Oxidation of Benzylic C–H Bonds with HKUST-1@Fe$_3$O$_4$

**Preparation of HKUST-1@Fe$_3$O$_4$:**

\[ \text{HKUST-1@Fe$_3$O$_4$} \]

**Oxidation of benzylic hydrocarbons:**

\[
\begin{align*}
\text{Oxidation} & : \quad \text{HKUST-1@Fe$_3$O$_4$ (25 mg)} \\
& \quad \text{TBHP (2.5 mol equiv), benzonitrile (0.5 mL)} \\
& \quad 80 \, ^\circ \text{C}, 14 \, \text{h}
\end{align*}
\]

**Significance:** The magnetic core–shell nanocomposites HKUST-1@Fe$_3$O$_4$ were prepared from Fe$_2$O$_3$-CO$_2$H (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@Fe$_3$O$_4$ 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.