Electronic Supplementary Information

Iron-copper bimetallic nanoparticles supported on hollow mesoporous silica spheres: An effective heterogeneous Fenton catalyst for orange II degradation

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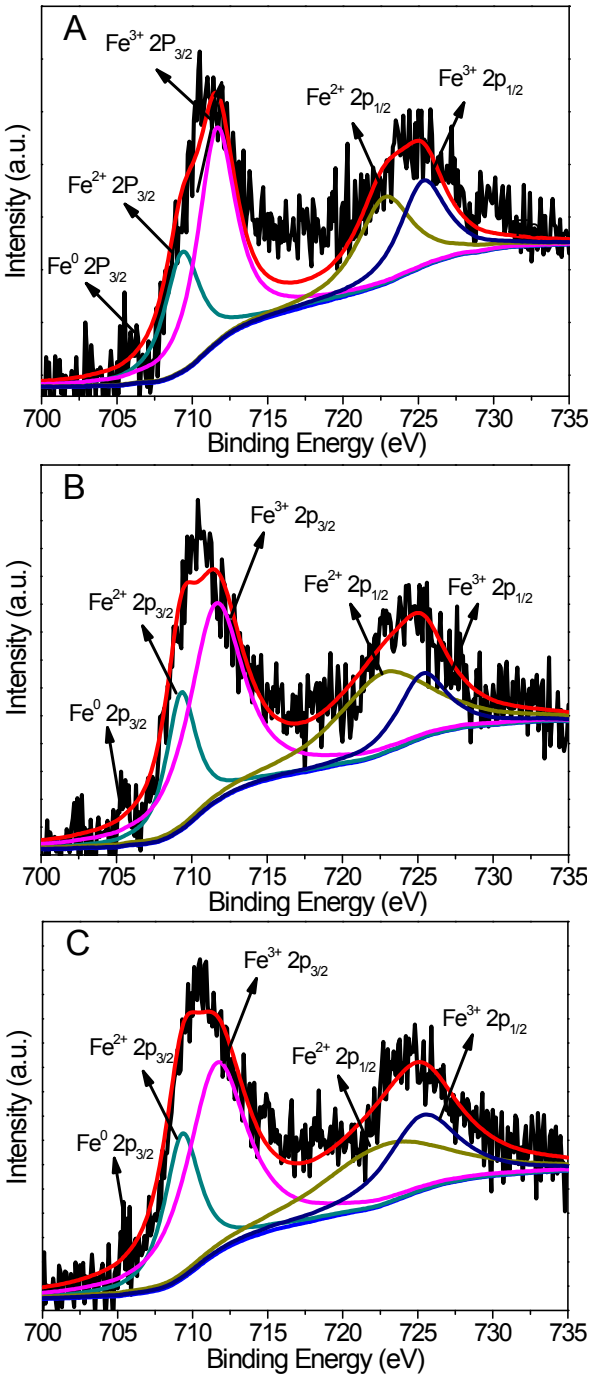


Fig. S1. XPS spectra of Fe in (A) FeCu/HMS, (B) FeCu/MS and (C) Fe/HMS

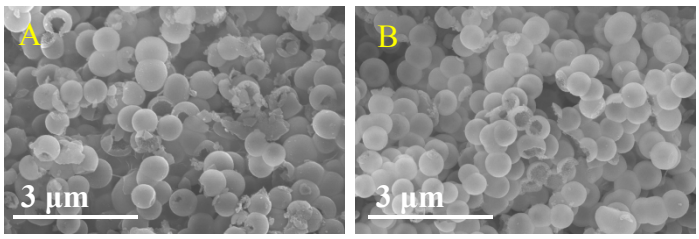


Fig. S2. SEM of hollow sphere before (A) and after (B) removal of template

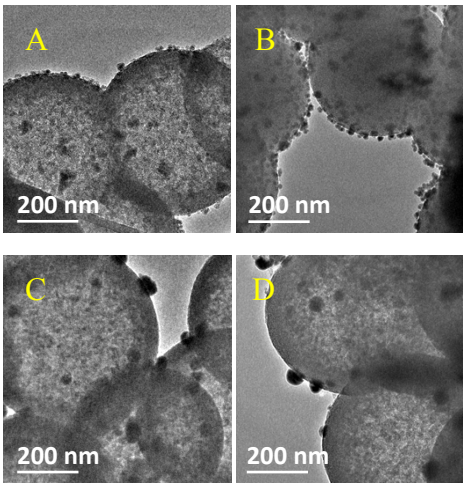


Fig. S3. High-magnification TEM images of (A) FeCu/HMS, (B) FeCu/MS, (C) Fe/HMS and (D) Cu/HMS

