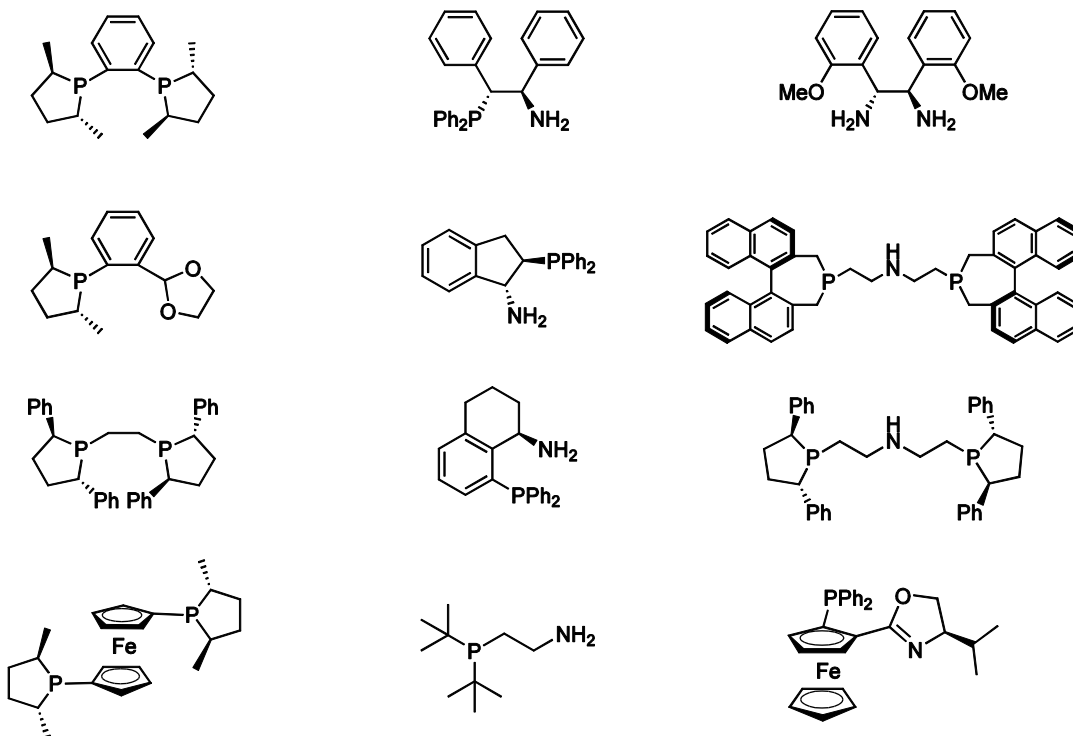


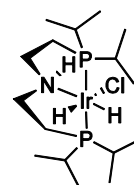
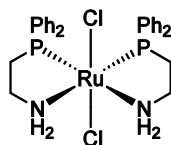
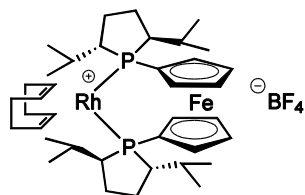
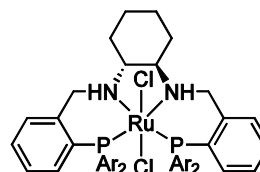
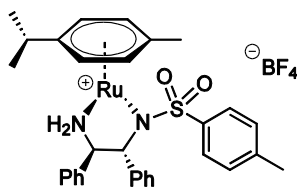
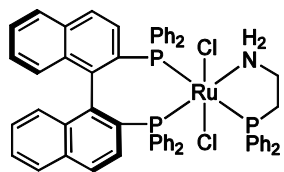
Hydrogenation

KCT maintains an exceptionally broad portfolio of ligand and catalyst technologies that find application in the hydrogenation (asymmetric or otherwise) of ketones, aldehydes, imines and olefins. The importance of such asymmetric hydrogenation processes was recently underscored by the awarding of half of the 2001 Nobel Prize in chemistry to Noyori and Knowles for their work in this field.

The asymmetric reduction of ketones, aldehydes and imines yields chiral alcohols and amines which are highly valued end-products or intermediates in the flavour and fragrance, pharmaceutical, agrochemical, materials and fine chemicals industries.¹ KCT's own chiral and achiral aminophosphine technology comprises an integral part of our portfolio of highly selective and efficient, functional-group tolerant ruthenium catalysts. Beyond these, a range of privileged chiral auxiliaries including phospholanes² and diamines make KCT a leader in enantioselective ketone, aldehyde and imine reduction.



For the asymmetric hydrogenation of olefins our range of phospholanes, including DuPhos, BPE and Ferrolane ligands, offer access to catalyst systems whose efficacies are well-established.³ These are further complimented by a range of rhodium and iridium catalysts which augment our already comprehensive capabilities in asymmetric hydrogenation. All of our catalytic systems deliver solutions with high functional group tolerance, stellar loading (10^4 to 10^6 substrate-to-catalyst ratio), exceptional efficiency (typical 100% conversion), and high-to-excellent stereoselectivity (90 to >99% ee).



References:

1. (a) Saudan, L. A. *Acc. Chem. Res.* **2007**, 40, 1309. (b) Guiry, P. J.; Saunders, C. P. *Adv. Synth. Catal.* **2005**, 346, 497. (c) Ohkuma, T.; Ooka, S. H.; Ikariya, T.; Noyori, R. *J. Am. Chem. Soc.* **1995**, 117, 2675. (d) Doucet, H.; Ohkuma, T.; Murata, K.; Yukozawa, T.; Kozawa, M.; Katayama, E.; England, A. F.; Ikariya, T.; Noyori, R. *Angew. Chem. Int. Ed.* **1998**, 37 1703.
2. Sold under license from DuPont, which license does not include the right to use the compounds in producing products for sale in the pharmaceutical field.
3. *Handbook of Homogeneous Hydrogenation*, ed. J. G. De Vries and C. J. Cornelis, Wiley-VCH, Weinheim, 2007, vol. 1 - 3.