

## In-situ thermal solvent-free synthesis of doped ZIF-8 as a highly efficient visible-light-driven photocatalyst

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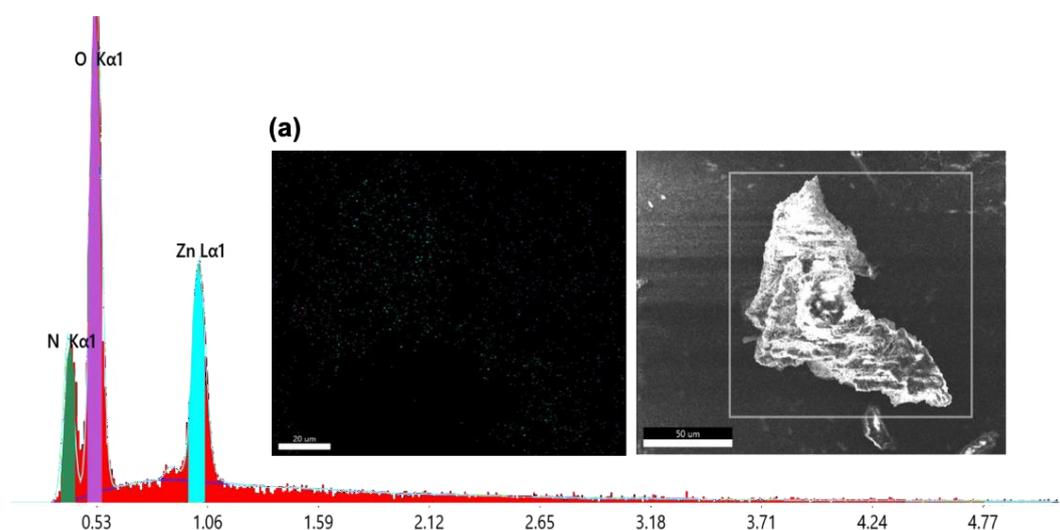
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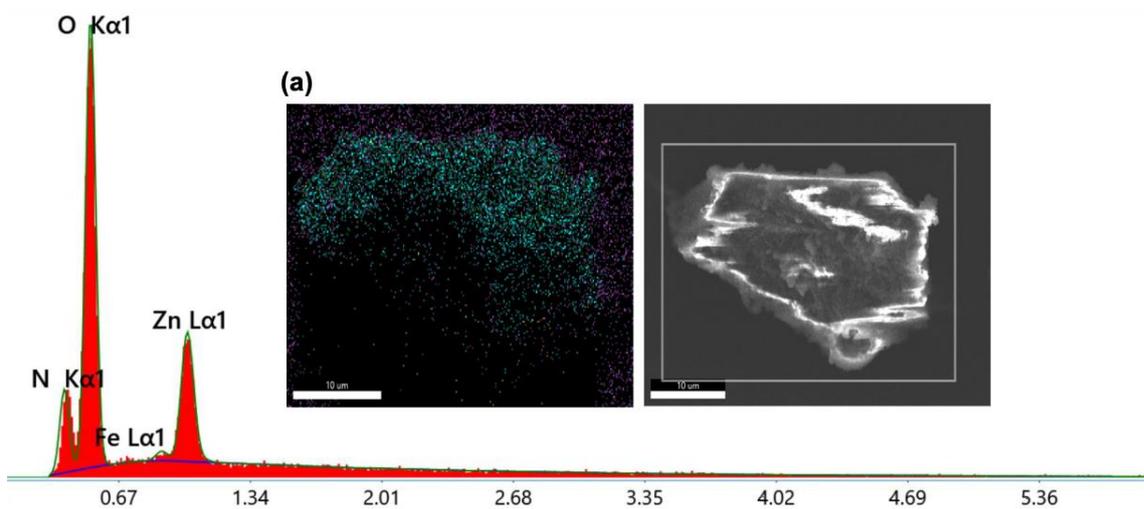
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### 1. The pH effect and dye concentration adjustment process

