Design and X-ray Structures of New Chiral Ferrocenyl Ligands to be used in Asymmetric Catalysis

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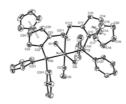
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Worldwide sales of chiral drugs in single-enantiomer forms continued growing at a more than 13% annual rate. Then discovery of truly efficient methods of obtaining optically pure chiral substances remains a substantial challenge for synthetic chemists. Since the early 1970s, there is a growing interest in asymmetric catalysis. One of the most powerful general strategies is the use of chiral metal complexes as homogeneous molecular catalysts. Our group is involved in the syntheses of chiral enantiomerically pure modular ligands.

Two efficient syntheses of a chiral enantiomerically pure C2-symmetry diphosphine-monoether will be presented. The study of the coordination chemistry of this large bite-angle diphosphine proved that this diphosphine can chelate one single metal with the two phosphorus being trans to each other.



Associated with palladium precursors, this ligand forms an efficient catalyst for asymmetric allylic substitution with good reactivity and good enantioselectivity (ee up to 81%).

Furthermore, a new family of ferrocenyl phosphine thioethers have been designed and synthesized with high efficiency. This new type of ligand proved to be efficiently bound to various metals (Pd, Pt, Ir...)

These ligands were tested in asymmetric allylic substitution, and proved to be good systems with high activity and enantioselectivity (ee up to 93%).