

## Supporting Information

Template synthesis of nitrogen-doped carbon nanocages-encapsulated carbon nanobubbles as catalyst for activation of peroxymonosulfate

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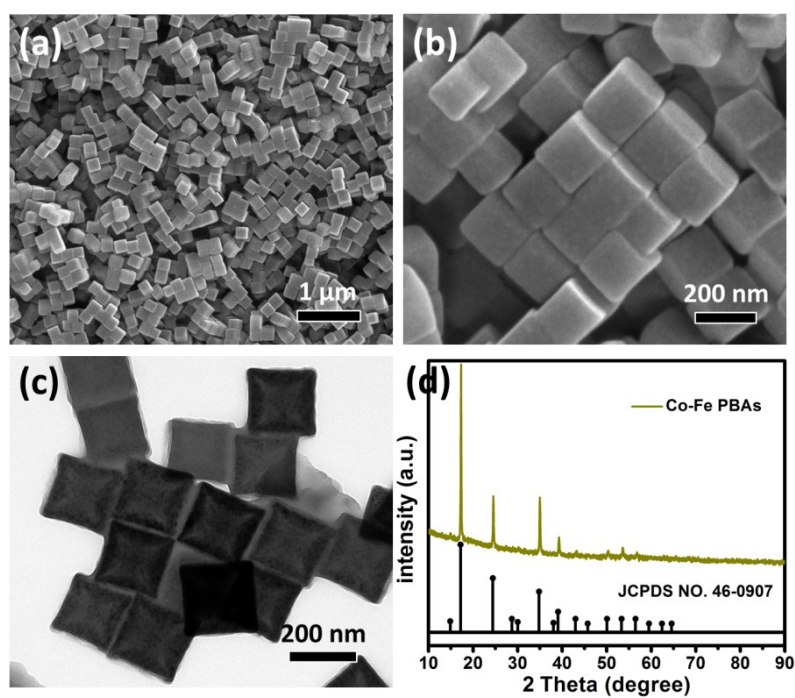
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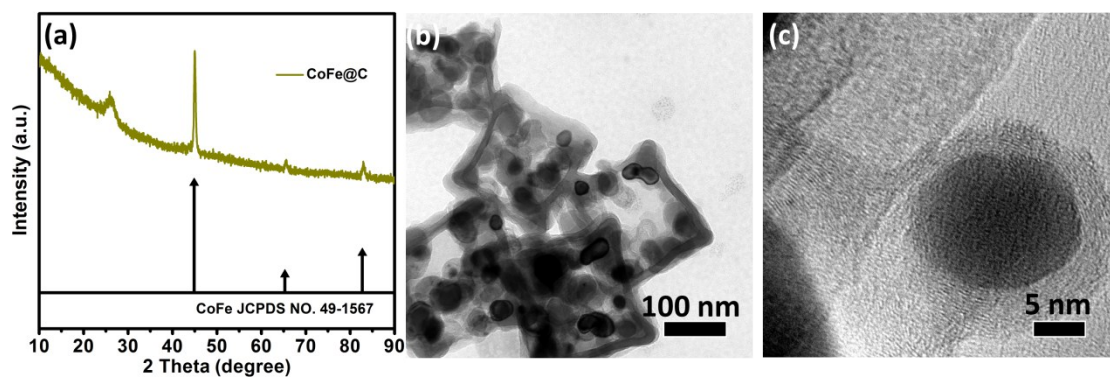
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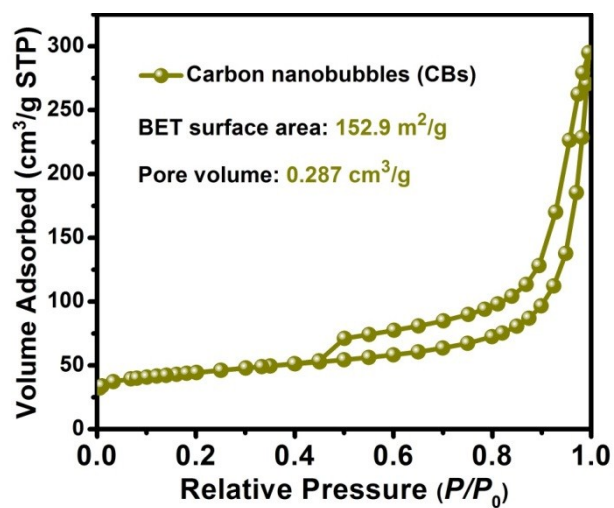
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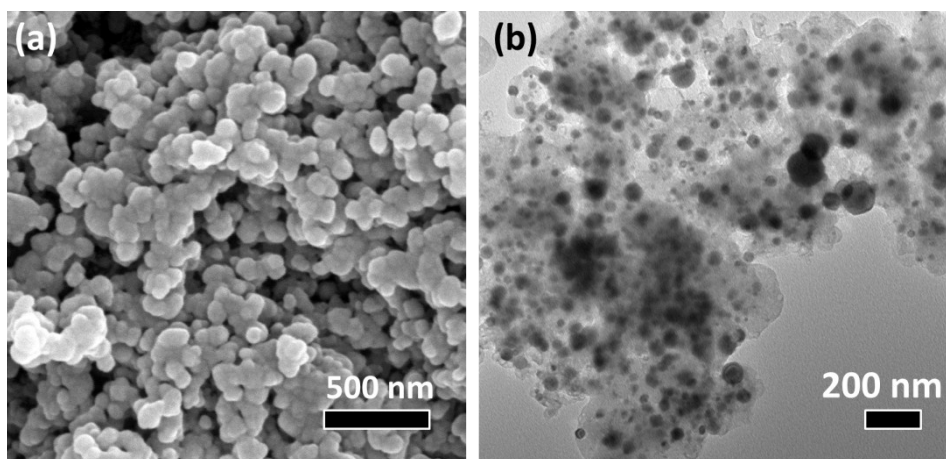
**Figure S1.** SEM, TEM and XRD patterns of Co-Fe PBAs nanocubes.



