

# **The preparation of Fe/wood-based activated carbon catalyst for phenol hydroxylation from Fe<sup>2+</sup> and Fe<sup>3+</sup> precursors†**

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## **Electronic Supplementary Information (ESI)**

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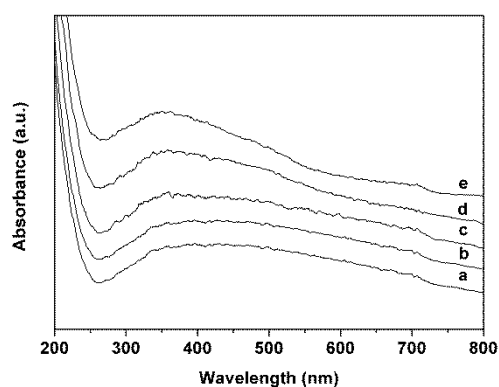
**Fig. S2** FTIR spectra of catalysts.

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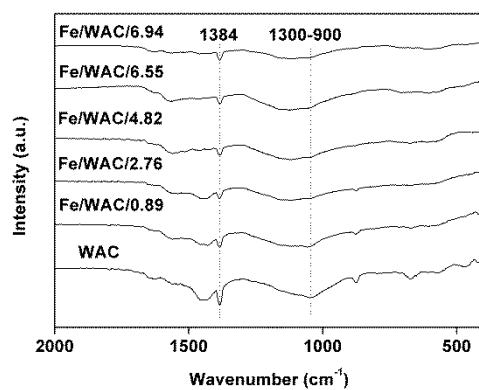
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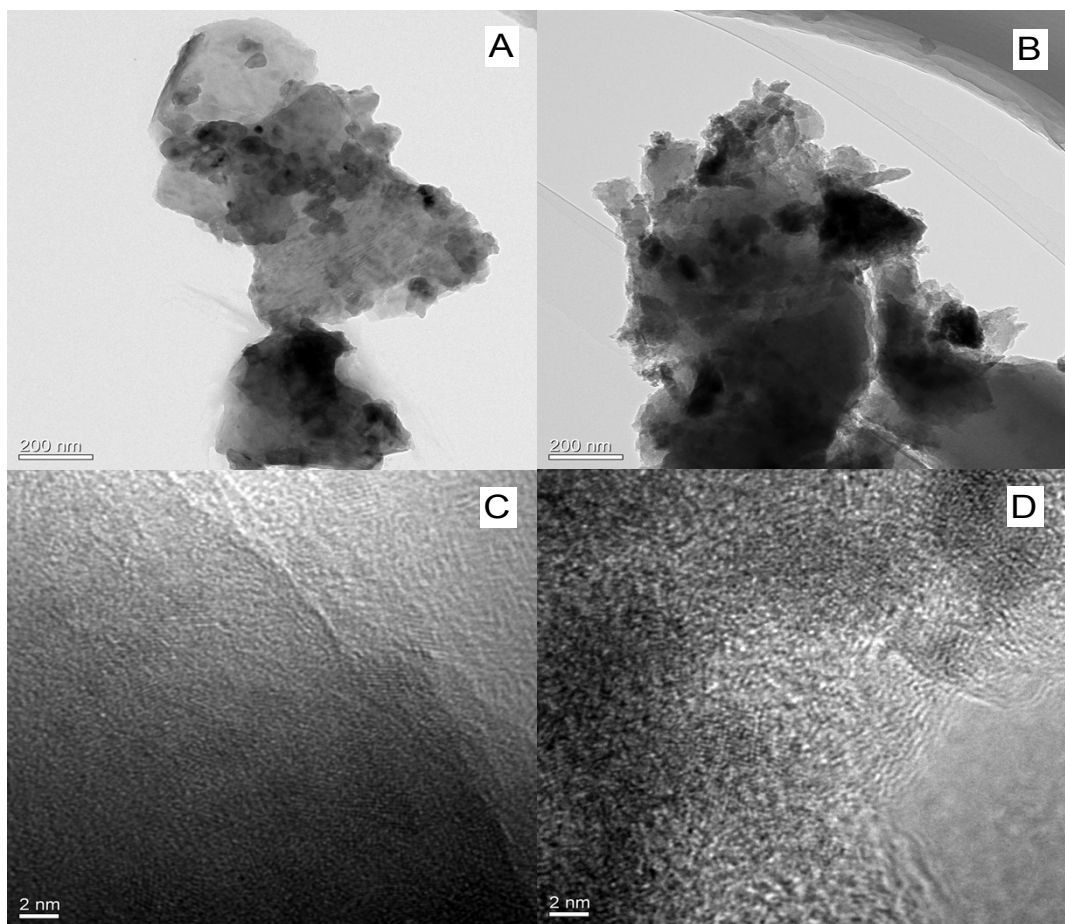
**Table S2** Recycling of Fe/WAC/0.89 for phenol hydroxylation



