Synthesis of cyclic ethers via organozirconium catalysis

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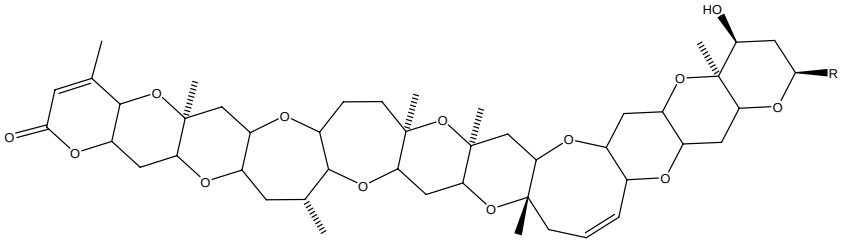
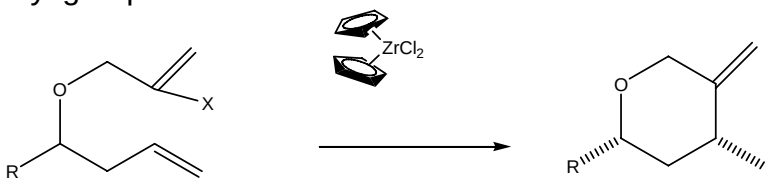
The cyclic ether is a feature that is often observed in naturally occurring compounds. These compounds often show important biological activity. An example, brevetoxin B, a cyclic polyether shown below, is a potent neurotoxin, known to bind to voltage gated sodium channels in the membranes of nerve cells. Developing new ways to synthesize the key features of these molecules is an important challenge to the organic chemist.



In this project, we will explore a new way to construct substituted cyclic ethers from acyclic dienes ethers using zirconium complexes to control the geometry of the reaction. We will synthesize dienes like (1), and allow them to react with butylmagnesium chloride, in the presence of a zirconium catalyst. Cyclization under these conditions should yield the cyclized product (2). The orientation of the alkyl group should determine the stereochemical orientation of the methyl group.



1 2

We hope to expand the scope of these reactions from to other functional groups as well. We hope examine theses issues using a variety of NMR techniques.

Students involved in this project will get experience running reactions in glassware designed to maintain an oxygen free environment, as well characterizing products using NMR and mass spectrometry. Students will be encouraged to present the results of their research at meetings of the American Chemical Society.