CuO nanosheet as a recyclable Fenton-like catalyst prepared from simulated Cu(II) waste effluents by alkaline H$_2$O$_2$ reaction

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Table S1. Comparison of various Fe-oxide catalysts in the catalytic performance under visible irradiation.

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<th>Catalysts</th>
<th>Target pollutant</th>
<th>Conditions</th>
<th>Removal efficiency (%)</th>
<th>TOC removal (%)</th>
<th>References</th>
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</thead>
<tbody>
<tr>
<td>FeO</td>
<td>2,4-dichlorophenol (200 mg L⁻¹)</td>
<td>[Catalyst]= 2.5 g L⁻¹, [H₂O₂] = 50 mM, initial pH=5.5, time=10 min</td>
<td>18</td>
<td>-</td>
<td>J. Ind. Eng. Chem, 2015, 21, 668-676.</td>
</tr>
<tr>
<td>Fe₂O₃</td>
<td>Orange II (20 mg L⁻¹)</td>
<td>[Catalyst]=1.5 g L⁻¹, [H₂O₂] = 10 mM, initial pH=6, time=60 min</td>
<td>20</td>
<td>-</td>
<td>J. Colloid Interf. Sci, 2018, 529, 247-254</td>
</tr>
<tr>
<td>Fe₂O₃</td>
<td>Phenol (10 mg L⁻¹)</td>
<td>[Catalyst]=1 g L⁻¹, [H₂O₂] = 26 mM, initial pH=4.0, time=120 min</td>
<td>55</td>
<td>-</td>
<td>Appl. Catal. B:Environ, 2017, 211, 157-166</td>
</tr>
<tr>
<td>α-Fe₂O₃</td>
<td>Phenol (50 mg L⁻¹)</td>
<td>[Catalyst]= 1 g L⁻¹, [H₂O₂] = 3 mM, initial pH=5.5, time=120 min</td>
<td>60</td>
<td>25</td>
<td>J. Photoch. Photobio. A, 2017, 332, 1,521-533</td>
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<tr>
<td>α-Fe₂O₃</td>
<td>AO7 (35 mg L⁻¹)</td>
<td>[Catalyst]= 0.1 g L⁻¹, [H₂O₂] = 1.94 mM, initial pH=6.85, time=14 min</td>
<td>2</td>
<td>-</td>
<td>Appl. Catal. B:Environ, 2010, 96, 1-2,162-168</td>
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<tr>
<td>Fe₃O₄</td>
<td>Phenol (20 mg L⁻¹)</td>
<td>[Catalyst]= 0.25 g L⁻¹, [H₂O₂] = 10 mM, initial pH=5.0, time=120 min</td>
<td>52</td>
<td>-</td>
<td>Sep. Purif. Technol, 2016, 171, 80-87</td>
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<tr>
<td>Fe₃O₄</td>
<td>Phenol (0.4 mM)</td>
<td>[Catalyst]= 0.5 g L⁻¹, [H₂O₂] = 5 mM, pH=7, time=120 min</td>
<td>60</td>
<td>-</td>
<td>J. Hazard. Mater, 2017, 325, 90-100.</td>
</tr>
<tr>
<td>CuO</td>
<td>Phenol (100 mg L$^{-1}$)</td>
<td>[Catalyst]= 0.15 g L$^{-1}$, [H$_2$O$_2$] =120 mM, pH=6, time=40 min</td>
<td>100</td>
<td>67</td>
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Figure S7. The effect of presence of chloride on the phenol degradation Fenton-like reaction. Experimental conditions: 50 mg/L phenol, 150 mL catalyst, initial pH = 6, [H$_2$O$_2$] = 100 mmol/L, [Cl$^-$] = 100 mM, under visible irradiation.
Figure S8. The intermediates variations on the HPLC chromatograph during phenol degradation with different reaction conditions. 1. phenol; 2&5. benzoquinone; 3. Maleic acid; 4. oxalic acid.
Figure S9. Cyclic voltammograms of CuO NSs electrode at scan rate of 100 mV/s in 0.5M Na$_2$SO$_4$ solution (pH = ~6) under visible light irradiation and dark condition.

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Experimental conditions: 50 mg/L phenol, 150 mg/L catalyst, initial pH = 6.
Figure S11. Wide angle XRD patterns of CuO NS and secondary recovered CuO NS.