Cu–Co Dual-Atom Catalysts Supported on Hierarchical USY Zeolites for an Efficient Cross-Dehydrogenative C(sp²)–N Coupling Reaction


Cross-Dehydrogenative C(sp²)–N Coupling by a Cu–Co Dual-Atom Catalyst Supported on Hierarchical Zeolite

**Significance:** A copper–cobalt dual-atom catalyst supported on hierarchical USY zeolites (Cu–Co–Y), prepared according to eq. 1, promoted the cross-dehydrogenative coupling of unprotected phenols with phenothiazines and phenoxazine under an O₂ atmosphere to give the corresponding C–N-coupled products in up to 82% yield (eq. 2).

**Comment:** Cu–Co–Y was characterized by means of N₂ adsorption-desorption isotherm, XRF, MALDI-TOF/TOF-MS, SXRD, TEM, EDX, UV/Vis, XPS, and XANES analyses. In the reaction of 4-methoxyphenol with phenothiazine, the catalyst was recovered and reused four times with gradual loss of its catalytic activity (fresh: 81%, 6th run: 65%).