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Facile Fabrication of Magnetically Recyclable Metal-Organic Framework Nanocomposites for Highly Efficient and Selective Catalytic Oxidation of Benzylic C–H Bonds

Chem. Commun. **2014**, 50, 8374–8377.

Oxidation of Benzylic C–H Bonds with HKUST-1@Fe₃O₄

Category

Polymer-Supported Synthesis

Key words

metal-organic framework

oxidation

iron oxide

heterogeneous catalysis

SYNFACT
of the month

Preparation of HKUST-1@Fe₃O₄:

Oxidation of benzylic hydrocarbons:

Significance: The magnetic core-shell nanocomposites HKUST-1@Fe₃O₄ were prepared from Fe₃O₄-CO₂H (Φ 20 nm), polyvinylpyrrolidone (PVP), Cu(OAc)₂, and trimesic acid (BTC), in which the iron-based nanoparticles were encapsulated by the resulting HKUST-1 shell [for the copper-organic framework of Cu(OAc)₂ and trimesic acid, see: Chui et al. *Science* **1999**, 283, 1148]. The oxidation of benzylic C–H bonds was carried out with HKUST-1@Fe₃O₄ and TBHP to give the corresponding desired carbonyl products in up to >99% conversion and >99% selectivity.

Comment: The catalyst was characterized by SEM, HR-TEM, PXRD, BET, and FT-IR analyses. Elemental analysis revealed a ratio of copper and iron of 19.34% and 28.63%. The catalyst was recovered by an external magnet and reused twice without significant loss of the catalytic activity.

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Synfacts 2014, 10(10), 1101 Published online: 17.09.2014
DOI: 10.1055/s-0034-1379194; Reg-No.: Y10314SF