



Synthesis of Novel Sulfur-Based Heterocycles for Biological Activity Testing

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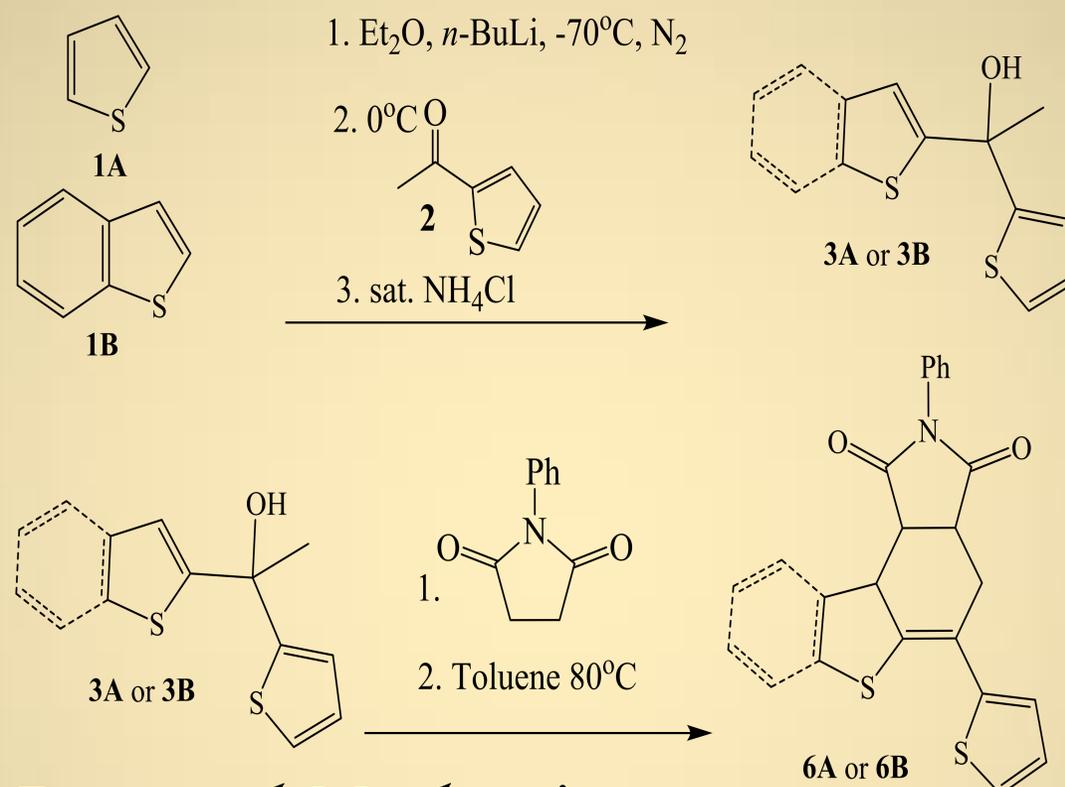
Introduction

- The purpose of this study is to characterize two novel compounds, (**6A** or **6B**) and test them for biological activity.
- Thiophene (**1A**) and benzothiophene (**1B**) are the key starting materials in this reaction. They have been the focus of Dr. Noland's most recent research on organic heterocyclic compounds.
- Several compounds previously made by Dr. Noland's research group have been tested by the Developmental Therapeutics Program at the National Cancer Institute and shown biological activity against viruses (HIV-1) as well as lung, skin, bone, and breast cancers.
- Submitting novel compounds for biological activity has true anonymity, the purpose of this experiment was to try to add two more sulfur-containing compounds that would show biological activity against the viruses and diseases listed above.

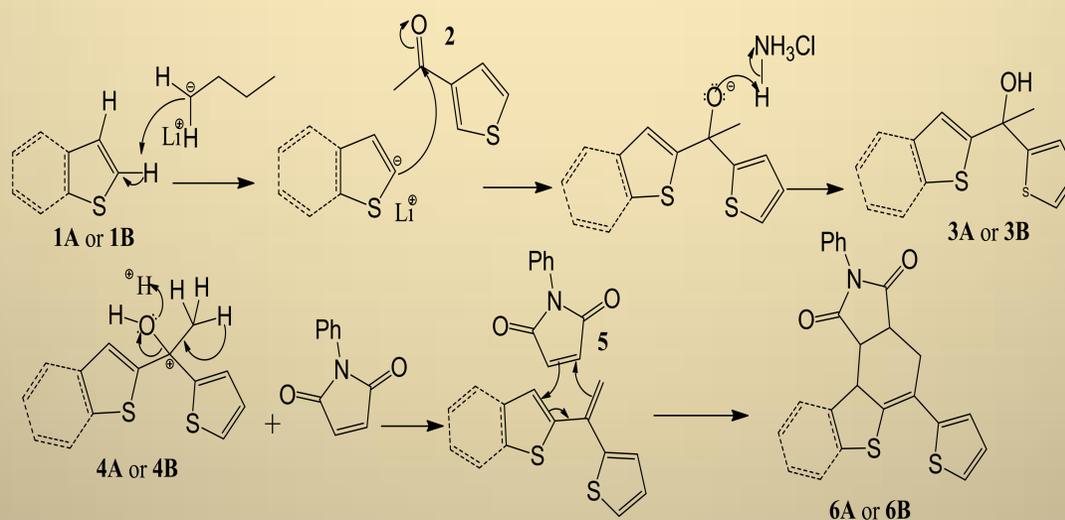
Reaction Description

- Reaction (**1A** or **1B**) to (**3A** or **3B**) is a nucleophilic addition reaction to the carbonyl carbon of 2-acetylthiophene (**2**).
- The Diels-Alder reaction, shown in proposed mechanism (**3A** or **3B**) to (**6A** or **6B**), is used to make six-membered rings. This reaction was used in a single step by trapping the olefin compound (**4A** or **4B**).

Synthesis



Proposed Mechanisms



Research Applications

- This research has helped complement other reactions using thiophene and benzothiophene by furthering our understanding of these types of heterocyclic compounds.
- Dr. Noland's lab continues to work on these compounds trying different ketone groups to add to thiophene and benzothiophene.

Conclusions

- One novel compound has been successfully characterized (**3B**).
- Compounds (**6A**) and (**6B**) have been made, but are not yet fully purified and characterized.
- All compounds have been made, 1 out of the 3 novel compounds is characterized.
- After (**6A**) and (**6B**) have been fully characterized, they will be submitted and tested for biological activity.
- The new method of trapping the olefin compound (**4A** or **4B**) to complete a Diels-Alder reaction in one step is a new technique for Dr. Noland's research.

Acknowledgments

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