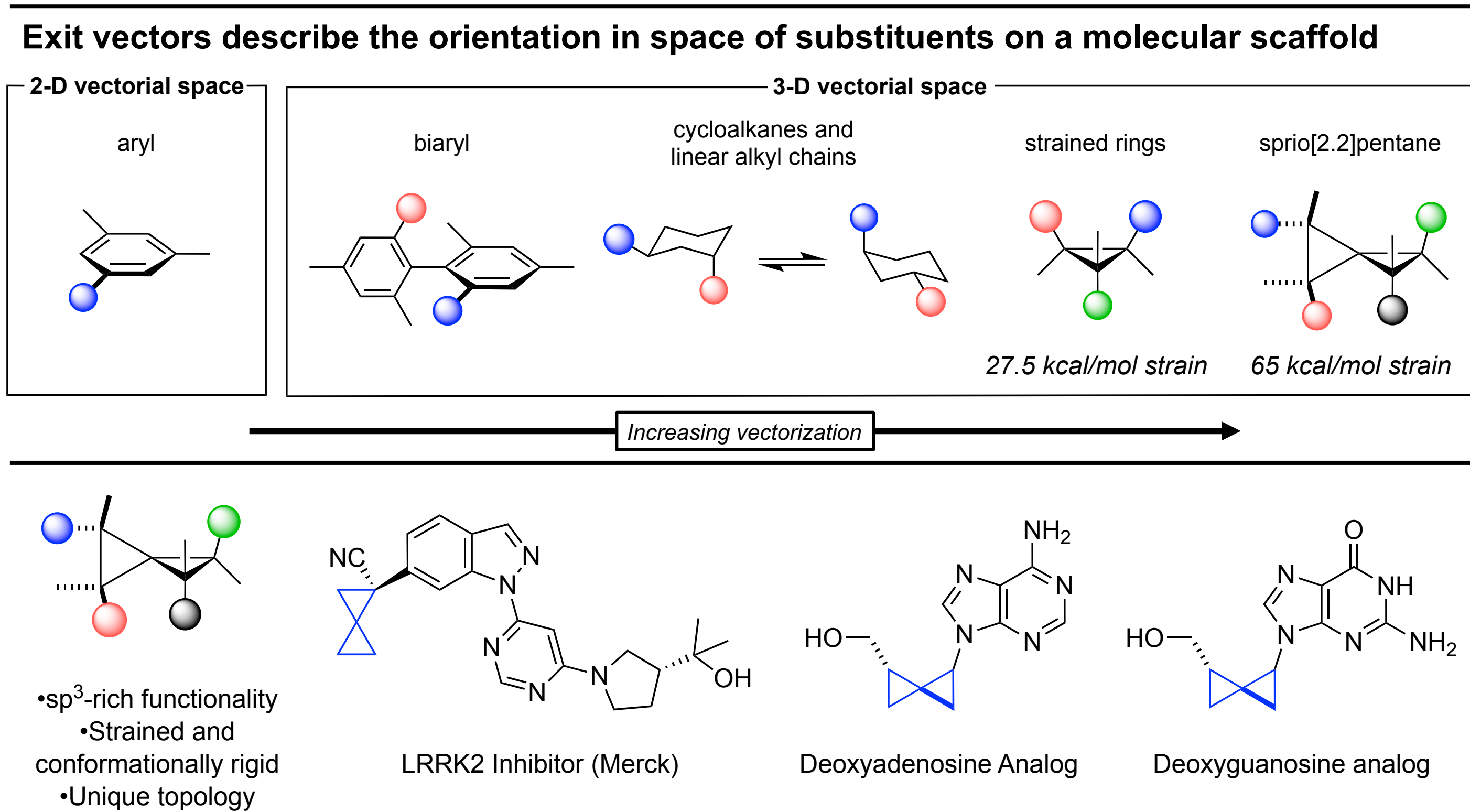


# Efficient Synthesis of Aryl Spiro[2.2]pentanes and Vinylcyclopropanes using Dialkyl Sulfone Reagents as Carbene Equivalents