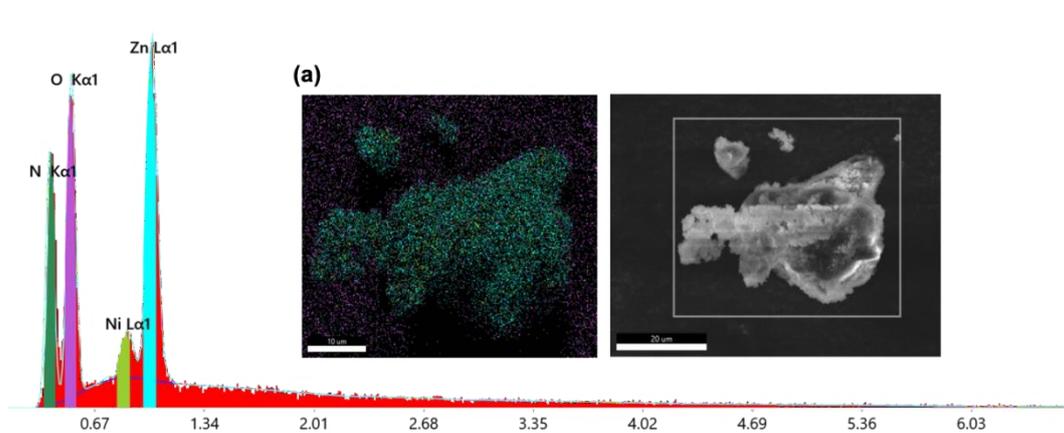
The study also examined the impact of pH on the photocatalytic activity of the solution. The MB solution had a concentration of 10 mg/L, and the Fe@ZIF-8 dosage was 0.012 g/mL. The pH of the solution was adjusted by adding HCl and NaOH to attain the desired value. The pH of the solution was initially adjusted to pH 3 using a 1 M HCL solution. Then, a 0.5 M NaOH solution was added drop by drop until a pH of 10 was reached. To investigate the impact of dye concentration, we prepared concentrated solutions of MB at different concentrations, such as 10 mg/L and 20 mg/L. These solutions were subsequently introduced into a 0.012 g/mL fixed catalyst. According to the findings, a concentration of 10 mg/L of MB dye solution was the optimal choice for the studies.



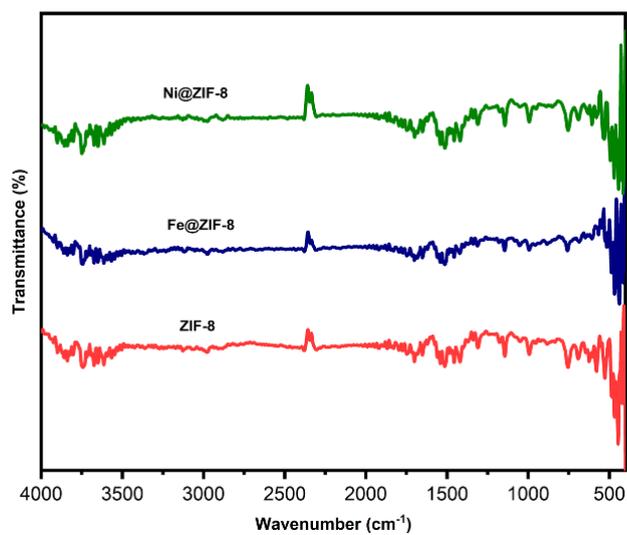
**Figure S1.** EDS mapping spectra and FESEM images (a: Elemental mapping) of ZIF-8.



**Figure S2.** EDS mapping spectra and FESEM images (a: Elemental mapping) of Fe@ZIF-8.



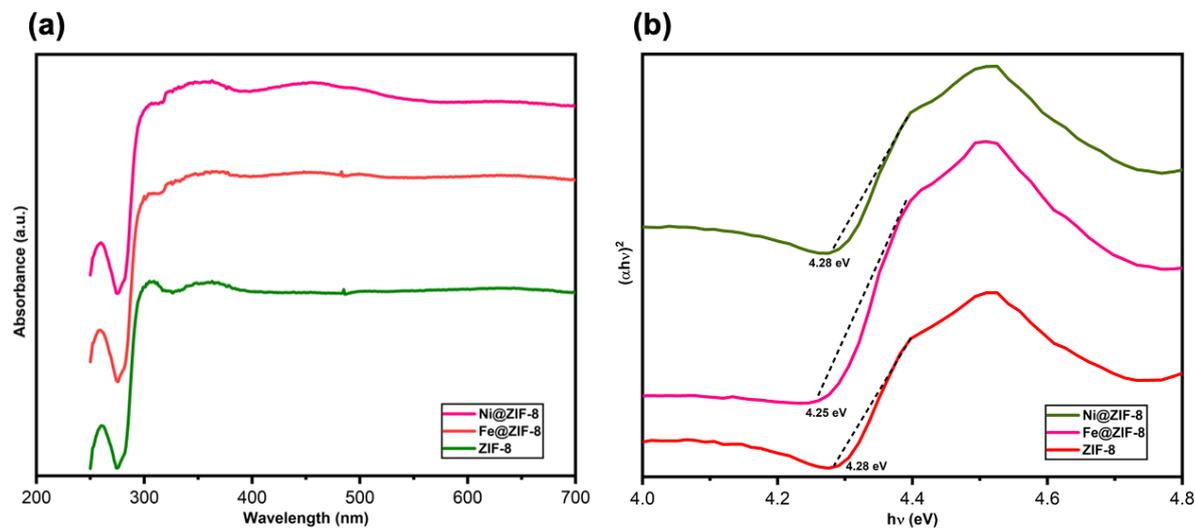
**Figure S3.** EDS mapping spectra and FESEM images (a: Elemental mapping) of Ni@ZIF-8.



