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Catalytic Oxidative Synthesis of Nitriles Directly from Primary Alcohols and Ammonia

Synthesis of Nitriles from Primary Alcohols and NH₃ with Ru(OH)ₓ/Al₂O₃

**Significance:** An Al₂O₃-supported ruthenium hydroxide catalyst (Ru(OH)ₓ/Al₂O₃) promoted the reaction of primary alcohols 1 or aldehydes 2 with ammonia to give the corresponding nitriles 3 in 65–96% yield (from 1, 13 examples; from 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)ₓ/Al₂O₃ 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)ₓ/Al₂O₃ was superior to that of the other supported catalysts for the formation of 3a from 1a [Au(OH)ₓ/Al₂O₃: 10%, Pd(OH)ₓ/Al₂O₃: <1%, Pt(OH)ₓ/Al₂O₃: <1%, Rh(OH)ₓ/Al₂O₃: <1%, Ru/C: 22%, RuHAP: 4%].

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