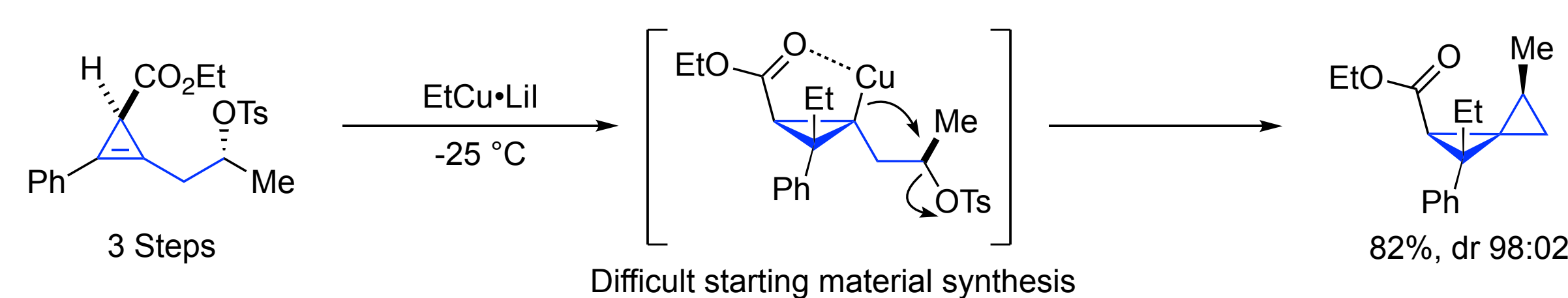
Department of Chemistry, University of North Carolina, Chapel Hill  
 Charles R. Teeples, J. Cabell Metts, Prof. Sidney M. Wilkerson-Hill