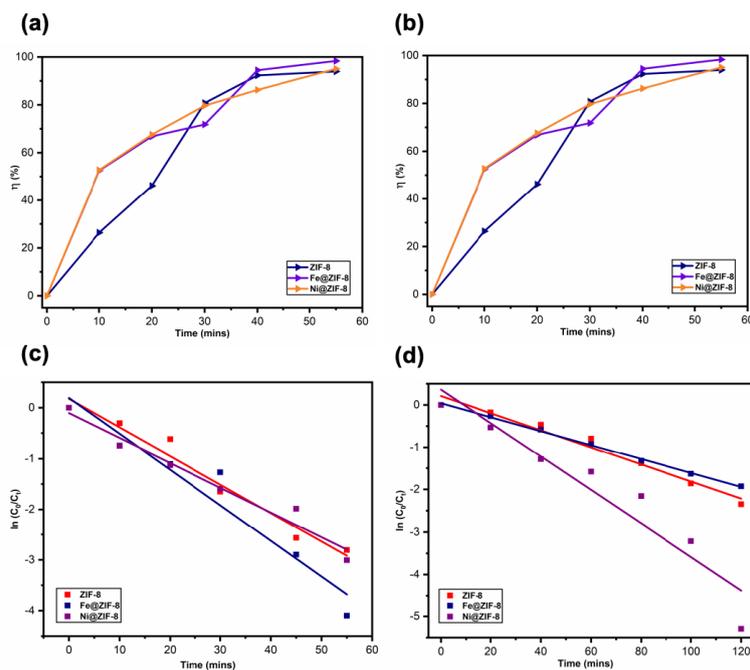
**Figure S4.** ATR-FTIR of the prepared material.

**Table 1.** Atomic % in prepared samples calculated by XPS.

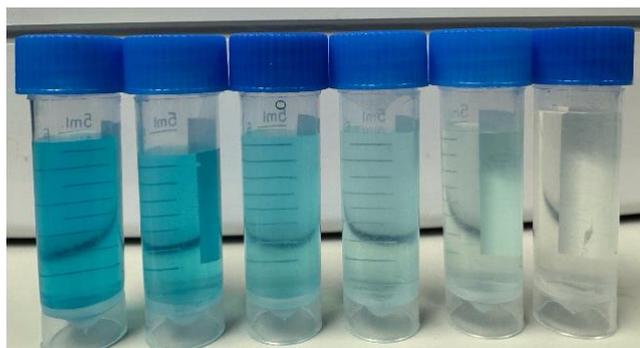
Sample	Zn atomic (%)	C atomic (%)	N atomic (%)	Fe atomic (%)	Ni atomic (%)
ZIF-8	6.51	73.79	18.72	-	-
Fe@ZIF-8	4.96	74.06	18.41	2.16	-
Ni@ZIF-8	4.52	76.37	17.05	-	1.28



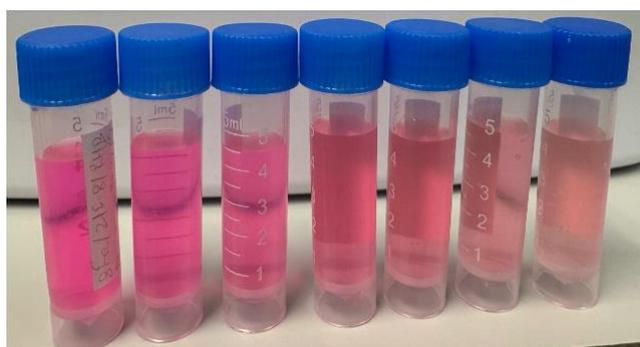
**Figure S5.** (a) UV-vis diffuse reflectance spectra of as-prepared samples (b) Tauc's plots of prepared samples calculated from UV-vis absorption spectra.



