Supporting Information for

Enhancement of hydroxyl radical generation of solid state photo-Fenton reagent based on magnetite/carboxylate-rich carbon composites by embedding carbon nanotubes as electron transfer channel

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Experimental Section:

Preparation of magnetite/carboxylate-rich carbon particles (MCRCPs)

$FeCl_3$ (0.5 g) and sodium gluconate (3 g), and PVP (1.0 g) were dissolved in 60 mL deionized water, and then transferred into a Teflon-lined stainless-steel autoclave with a capacity of 100 mL. The autoclave was sealed and heated at 180 ºC for 24 h. After cooling down to room temperature, the black products were washed several times with deionized water and absolute ethanol. Finally, the washed precipitation was dried in vacuum oven at 60 ºC for 24 h.

Preparation of magnetite/CNTs composites

CNTs (0.1 g) and $Fe(acac)_3$ (0.2 g) were added to a solvent mixture of ethylene glycol (20 mL). The suspension was poured into 50 mL stainless steel autoclave and sealed after the suspension bubbled with N_2. And then the aoutoclave was heated at 180 ºC for 24 h. After cooling down to room temperature, the black products were washed several times with deionized water and absolute ethanol. Finally, the washed precipitation was dried in vacuum oven at 60 ºC for 24 h.

Preparation of Fe_3O_4 nanoparticles

$FeCl_3.6H_2O$ (2.43 g) and $FeSO_4.7H_2O$ (1.67 g) were dissolved in 50 mL deionized water under nitrogen gas with vigorous stirring at 80 ^oC. Then 2 M NaOH aqueous solutions were rapidly added into the solution until the pH of the solution was adjusted to 10. After heating, the black suspension was cooled to room temperature naturally. The black products were washed several times with deionized water and absolute ethanol. Finally, the washed precipitation was dried in vacuum oven at 60 ºC for 12 h.

Results and discussion

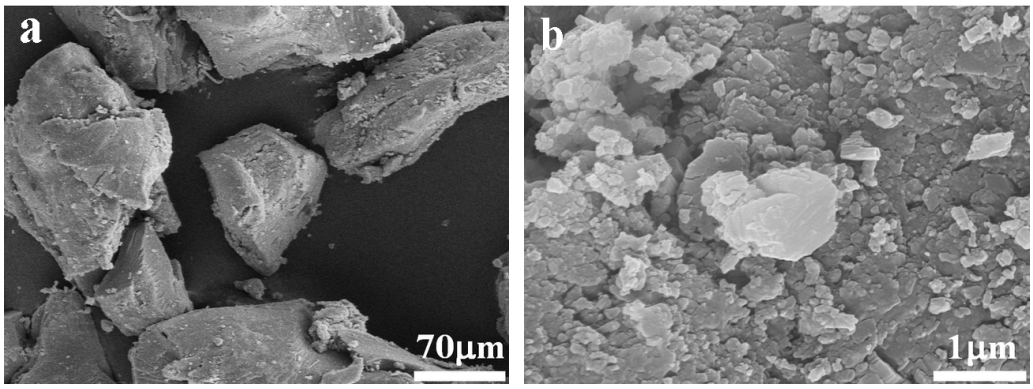

Fig. S1. (a) Low magnification SEM image of the MCRCPs, (b)high magnification SEM image of the surface of MCRCPs,