## Importance of Spiro[2.2]pentanes

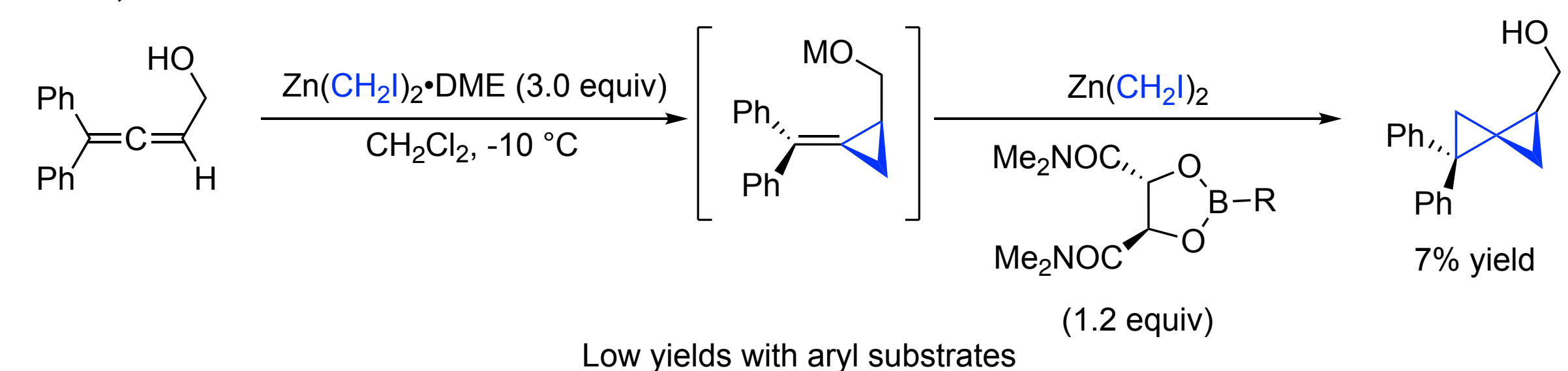


## Prior Art in the Synthesis of Aryl Spiropentanes

Marek, 2022

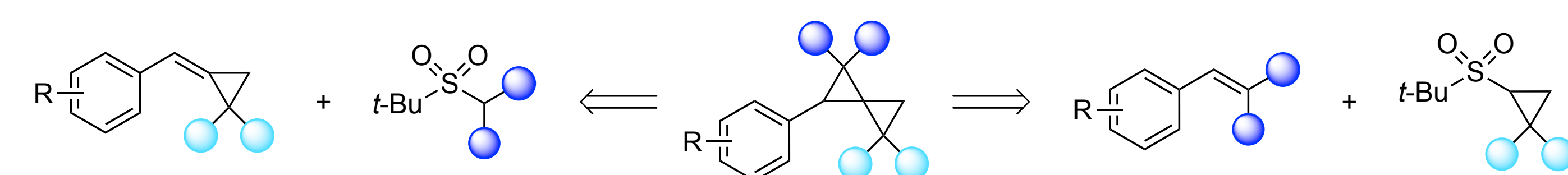


Charette, 2001

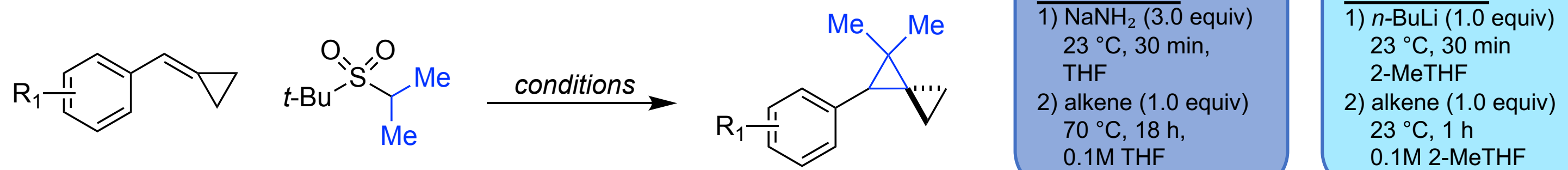


## Accessing Spiro[2.2]pentanes With Dialkyl Sulfone Reagents

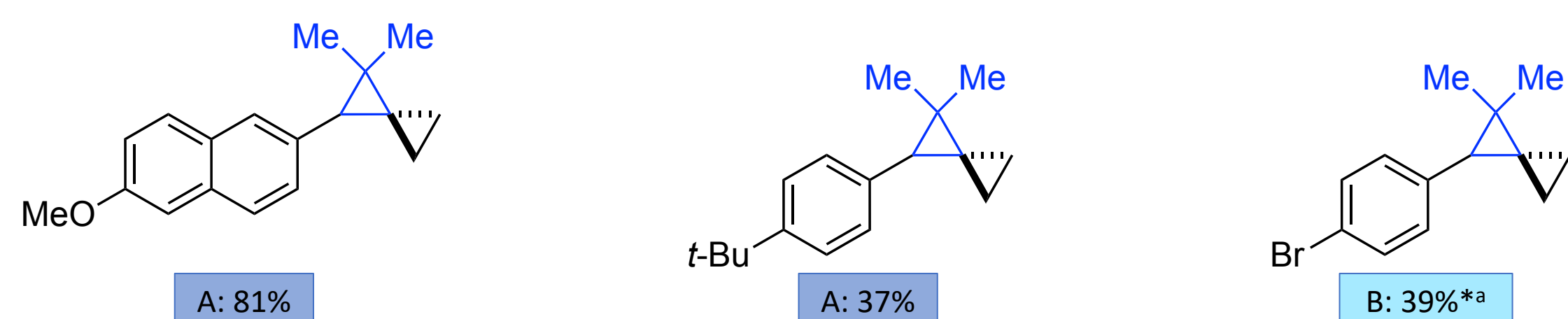
### Two Hypothesized Disconnections to Form Aryl Spiropentanes



