Highly active Fenton-like catalyst derived from solid waste-iron tailings using wheat straw pyrolysis

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Table S1 Characteristics of wheat straw and iron tailings

|  |  |  |
| --- | --- | --- |
| Proximate analysis | Wheat straw (Raw biomass) Average wt% |  |
| Volatile matter | 86.09 |  |
| Fixed carbon | 9.27 |  |
| Ash | 4.64 |  |
| XRF analysis | Wheat straw （Raw biomass）  | Iron tailings |
| Average wt% |
| SiO2 | 4.35 | 41.21 |
| Fe2O3 | 0.264 | 29.25 |
| Al2O3 | 0.337 | 9.47 |
| CaO | 0.443 | 7.105 |
| MgO | 0.235 | 5.31 |
| Ba | - | 3.62 |
| K2O | 2.369 | 1.73 |
| Cl | 0.905 | - |
| S | 0.181 | 1.23 |
| Mn | 0.0502 | 0.41 |
| TiO2 | 0.024 | 0.35 |
| Na2O | 0.072 | 0.15 |
| Sr | - | 0.0762 |
| P | 0.0721 | 0.057 |

Table S2 The metal ion concentration in leaching test

|  |  |
| --- | --- |
| Metals | Concentration (ppb) |
| 1st | 2nd | 3rd |
| Li | 7.07  | 1.77  | 3.67  |
| Na | 1051.94  | 468.46  | 1592.07  |
| Mg | 393.97  | 257.27  | 474.06  |
| Al | 84.62  | 34.04  | 86.94  |
| K | 1131.30  | 569.80  | 2299.87  |
| Ca | 4706.97  | 2423.60  | 2993.95  |
| V | 2.07  | 1.13  | 1.29  |
| Cr | 1.10  | 0.40  | 0.82  |
| Mn | 25.50  | 19.29  | 29.91  |
| Fe | 88.78  | 85.07  | 92.67  |
| Ni | 0.82  | 0.24  | 2.05  |
| Cu | 3.27  | 1.29  | 4.17  |
| Zn | 1.27  | 0.28  | 3.47  |
| Ga | 0.08  | 0.10  | 0.15  |
| As | 0.59  | 0.32  | 0.33  |
| Rb | 3.99  | 1.39  | 2.87  |
| Sr | 60.76  | 49.57  | 86.80  |
| Ag | 0.02  | 0.03  | 0.03  |
| Cd | 0.04  | 0.14  | 0.14  |
| Cs | 1.93  | 0.88  | 1.04  |
| Ba | 331.78  | 239.93  | 422.94  |
| Pb | 0.23  | 0.57  | 1.00  |

 

Figure S1 The SEM image of synthesized RT-900-60, scale bar=10 μm (a) and I/W(3:1)-900-60, scale bar=10 um, insert image scale bar=3 um (b)



Figure S2 Characterization of the prepared catalysts by N2 adsorption-desorption: (a) Pore size distribution; (b) adsorption-desorption isotherm



Figure S3 Stability and reusability of I/W(3:1)-900-60 for the degradation of MB

Figure S4 (a) XRD patterns of fresh and used I/W(3:1)-900-60; (b) SEM image of used I/W(3:1)-900-60 ([MB]=60 mg/L, [catalyst]=0.3 g/L, [H2O2]=16 mmol/L)