

Oxidative Cleavage and Ammoxidation of C–S Bonds by Cobalt/N-Doped Carbon Catalyst

Category

Polymer-Supported Synthesis

Key words

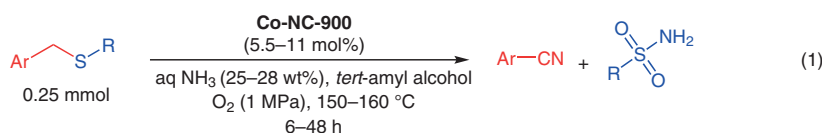
cobalt catalysis

oxidative cleavage

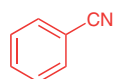
ammoxidation

organosulfur

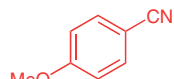
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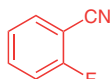
Selected results:



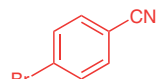
R = H, 94% GC yield
R = Me, 87% GC yield
R = Et, 93% GC yield



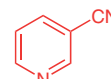
R = H, 88% GC yield
R = Me, 74% GC yield



R = H, 95% GC yield
R = Me, 86% GC yield

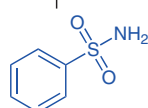


R = H, 92% GC yield
R = Me, 82% GC yield

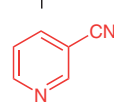


R = H, 87% GC yield
R = Me, 56% GC yield

R = Ph

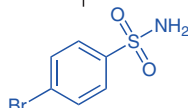


84% GC yield

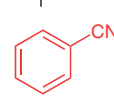


60% GC yield

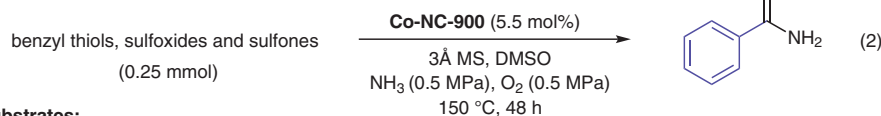
R = 4-BrC6H4



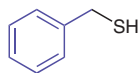
68% GC yield



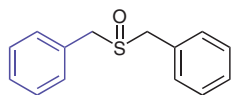
85% GC yield



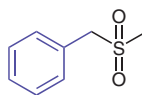
Selected substrates:



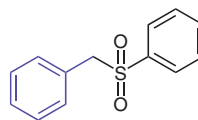
97% GC yield



98% GC yield



76% GC yield



84% GC yield

Significance: A cobalt/N-doped carbon catalyst (**Co-NC-900**) was found to promote the oxidative cleavage of thiols, sulfides and aryl benzyl sulfides with aqueous NH₃ as the nitrogen source under O₂ to give the corresponding nitriles in ≤95% GC yield (eq. 1). This catalytic system also promoted the ammoxidation of benzyl thiols, sulfoxides, and sulfones with NH₃ to give the corresponding benzamide in up to 98% GC yield (eq. 2).

Comment: The authors have previously reported the preparation of **Co-NC-900** and its application to the aerobic oxidative successive C–C bond cleavage of alcohols to ester (*Angew. Chem. Int. Ed.* **2020**, *59*, 19268). In the oxidative cleavage reaction of phenylmethanethiol, the catalyst was recovered by filtration and reused five times without significant loss of its catalytic activity.