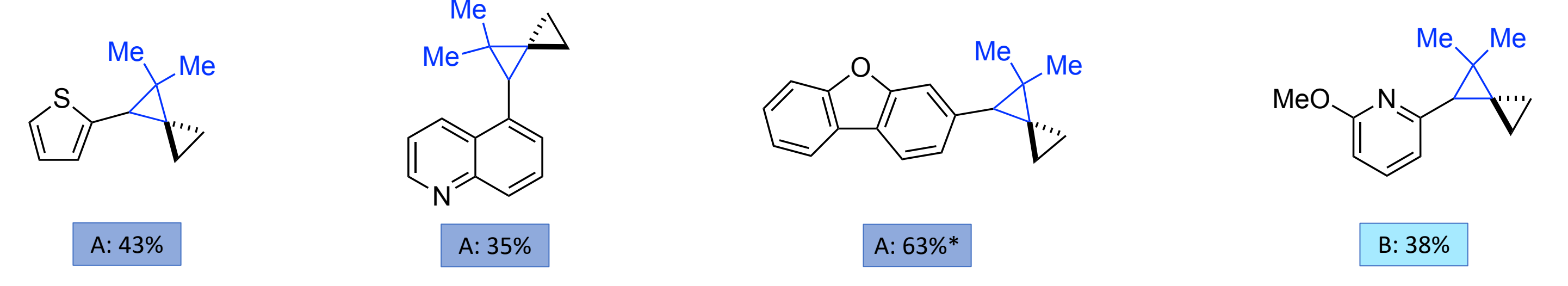
### Spiropentanes from Methylene-cyclopropane Disconnection