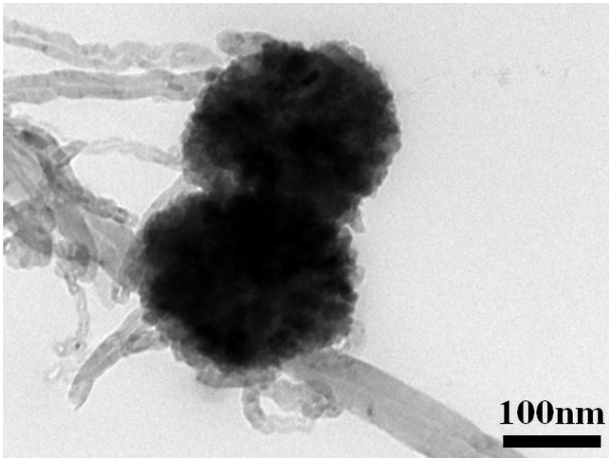

Fig. S2. TEM of image of the magnetite/CNTs

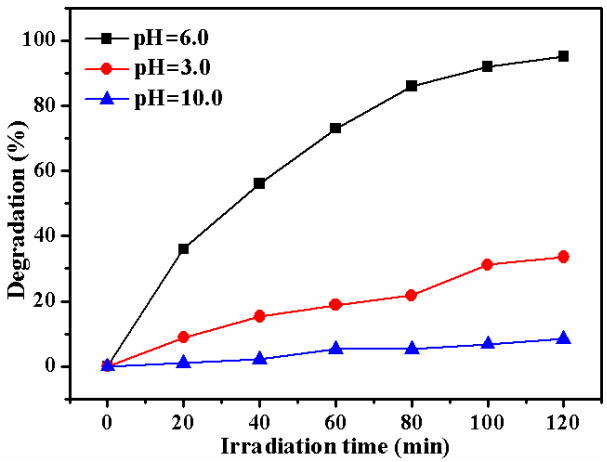

Fig. S3. The effect of pH on MB degradation using MCRCPs/CNTs as catalyst.

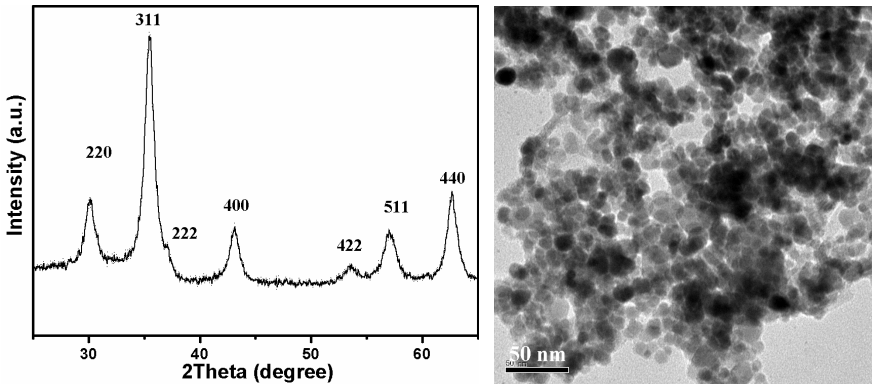

Fig. S4. the XRD pattern (left) and TEM image (right) of the Fe_3O_4 nanoparticles

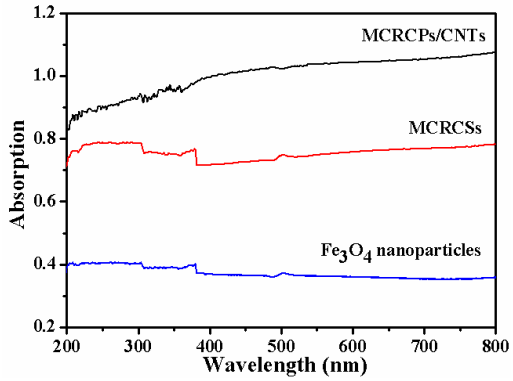

Fig. S5. UV-Vis absorption spectra of Fe_3O_4 nanoparticles, MCRCSs, and MCRCPs/CNT

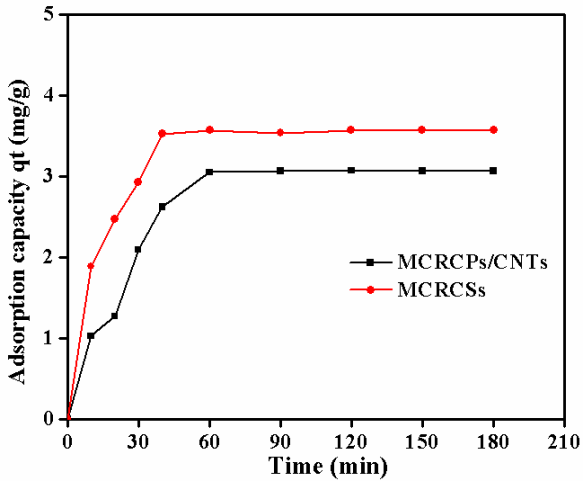

Fig. S6. The methylene blue adsorption capacities of MCRCSs and MCRCPs/CNTs