

essentially quantitative, with an 88 per cent yield after recrystallisation.

Other work on nitrile hydration, not involving the platinum group metals, has been undertaken, but is not discussed here.

Conclusion

The hydration of nitriles, while being one of the classic reactions of organic chemistry, is, at present, used comparatively little in the fine

chemicals industry. The discovery of extremely active platinum-containing homogeneous catalysts, in particular one derived from dimethylphosphine oxide, which can hydrate several nitriles in aqueous media and in particular, can hydrate acetonitrile with a turnover number of over 50,000, suggests that the fine chemical and pharmaceutical industries will in future be able to make use of this reaction much more widely.

References

- 1 B. S. Rabinovich and C. A. Winkler, *Can. J. Res.*, 1942, **20B**, 221; C. J. O'Connor, *Quart. Rev.*, 1970, **24**, 553
- 2 B. Radziszewski, *Ber. Dtsch. Chem. Ges.*, 1885, **18**, 355
- 3 K. B. Wiberg, *J. Am. Chem. Soc.*, 1953, **75**, 3961
- 4 A. R. Katritzky, B. Pilarski and L. Urogdi, *Synthesis*, 1989, 949 and references therein
- 5 M. P. Suh, K. Y. Oh, J. W. Lee and Y. Y. Bae, *J. Am. Chem. Soc.*, 1996, **118**, 777
- 6 R. A. Michelin, M. Mozzon and R. Bertani, *Co-ord. Chem. Rev.*, 1996, **147**, 299; R. W. Hay, "Comprehensive Co-ordination Chemistry" eds. G. Wilkinson, R. D. Gillard and J. A. McCleverty, Pergamon, Oxford, 1987, Vol. 6, pp. 411–485, espec. p. 449
- 7 S. E. Diamond, B. Grant, G. M. Tom and H. Taube, *Tetrahedron Lett.*, 1974, 4025
- 8 D. A. Buckingham, P. Morris, A. M. Sargeson and A. Zanella, *Inorg. Chem.*, 1977, **16**, 1910
- 9 J. Chin and J. H. Kim, *Angew. Chem. Int. Ed. Engl.*, 1990, **29**, 523; J. H. Kim, J. Britten and J. Chin, *J. Am. Chem. Soc.*, 1993, **115**, 3618
- 10 C. J. McKenzie and R. Robson, *J. Chem. Soc., Chem. Commun.*, 1988, 112
- 11 A. N. Pudovik, T. M. Sudakova and G. I. Evstaf'ev, *J. Gen. Chem., USSR*, (Engl. Trans.), 1974, **44**, 2371
- 12 T. Ghaffar and A. W. Parkins, *Tetrahedron Lett.*, 1995, **36**, 8657
- 13 D. M. Roundhill, R. P. Sperline and W. B. Beaulieu, *Co-ord. Chem. Rev.*, 1978, **26**, 263
- 14 P. W. N. M. van Leeuwen, C. F. Roobek, J. H. G. Frjns, A. G. Orpen, *Organometallics*, 1990, **9**, 1211
- 15 British Patent Appl., 9506389.7; 1995
- 16 C. M. Jensen, W. C. Trogler, *J. Am. Chem. Soc.*, 1986, **108**, 723
- 17 G. Villain, G. Constant, A. Gaset and P. Kalck, *J. Mol. Catal.*, 1980, **7**, 355
- 18 T. Yoshida, T. Matsuda, T. Okano, T. Kitani and S. Otsuka, *J. Am. Chem. Soc.*, 1979, **101**, 2027
- 19 M. Stevenson, S. J. Heyes, T. Ghaffar and A. W. Parkins, manuscript in preparation
- 20 D. L. Thorn and J. C. Calabrese, *J. Organomet. Chem.*, 1984, **272**, 283
- 21 C. Gadreau, A. Foucou and P. Merot, *Synthesis*, 1981, **73**
- 22 F. M. Menger, *Acc. Chem. Res.*, 1985, **18**, 128; A. J. Kirby, *Angew. Chem. Int. Ed. Engl.*, 1994, **33**, 551; R. Breslow, *Acc. Chem. Res.*, 1995, **28**, 146
- 23 J. Akisanya and A. W. Parkins, King's College London, unpublished work
- 24 D. R. Boyd and B. E. Byrne, Queen's University of Belfast, unpublished data

Encyclopedia of Chemical Technology

The Fourth Edition of the recently published Volume 19 of the Kirk-Othmer "Encyclopedia of Chemical Technology" contains sections covering the platinum group metals and their compounds. The first section overviews sources, mineralogy, recovery, refining and economic aspects, uses and physical properties, and is well illustrated by Tables.

Co-ordination compounds and organometallic compounds have been the most actively researched areas in this half of the century. This is reflected by the second sec-

tion covering platinum group metals compounds. The rich catalytic chemistry resulting from the relative ease of conversion between oxidation states is described along with the many other uses of these compounds. Both sections contain bibliographies.

There are twenty-seven volumes in each Edition, Volume 19 contains 1170 pages and costs £220. Copies are obtainable from the publishers John Wiley & Sons, ISBN 0-471-52688-6, Fax: 01243-843296, Email: cs-books@wiley.co.uk.