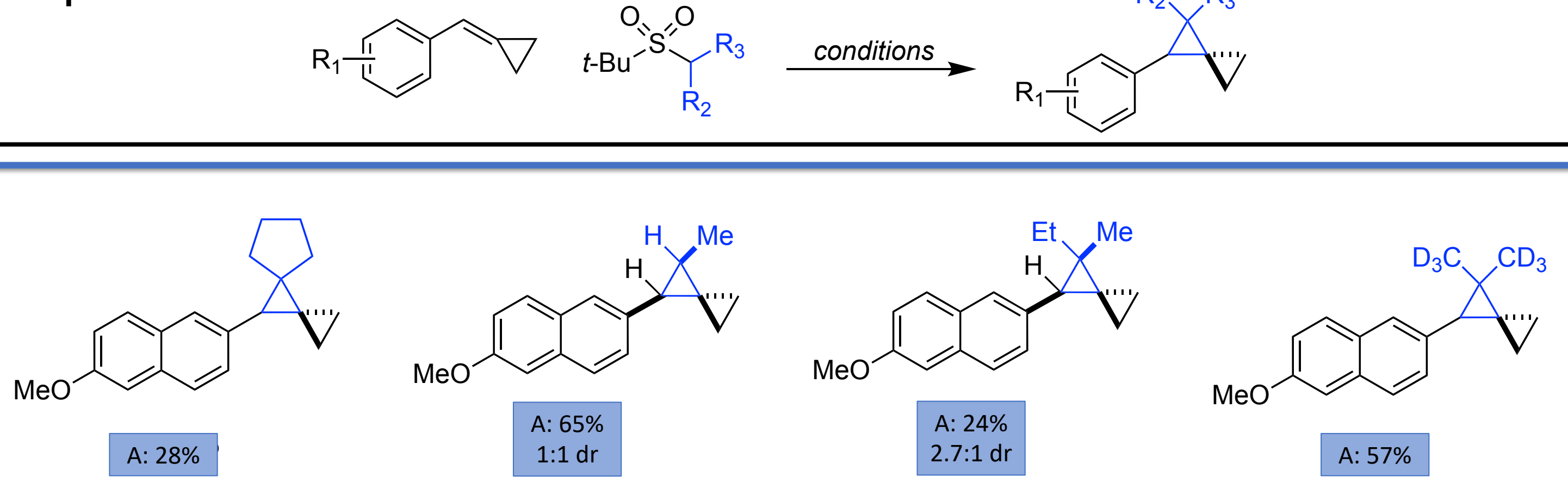
### Arenes



### Heteroarenes



### Scope of Sulfones:

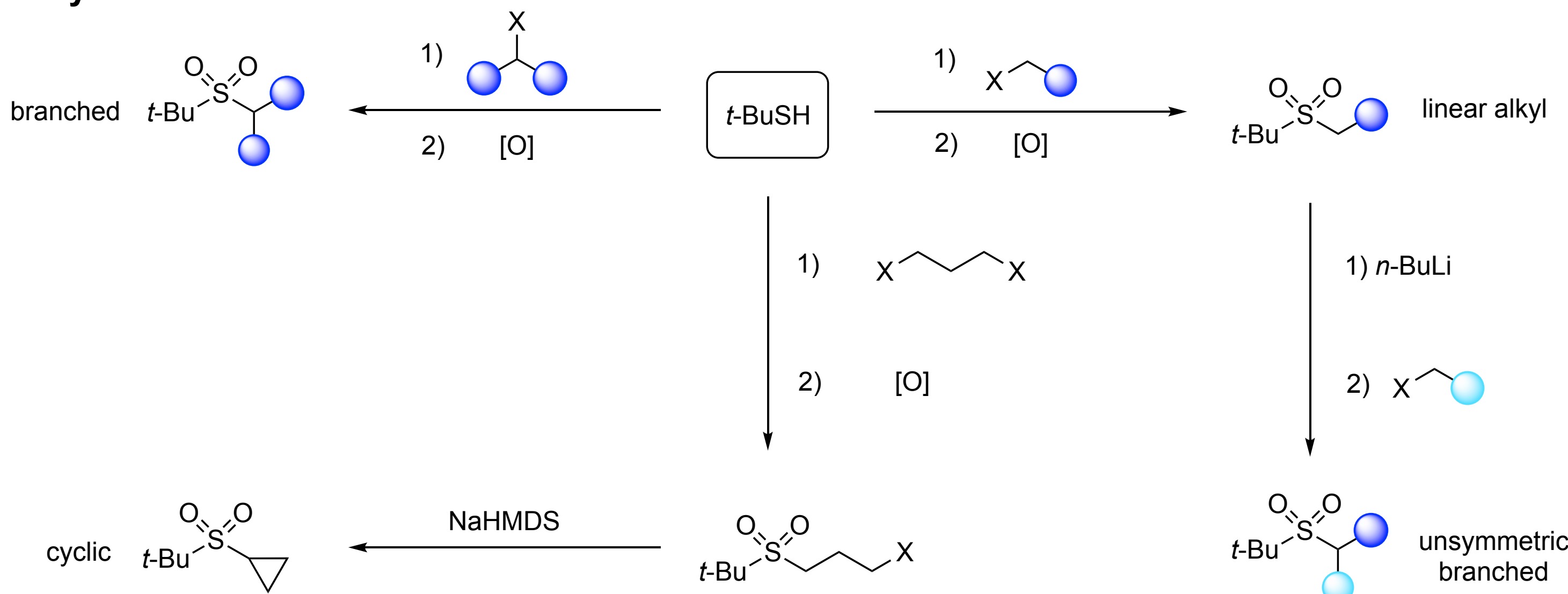


\*Yields obtained from <sup>1</sup>H NMR using 1,3,5-trimethylbenzene as internal standard

