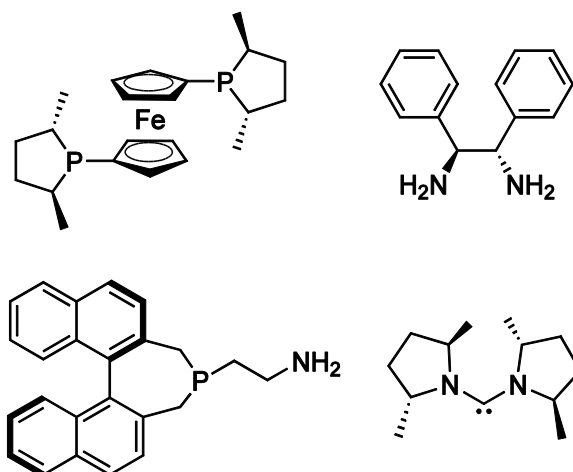


## Asymmetric Synthesis and Catalysis

The most effective catalyst systems are borne out of repeated and extensive modifications of the steric and electronic properties of their supporting ligands. Because of the subtle nature of the effect of ligand/catalyst structure on the outcome of an enantioselective catalytic event, a range of ligands and catalysts must be screened in order to optimize reaction outcome. To accomplish this, vast ligand and catalyst libraries are required for screening. KCT offers a broad range of chiral, proprietary (KCT-owned and in-licensed) and non-proprietary, ligands available for screening and use.



Our ligand portfolio includes in-licensed phospholanes<sup>1</sup> which have been established as premier ligands for the enantioselective hydrogenation of olefins.<sup>2</sup> Chiral diamines, which have found use in highly selective Noyori-type ruthenium hydrogenation catalysts for the enantioselective hydrogenation of ketones, aldehydes and imines, are also available.<sup>3</sup> As an established alternative to these systems KCT's aminophosphines, though primarily used for incorporation into ruthenium hydrogenation catalysts, have been shown to be useful for a range of applications such as enantioselective Michael addition and hydroformylation.<sup>4</sup>

The latest addition to our catalogue of chiral ligands is chiral acyclic diaminocarbenes (ADCs). While N-heterocyclic carbenes (NHC) have emerged as competent substitutes for tertiary phosphines in a number of catalytic applications, the use of ADCs (especially chiral analogues) remains relatively unexplored. We offer a broad range of chiral and achiral ADCs and NHCs for catalyst screening and synthesis at research and commercial quantities. Indeed, all of our ligands and catalysts are available in gram to kilogram quantities.

### References:

1. Sold under license from DuPont; license does not include the right to use the compounds in producing products for sale in the pharmaceutical industry.
2. C. J. Copley and P. H. Moran, in *Handbook of Homogeneous Hydrogenation*, ed. J. G. De Vries and C. J. Cornelis, Wiley-VCH, Weinheim, 2007, vol. 2, ch. 24.
3. O. Taheshi and R. Noyori, in *Handbook of Homogeneous Hydrogenation*, ed. J. G. De Vries and C. J. Cornelis, Wiley-VCH, Weinheim, 2007, vol. 3, ch. 32.
4. Amoroso, D.; Graham, T. W.; Guo, R.; Tsang, C.-W.; Abdur-Rashid, K. *Aldrichim. Acta* 2008, 41, 15.