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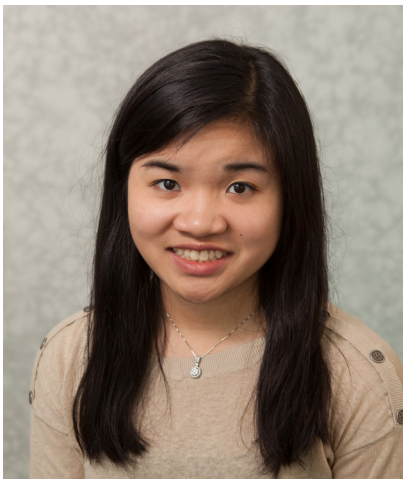

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The lack of a simple, single step synthesis of chiral silanes is an obstacle to the use of chiral silanes in the synthesis of chiral drugs or materials because there are no naturally occurring chiral, non-racemic silicon compounds. Therefore, it would be useful to find a method that provides high yields of chiral, non-racemic, silicon compounds that can be used in synthesizing chiral drugs.

Initial studies done in Sommer's et al. (1964) laboratory required a multistep synthesis for preparing chiral silicon compounds. This method had poor yields and required much time and hence hindered the use of chiral silicon compounds. Therefore, finding the development of a single-step synthesis for making chiral silanes is important and can lead to several advantages over a multistep synthesis such as it is more efficient, it is less expensive, and it would take less time to make. A previous GVSU student has shown that reaction of a pro-chiral dimenthoxyphenylmethylsilane with nucleophiles can produce a chiral silane with good selectivity for phenyl and methyl groups. In our current study, the overall goal of this project was to find a single-step synthesis that can yield a single enantiomer when the substituents are a phenyl and a vinyl group.

The starting material, dimenthoxyphenylvinylsilane was prepared from dichlorophenylvinylsilane. Dicholorophenylvinylsilane reacted with 2 equivalents of menthoxyllithium in THF solvent to produce dimenthoxyphenylvinylsilane, which was then purified by column chromatography and the product was isolated in a 72.6 % yield. The dimenthoxyphenylvinylsilane was used for the reactions in preparing chiral silicon compounds. Napthyllithium, butyllithium, methyllithium, and tert-butyllithium reacted with the dimenthoxyphenylvinylsilane to form the chiral silicon compounds. These reactions were performed under N2, in hexane solvent at -78o C except the reaction of dimenthoxyphenylvinylsilane with tert-butyllithium which was done in diethyl ether solvent. After the products were made, these compounds were purified by column chromatography, then they were analyzed with the use of NMR, GC- Mass Spectrum, and HPLC. The yields of these reactions varied from 18.4% to 72.05% and in the case of the methyllithium substitution initial results were consistent with a high selectivity for one enantiomer.

Our hypothesis for the selectivity observed in these reactions is that nucleophiles are more likely to attack the silicon at the more open-side that would lead into a higher selectivity. The crowded side of the dimenthoxyphenylvinylsilane is less likely to undergo nucleophilic substitution because steric-effect would occur and would prevent the nucleophile from attacking the electrophilic silicon atom.

We have investigated the reactions of dimenthoxyphenylvinylsilane with different organolithiums to produce a series of chiral silanes which have been isolated in moderate to good yield. Future studies of these compounds will involve further characterization of the new compounds made and substitution of the menthoxy group with hydride and bromide to form a silicon compound that can be readily used in the synthesis of chiral organic molecules.

*This scholar and faculty mentor have requested that only an abstract be published.