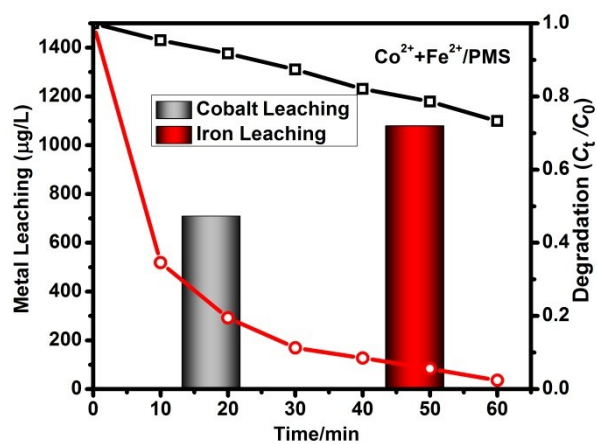
**Figure S2.** XRD and TEM patterns of CoFe@C@NCCs derived from Co-Fe PBAs@PDA.



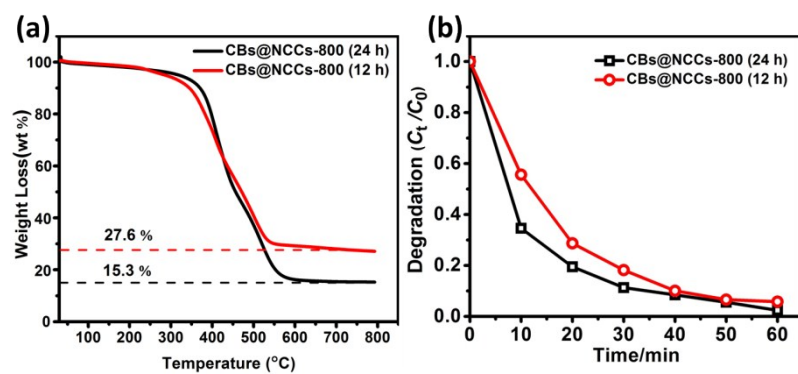
**Figure S3.**  $N_2$  adsorption-desorption isotherms, BET surface area and pore volume of CBs without nitrogen-doped carbon nanocages.



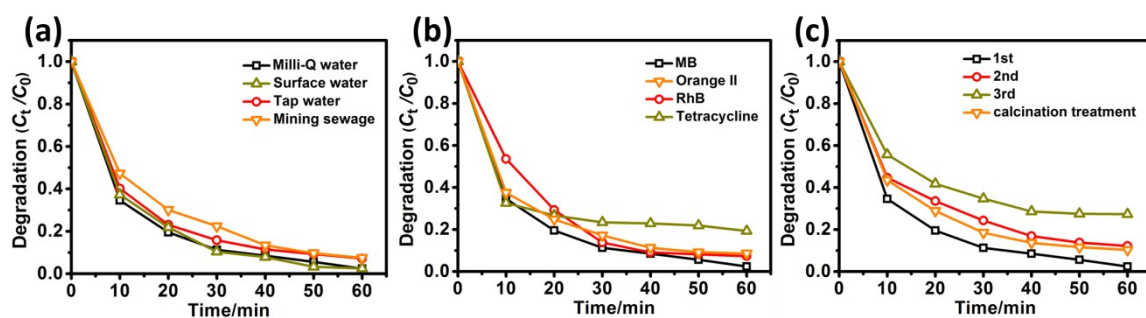
**Figure S4.** SEM and TEM images of CoFe/C nanocomposites derived from Co-Fe PBAs.



**Figure S5.** The metal leaching in MB degradation system, and MB degradation in homogeneous  $\text{Co}^{2+}+\text{Fe}^{2+}/\text{PMS}$  system. ( $[\text{Co}^{2+}] = 710 \text{ } \mu\text{g/L}$ ;  $[\text{Fe}^{2+}] = 1080 \text{ } \mu\text{g/L}$ ; MB, 100 mg/L; Oxone, 1.00 g/L; T, 288 K.)



**Figure S6.** TG curves (a) and MB degradation activities (b) of CBs@NCCs-800 with different acid etching time. (MB, 100 mg/L; catalyst, 0.06 g/L; Oxone, 1.00 g/L; T, 288 K).



**Figure S7.** The influences of actual water bodies for the degradation of MB (a); the degradation of different organic pollutants in CBs@NCCs-800/PMS system (b); reusability and stability tests of CBs@NCCs-800 (MB, 100 mg/L; catalyst, 0.06 g/L; Oxone, 1.00 g/L; T, 288 K).