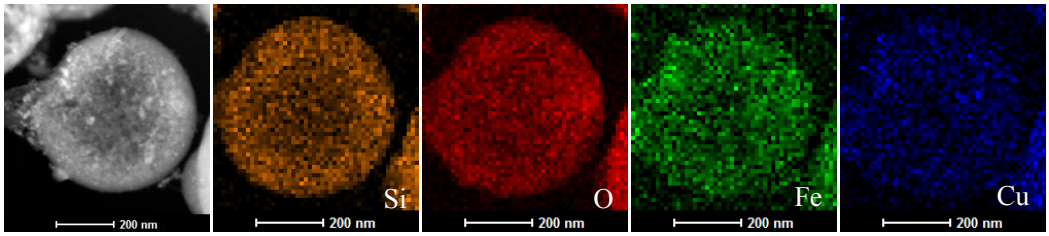


Fig. S4. EDX-STEM images of FeCu/HMS

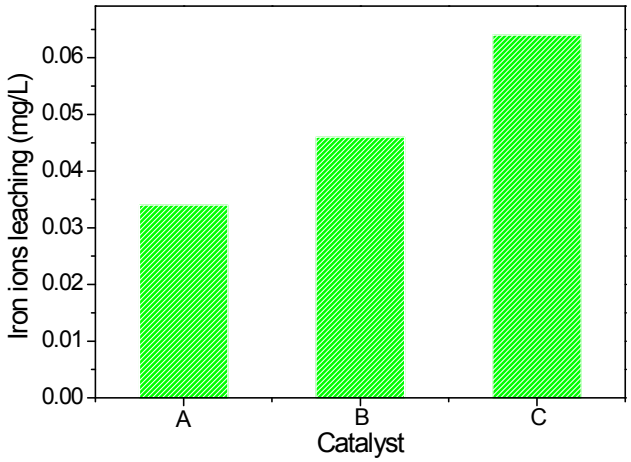


Fig. S5. Iron ions leaching of (A) FeCu/HMS, (B) FeCu/MS and (C) Fe/HMS after reaction 2h under the condition of H_2O_2 13.7 mM, catalyst dosage 1g/L, orange II concentration 50 mg/L, pH at 7.0, 30 ^oC