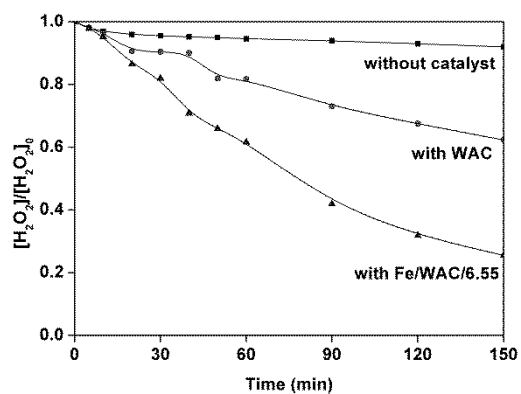
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**Fig. S4** The decomposition of  $\text{H}_2\text{O}_2$  in blank experiment.

**Table S1** Effect of molar ratio of Fe<sup>3+</sup> to Fe<sup>2+</sup> for phenol hydroxylation <sup>a</sup>

Fe <sup>3+</sup> /Fe <sup>2+</sup>	<i>X</i> <sub>Ph</sub> (%)	<i>S</i> <sub>DHB</sub> (%)	<i>Y</i> <sub>DHB</sub> (%)	Yield of product (%)			
				CAT	HQ	BQ	Others
0/1	22.9	49.6	11.4	3.4	8.0	1.9	9.6
1/1	50.1	79.8	40.0	21.7	18.3	1.8	8.3
2/1	51.1	80.6	41.2	22.0	19.2	1.7	8.2
3/1	50.6	79.6	40.3	21.8	18.5	1.7	8.6
4/1	51.5	79.8	41.1	22.1	19.0	1.8	8.6
1/0	23.7	52.8	12.5	3.9	8.6	2.1	9.1

<sup>a</sup> Reaction condition: 0.05 g of catalyst, 0.48 g of phenol (5 mmol), 0.50 g of 30 wt% aqueous H<sub>2</sub>O<sub>2</sub> (5 mmol), 10 ml water, reaction temperature 313 K, reaction time 40 min.

**Table S2** Recycling of Fe/WAC/0.89 for phenol hydroxylation <sup>a</sup>

Catalyst	<i>X</i> <sub>Ph</sub> (%)	<i>S</i> <sub>DHB</sub> (%)	<i>Y</i> <sub>DHB</sub> (%)	Yield of product (%)				Fe content (wt%)
				CAT	HQ	BQ	Others	
BR <sup>b</sup>	25.5	67.5	17.2	9.3	7.9	3.3	5.0	0.89
AR1 <sup>c</sup>	23.0	66.1	15.2	8.4	6.8	3.4	4.4	0.71
AR2	10.8	46.3	5.0	3.6	1.4	2.0	3.8	0.65
AR3	5.0	46.0	2.3	1.8	0.5	1.1	0.3	0.51

<sup>a</sup> Reaction condition: 0.05 g of Fe/WAC/0.89, 0.48 g of phenol (5 mmol), 0.50 g of 30 wt% aqueous H<sub>2</sub>O<sub>2</sub> (5 mmol), 10 ml water, reaction temperature 313 K, reaction time 40 min. <sup>b</sup> BR meant before reaction. <sup>c</sup> AR1 meant after once run, ARN means after N times run.