**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 NH$_3$ as the nitrogen source under O$_2$ 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 NH$_3$ to give the corresponding benzamides 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.