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

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.