

## Supporting Information

### Facile 3D Self-Assembly of Porous Iron Hydroxide and Oxide Hierarchical Nanostructures for Removing Dyes from Wastewater

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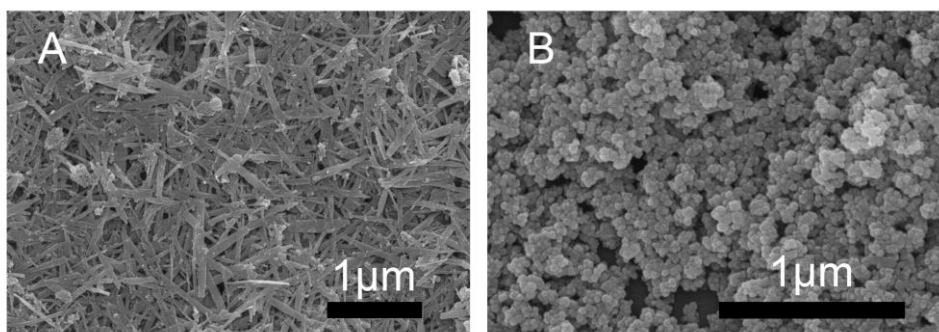
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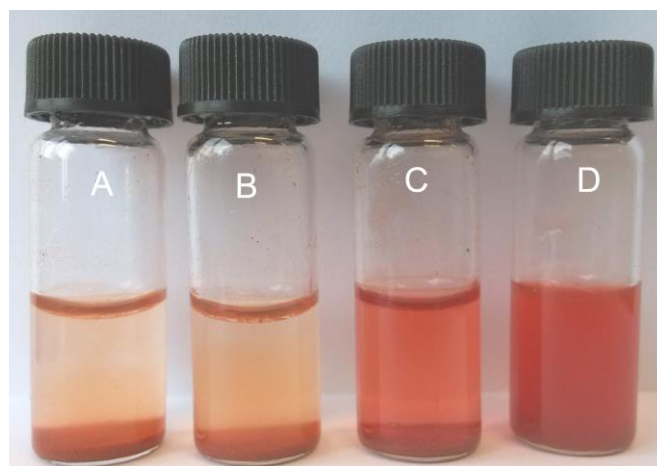
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**Fig. S1.** Photo image of iron nails in different medium for 5 days at room temperature (about 20 °C). (A) water; (B) 0.2 M  $\text{NH}_4\text{Cl}$ ; (C) 0.2 M  $(\text{NH}_4)_2\text{SO}_4$ .



**Fig.S2.** SEM images of conventional  $\alpha\text{-FeOOH}$  nanoparticles as-prepared and  $\alpha\text{-Fe}_2\text{O}_3$  nanoparticles.



**Fig. S3.** Photo images after adsorption of Congo red by (A) iron hydroxide hierarchical nanostructures; (B) iron oxide hierarchical nanostructures; (C) conventional  $\alpha$ -FeOOH and (D)  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles, respectively.

**Table S1 BET surface area and Maximum Congo red adsorption capacities ( $q_m$ ) of different adsorbents.**

Adsorbents	BET surface area ( $m^2/g$ )	$q_m$ (mg/g)	References
$\alpha$ -FeOOH Hierarchical Nanostructures	101	56.3	Present work
$\gamma$ -Fe <sub>2</sub> O <sub>3</sub> Hierarchical Nanostructures	114	58.2	Present work
MnO <sub>2</sub> Hierarchical Hollow Nanostructures		80	[10]
Mesoporous Fe <sub>2</sub> O <sub>3</sub>	111	53	[35]
ZnFe <sub>2</sub> O <sub>4</sub> hollow nanospheres		16	[36]
ZnAl-layered double hydroxides		20	[37]
FeOOH hierarchical nanostructures	239	240	[12]
Urchin-like $\alpha$ -FeOOH hollow spheres	97	275	[38]
Ni(OH) <sub>2</sub> nanosheets	127	60	[39]
hierarchical spindlelike $\gamma$ -Al <sub>2</sub> O <sub>3</sub>	149	90	[40]
Nestlike $\alpha$ -Fe <sub>2</sub> O <sub>3</sub> Nanostructures	152	160	[41]