

Asymmetric Iridium-Catalyzed Allyl–Alkene Coupling en route to Chiral 1,5-Dienes

Category

Metal-Catalyzed
Asymmetric
Synthesis and
Stereoselective
Reactions

Key words

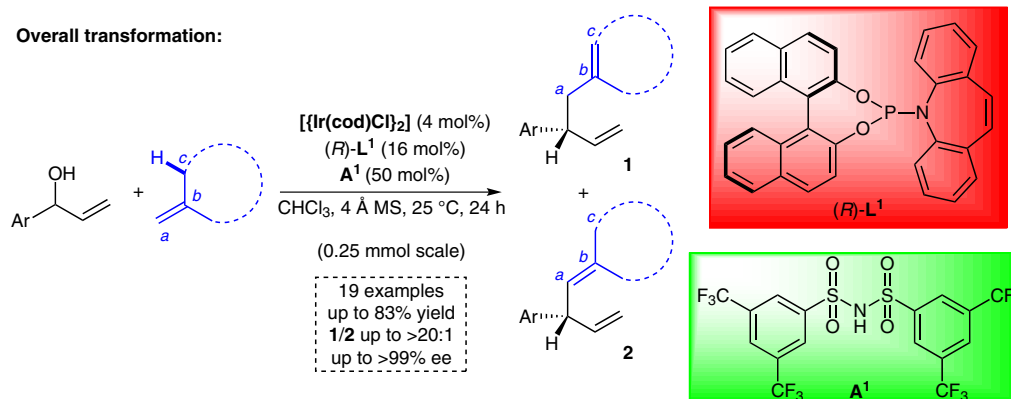
iridium

allyl–alkene
coupling

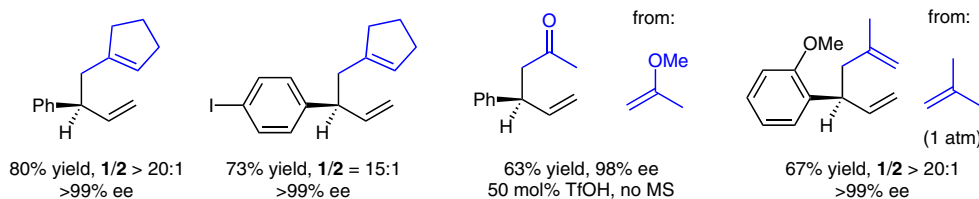
phosphoramidites

SYNFACT
of the month

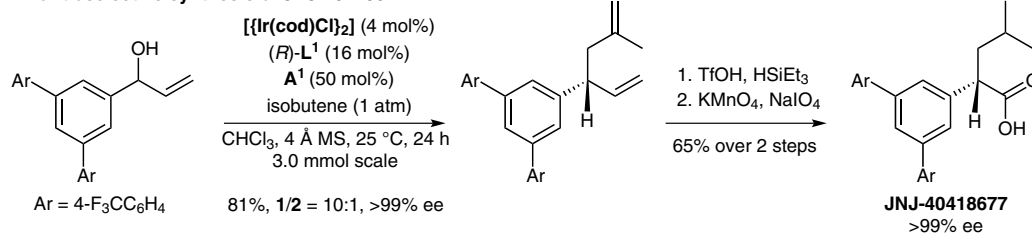
Overall transformation:



Selected examples:



Enantioselective synthesis of JNJ-40418677:



Significance: The enantioselective allylic alkylation serves as a reliable route to access useful enantioenriched building blocks. One particularly important variant is the asymmetric allylic allylation reaction. The rare reports of this transformation have only utilized allyl metals (or metalloids species), which lead to the production of stoichiometric waste. This report signifies an important advance in the field by coupling unactivated allylic alcohols and alkene nucleophiles with water as the only byproduct.

Comment: The authors present an efficient protocol for a highly asymmetric iridium-catalyzed allyl–alkene coupling of racemic allylic alcohols and alkenes using the chiral (P,olefin) phosphoramidite ligand $(R)\text{-L}^1$. In addition, unsymmetrical sulfonamide \mathbf{A}^1 was found to be the ideal promoter. The reaction, which resembles an ene reaction, produces chiral 1,5-dienes with high levels of asymmetric induction, and low levels of product olefin isomerization. The utility of this reaction was exhibited by the application to a concise synthesis of JNJ-40418677.