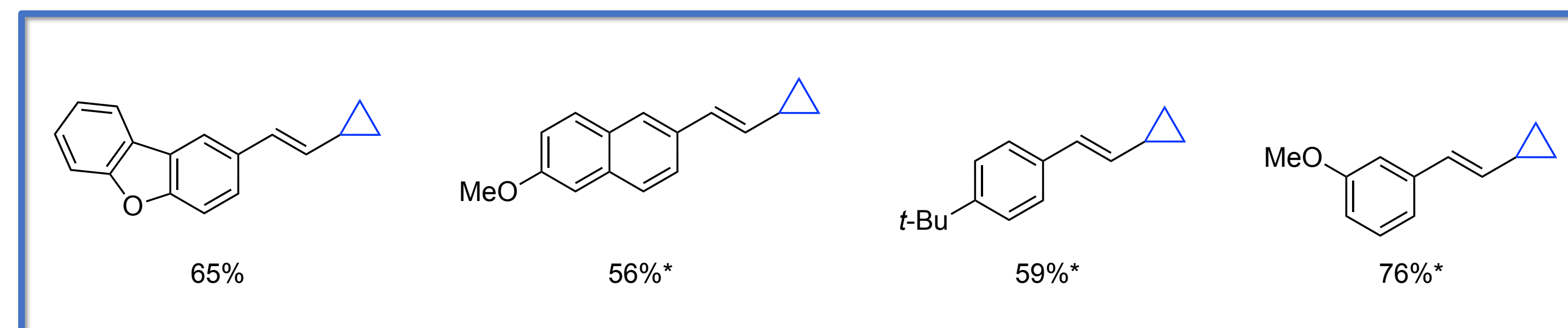
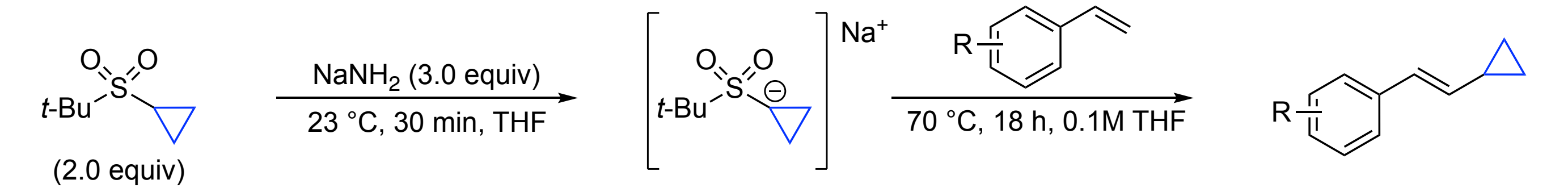
\*1.2 equiv of sulfone used with 1.2 equiv NaHMDS as base

## Synthesis and Modularity of Sulfones

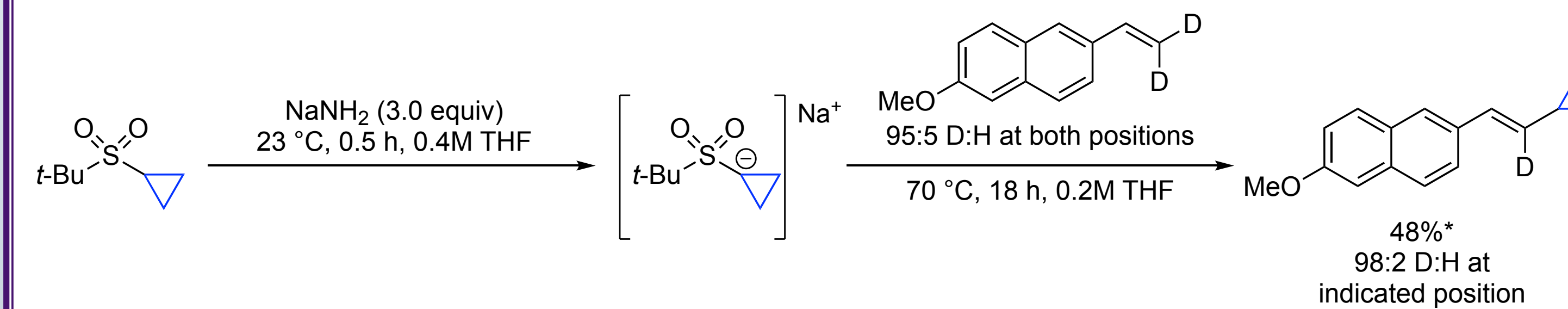
### Syntheses to Access Various Bench-Stable Sulfones



