Synthesis of Nitriles from Primary Alcohols and NH\textsubscript{3} with Ru(OH)\textsubscript{x}/Al\textsubscript{2}O\textsubscript{3}

![Chemical structures and reactions](image)

**Significance:** An Al\textsubscript{2}O\textsubscript{3}-supported ruthenium hydroxide catalyst (Ru(OH)\textsubscript{x}/Al\textsubscript{2}O\textsubscript{3}) promoted the reaction of primary alcohols \textit{1} or aldehydes \textit{2} with ammonia to give the corresponding nitriles \textit{3} in 65–96% yield (from \textit{1}, 13 examples; from \textit{2}, 7 examples). No leaching of ruthenium was observed by ICP-AES analysis after the reaction.

**Comment:** The authors have previously reported the preparation and characterization of Ru(OH)\textsubscript{x}/Al\textsubscript{2}O\textsubscript{3} and its application to the aerobic oxidative dehydrogenation of alcohols (Angew. Chem. Int. Ed. 2002, 41, 4538; Chem. Eur. J. 2003, 9, 4353). The catalytic activity of Ru(OH)\textsubscript{x}/Al\textsubscript{2}O\textsubscript{3} was superior to that of the other supported catalysts for the formation of \textit{3a} from \textit{1a} [Au(OH)\textsubscript{x}/Al\textsubscript{2}O\textsubscript{3}: 10%, Pd(OH)\textsubscript{x}/Al\textsubscript{2}O\textsubscript{3}: <1%, Pt(OH)\textsubscript{x}/Al\textsubscript{2}O\textsubscript{3}: <1%, Rh(OH)\textsubscript{x}/Al\textsubscript{2}O\textsubscript{3}: <1%, Ru/C: 22%, RuHAP: 4%].