

(Research Article 7)

“Active faceted Cu₂O hollow nanospheres for unprecedented adsorption and visible-light degradation of pollutants”

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Abstract:

We report the well-designed active {1 1 0} and {1 1 1} faceted Cu₂O hollow nanospheres (Cu₂O-HNs) for the quick removal of the high concentration pollutants in water. For the first time, these Cu₂O-HNs combine the advantages of the active facets, hollow structure and nanostructures. The abundance of dangling Cu atoms in two active facets results in positively charged surface to effectively react with the negatively charged pollutants. The hollow structure provides the opportunity to take full use of these active sites. Consequently, the active faceted Cu₂O-HNs demonstrate excellent adsorption and photodegradation capacities for high concentrated anionic dyes. The smallest Cu₂O-HNs (~100 nm) can adsorb ~90% of methyl blue (MB) (100 mg L⁻¹) in 10 min and degrade ~92% of MB (100 mg L⁻¹) in 10 min under visible-light. In particular, a film consisting of the smallest Cu₂O-HNs can quickly remove high concentrated organic dyes and be reused after solar light irradiation for 10 min in air, showing the promising practical application for the removal of organic pollutants.