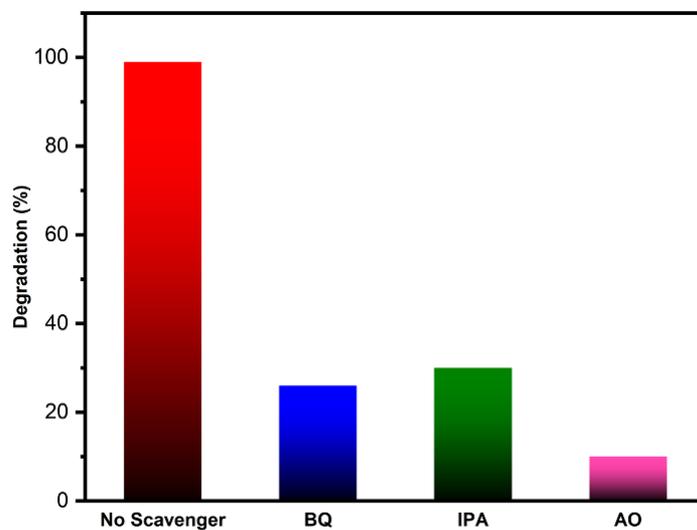
**Figure S6.** (a-b) MB and RhB photodegradation efficiency curves, (c-d) the MB and RhB kinetics curves for the prepared samples, respectively.



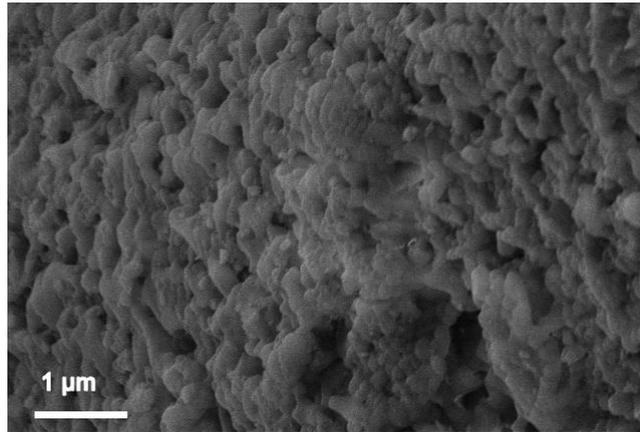
**Figure S7.** MB degradation using Fe@ZIF-8.



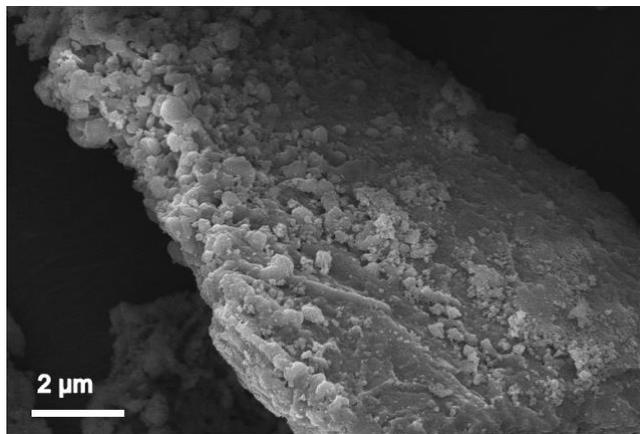
**Figure S8.** MB degradation using Fe@ZIF-8.



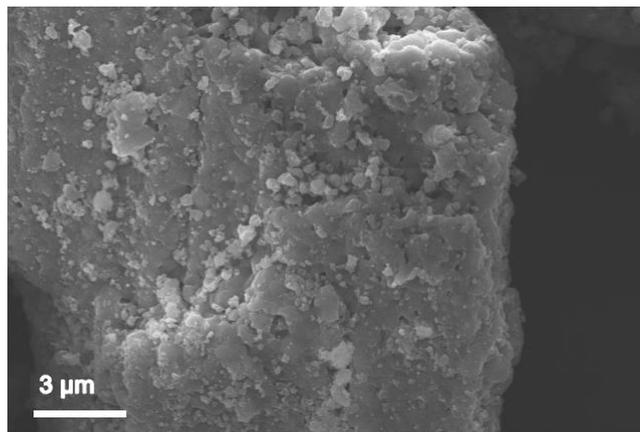
**Figure S9.** Photocatalytic degradation efficiencies of Fe@ZIF-8 for MB in the presence of scavengers (the concentration of the scavengers was 1 mM).



**Figure S10.** SEM of ZIF-8 (Scale 1μm).



**Figure S11.** SEM of Fe@ZIF-8 (Scale 2μm).



**Figure S12.** SEM of Ni@ZIF-8 (Scale 3μm).