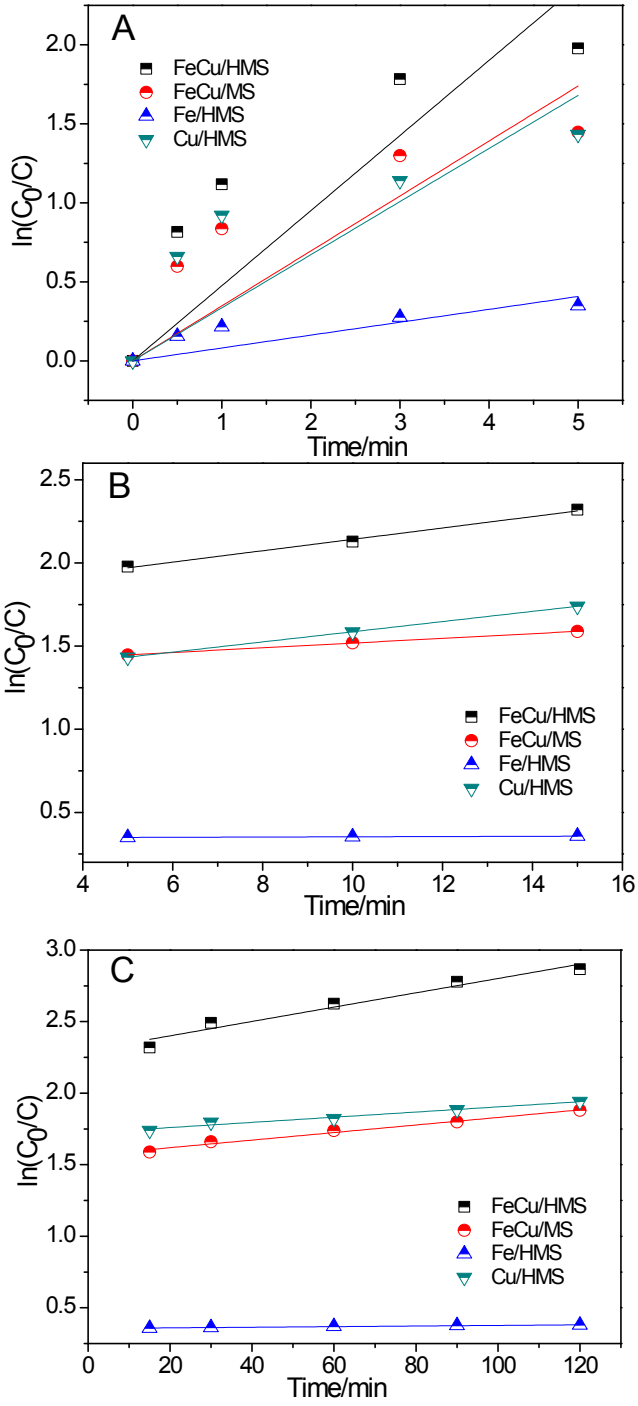


Fig. S6. Kinetics of three stages (A) 0-5min, (B) 5-15min, (C) 15-120min for degradation of 50 mg/L orange II with different catalysts under the condition of H_2O_2 13.7 mM, catalyst dosage 1g/L, pH at 7.0, 30 ^oC

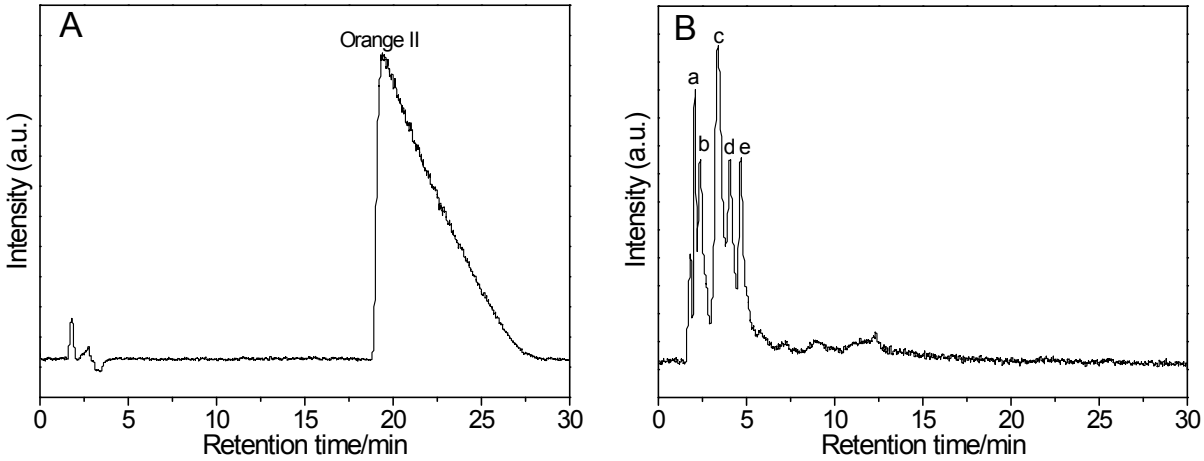
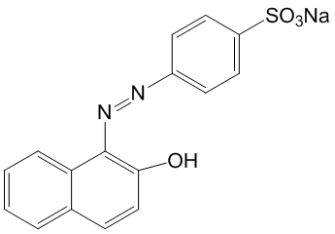
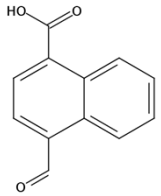
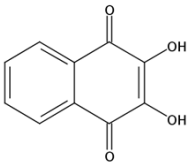
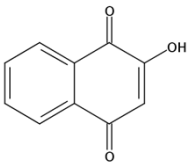
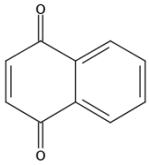


Fig. S7. HPLC diagrams of (A) initial orange II solution and (B) orange II degraded by FeCu/HMS heterogeneous Fenton system after 2h under the condition of H_2O_2 13.7 mM, catalyst dosage 1g/L, dye concentration 50 mg/L, pH at 7.0, 30 ^oC

Table S1 HPLC-MS identified possible reaction products during orange II degradation

Compound	Retention time	Chemical name	Chemical structure
Orange II	19.41 min	Orange II	
a	2.11 min	4-formyl-1-Naphthalenecarboxylic acid	
b	2.35 min	2,3-dihydroxy-1,4-Naphthalenedione	
c	3.38 min	2-hydroxy- 1,4-Naphthalenedione	
d	4.06 min	1,4-Naphthalenedione	
e	4.67 min	2-Carboxy-1,4-naphthoquinone