Drug Discovery & Development

Diazaphosphacycles, Which Are Used to Catalyze Commercially Important Reactions, and Methods of Synthesis

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WARF: P03130US

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing chiral phosphines and methods with which to produce them.

Overview

Phosphines have many commercial and industrial uses as attachments to rare earth metal catalysts, including specialized uses in asymmetric hydrogenation and other catalytic transformations. Asymmetrical hydrogenation is used to make commercially important products, including biologically active compounds such as pesticides and pharmaceuticals. However, chiral phosphines, which are used in reactions such as asymmetric hydrogenation that yield only one enantiomer of a product, are difficult and expensive to produce, often requiring multistep synthesis.

One specific group of phosphines, 3,4-diazaphospholanes, are five-membered rings containing two nitrogen atoms, two carbon atoms and a phosphorus atom as ring members. Each of the two carbon atom ring members is bonded to one of the ring nitrogen atoms and the ring phosphorus atom. Very few 3,4-diazaphospholanes have been reported and a need exists for chiral phosphines and methods for producing them. A need also remains for transition metal complexes that include chiral phosphines and for transition metal complexes for catalyzing important reactions.

The Invention

UW–Madison researchers have developed diazaphosphacycles and methods for synthesizing them. They further developed transition metal complexes that include diazaphosphacycles and methods for using them in catalytic transformations. The method to synthesize a diazaphosphacycle includes reacting a phosphine with a diimine and optionally one or more equivalents of an acid halide, a sulfonyl halide, a phosphoryl halide or an acid anhydride in the substantial absence of O_2 to form the diazaphosphacycle. The phosphine has the formula R1-PH2, where R1 is a substituted or unsubstituted aryl, alkyl, alkenyl, cycloalkyl or ferrocenyl group.

Applications

- Libraries of phosphine catalysts, chiral phosphines and transition metal complexes

Key Benefits

- Expands the limited availability of chiral phosphines and methods of phosphine synthesis

Additional Information

For More Information About the Inventors

- Clark Landis

Related Technologies

- For a one-step method to synthesize a diazaphosphacycle, see WARF reference number P01419US.
- For information about a class of bisphosphines useful in hydroformylation, see WARF reference number P04447US.

Tech Fields

- Drug Discovery & Development : Compound libraries
- Materials & Chemicals : Synthesis

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854