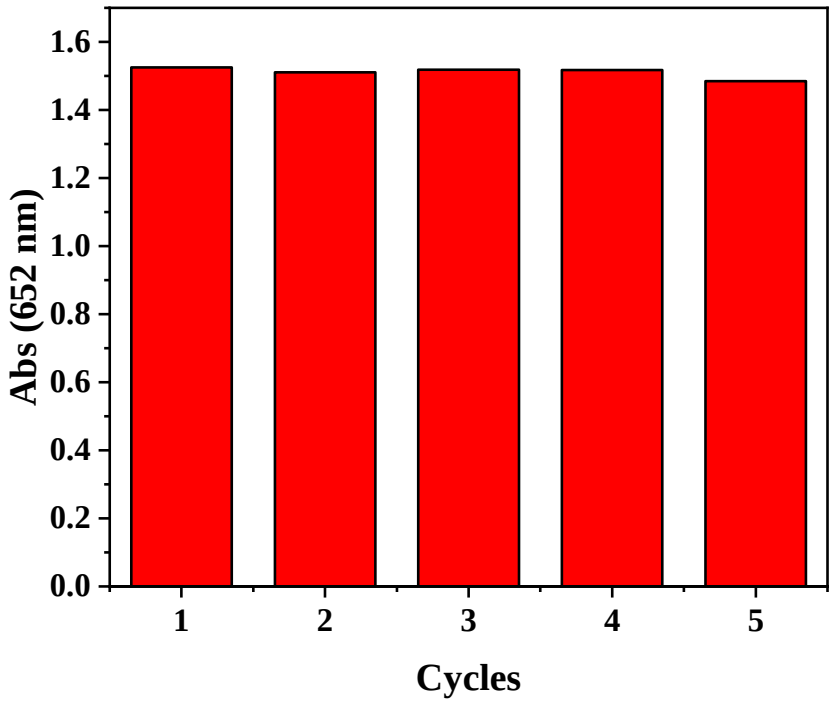

Fig. S4 Changes in cycle number versus absorbance value of ox-TMB solution in the presence of the same concentration of HQ.

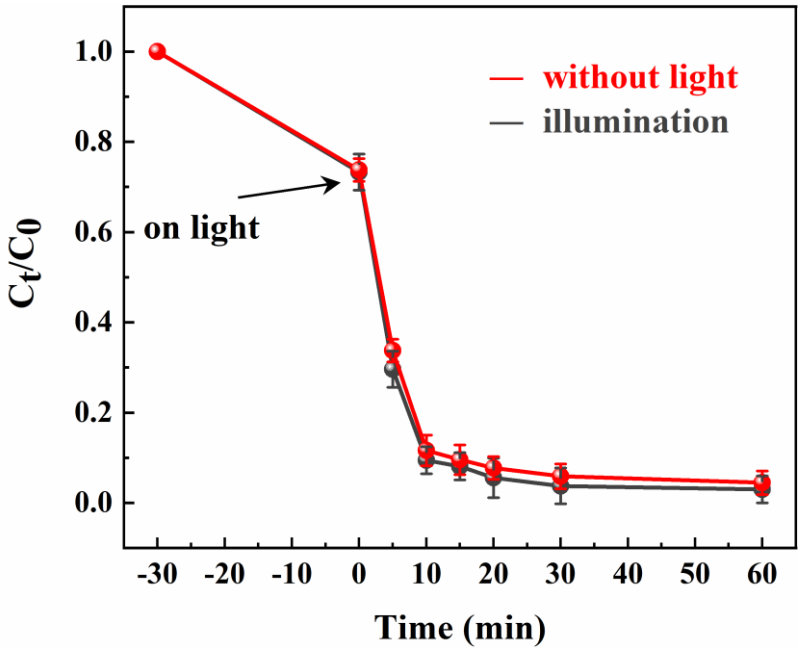

Fig. S5 The effect of with or without light source on the HQ degradation with the Fe_3O_4@MnO_2@HKUST-1 micromotor (Xenon lamp, 300W).

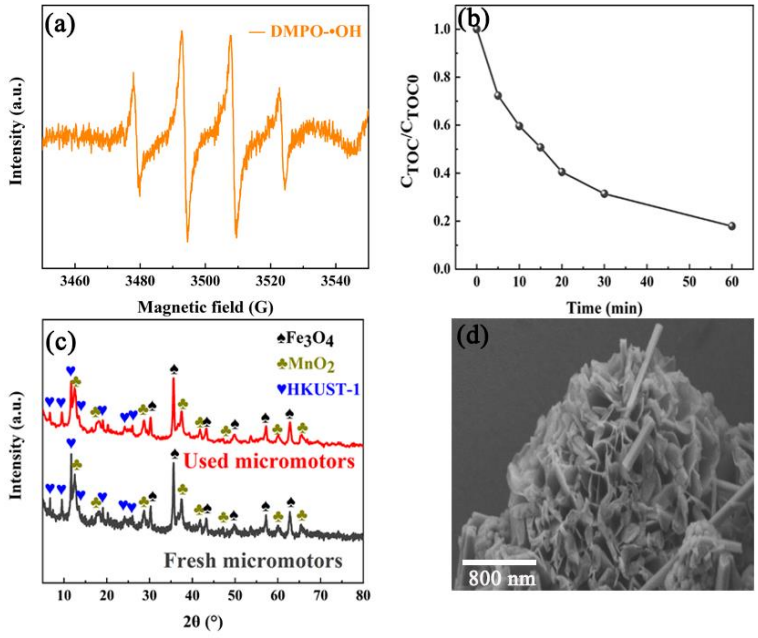

Fig. S6 EPR spectrums of DMPO-•OH in the degradation experiments of HQ (5min, 3 wt% H_2O_2) (a), the TOC spectrum of HQ degradation (b), XRD of Fe_3O_4@MnO_2@HKUST-1 micromotors before and after degradation of HQ (c),

FESEM image of Fe_3O_4@MnO_2@HKUST-1 micromotors after the HQ degradation (d).

Video S1 Motion behavior of Fe_3O_4@MnO_2@HKUST-1 in 1% H_2O_2 aqueous containing 0.5% of sodium dodecyl sulfonate.

Video S2 Motion behavior of Fe_3O_4@MnO_2@HKUST-1 in 5% H_2O_2 aqueous containing 0.5% of sodium dodecyl sulfonate under magnetron.

Table S1 surface area, pore volume, and average pore diameter of different sample.

sample	Surface Area(m^2/g)	Pore Volume(m^3/g)	average pore diameter (nm)
MnO_2	123.9	0.243	6.079
HKUST-1	1592.1	0.581	1.631
Fe_3O_4@MnO_2@HKUST-1	408.5	0.406	1.564

Table S2 atomic content ratio of different elements.

element	atomic percentage (%)
C	41.96
O	34.17
Mn	14.75
Fe	6.74
Cu	2.37
total	100.00