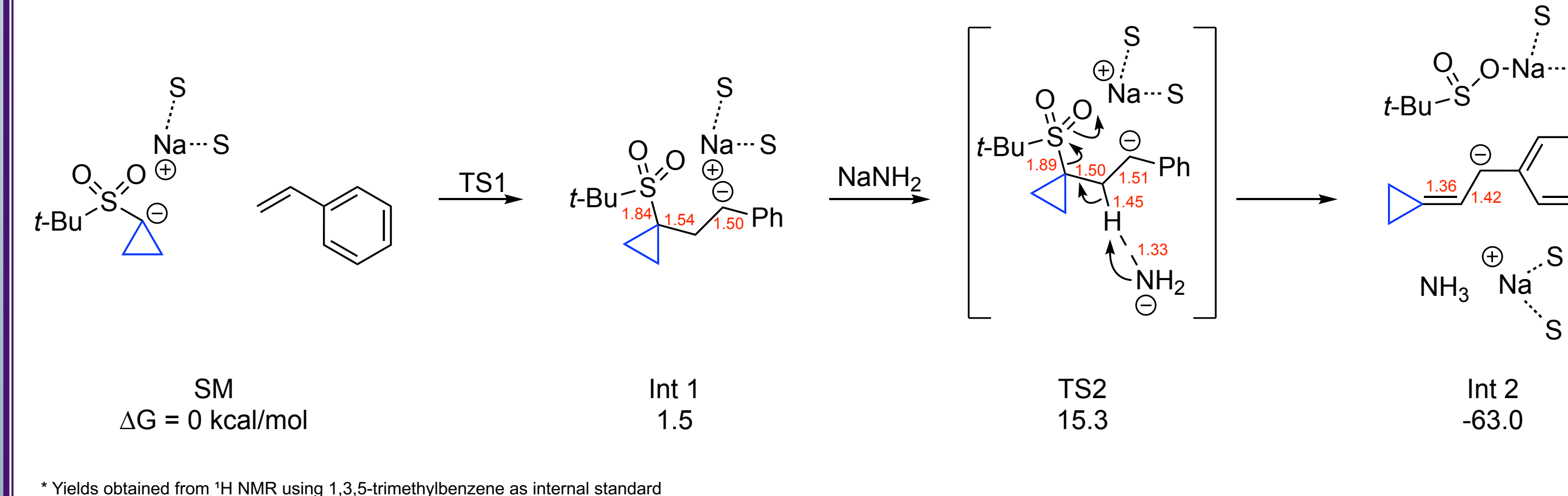
## Synthesis of Vinylcyclopropanes From Cyclopropyl Sulfones



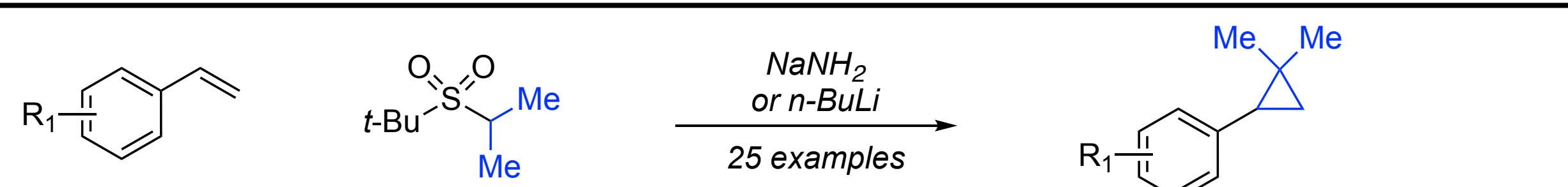
### Deuterium Labelling Experiment for the Synthesis of Vinylcyclopropanes



