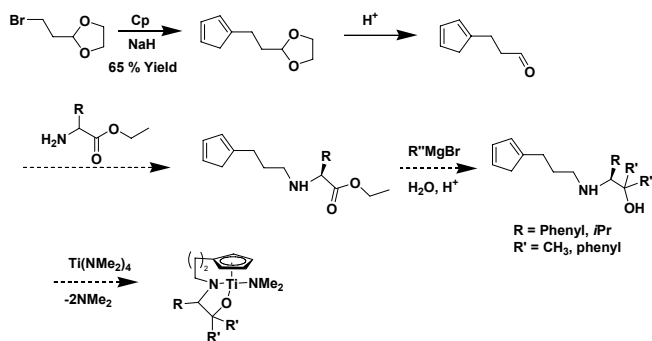
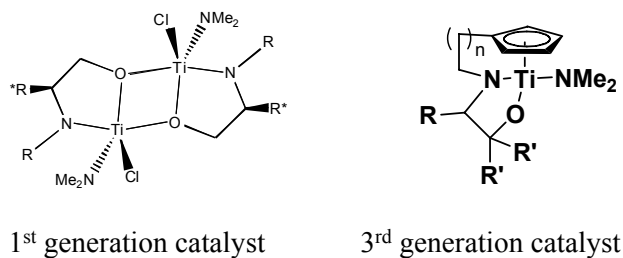


Synthesis of a Third Generation Tethered Ligand

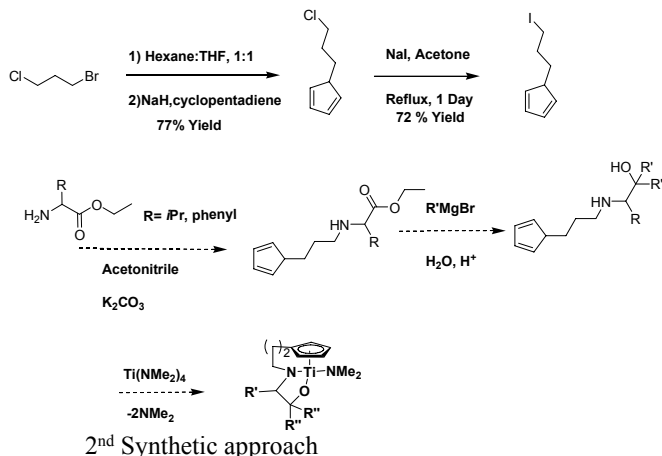
Andrew Stewart and Adam Johnson

Background. The Johnson lab works to prepare enantioselective titanium catalysts for use in hydroamination reactions. Previous catalysts have been dimeric and poorly enantioselective.

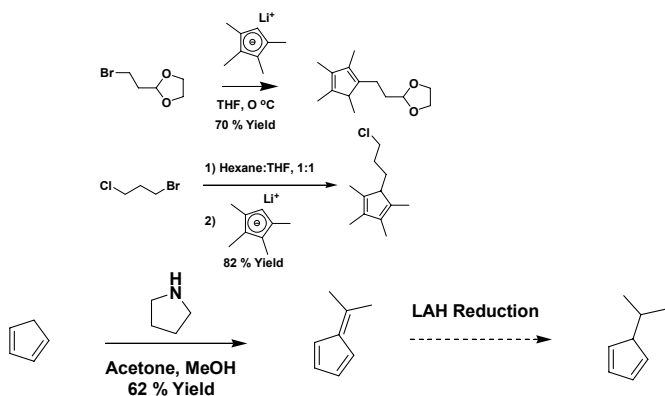
Approach. A third generation tethered ligand offers possibilities of a more enantioselective catalyst due to the rigid backbone of a tridentate ligand as well as the steric bulk of the ligand. This will then allow one conformation of the imido intermediate with the metal center. Several approaches have been taken to preparing this catalyst. Substituted cyclopentadienes are being investigated because in previous studies, increased steric bulk increases enantioselectivity. Also, this would potentially close off the option of the catalyst dimerizing with itself through the cyclopentadiene ring.



First synthetic approach for creating the third generation catalyst



2nd Synthetic approach



Cyclopentadiene derivatives that will be used in both synthetic approaches.

Results. Quantified yields are enumerated within the reaction schemes attempted. Unfortunately, with the first reaction scheme, the aldehyde yielded from the acetal was too volatile to determine yield. Successful reactions have also been performed with tetramethyl substituted cyclopentadiene with comparable yields. Isopropyl cyclopentadiene has also been synthesized to perform similar reactions.

Future Work. Work will be continued on preparing these catalysts and derivatives. Once made, X-ray crystal structures will be obtained and enantioselectivity will be tested.

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Research at Undergraduate Institutions