### Computational Studies Done in Collaboration with Prof. Dean J. Tantillo at UC Davis

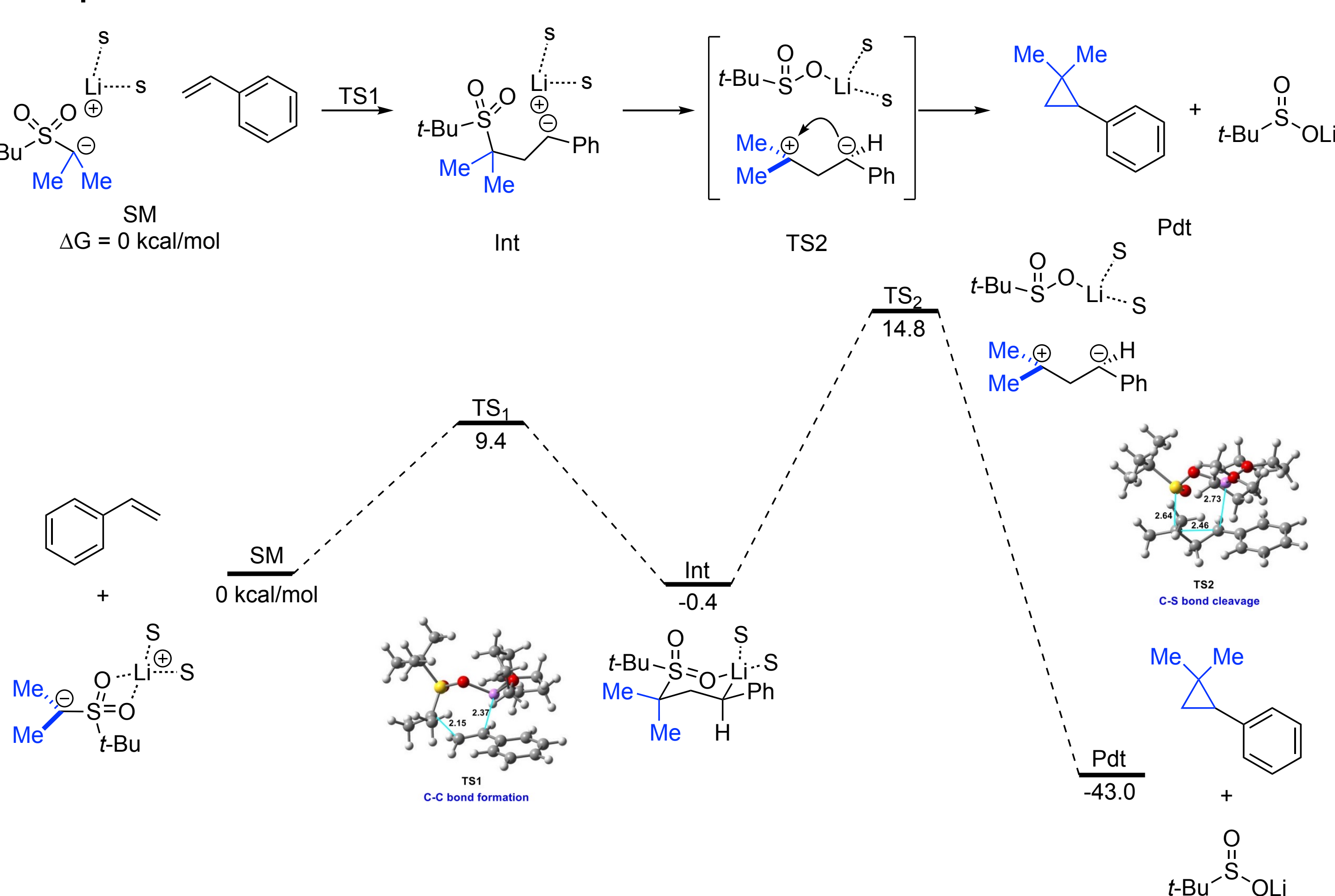


## Sulfones Used to Enable Cyclopropanation



Johnson, J. D.; Teeples, C. R.; Akkawi, N. R.; Wilkerson-Hill, S. M. *J. Am. Chem. Soc.* 2022, 144, 32, 14471–14476.

### Computational Studies Done in Collaboration with Prof. Dean J. Tantillo at UC Davis



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### Members

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 Emily Arnold (G1)  
 Tim Lewis (G1)  
 Liam Murphy (G1)  
**Cabell Metts (UG)**



Wilkerson-Hill  
 Group Website



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