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# BARANY THESPIANS 2005 EDITION: ORGANIC CHEMISTRY SKIT

Skit Production by the Barany Thespians of Professor Barany's  
Fall 2005 Chemistry 2301 Class

**The Cast:**

Jen Tarpinian  
Allison Jonjak  
Amber Corinne Rancourt  
Erin Renier  
Jordan Tyler Hart  
Jesse Thompson  
Mary Elizabeth Larson  
Christina Cowman  
Nicole Sullivan  
Siyao Gu

**Camera Man:**

Bradley Paul Weegman

**Special Thanks to:**

Mastermind- Professor Barany  
Dance Consultant- Jan Morse  
Fearless Leader- Jesse Thompson

**The Music:**

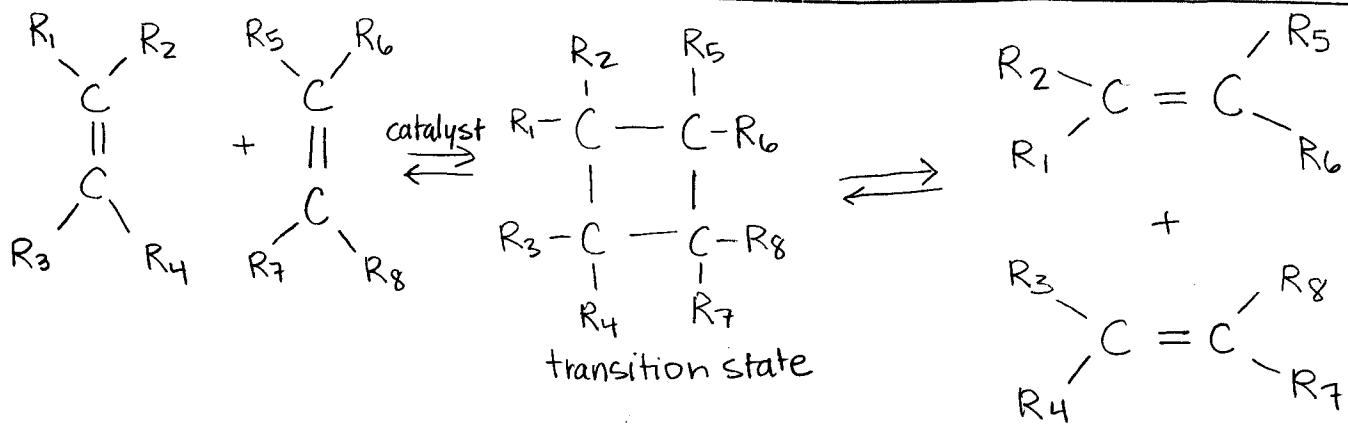
"Sing, Sing, Sing"- Benny Goodman, 1937  
"In the Mood"- Glen Miller, 1940  
"One O'clock Jump"- Count Basic, 1932  
"Woodchopper's Ball"- Woody Herman, 1939  
"Boogie Woogie Bugle Boy"- The Andrews Sisters, 1944  
"Ostrich Walk"- Original Dixieland Jazz Band, 1918  
"St. Louis Blues"- W.C. Handy, 1921  
"Big Butter and Egg Man"- Louis Armstrong, 1925

Compiled by:

*Erin Renier & Allison Jonjak*

**1. Basic Metathesis** ("Change your partner's dance")

The 2005 Nobel Prize discovered by Chauvin, Schrock, and Grubbs. This is a reversible process in which the product alkenes can be either cis or trans.



**2. Ring Forming Metathesis (Ring Closing Metathesis)**

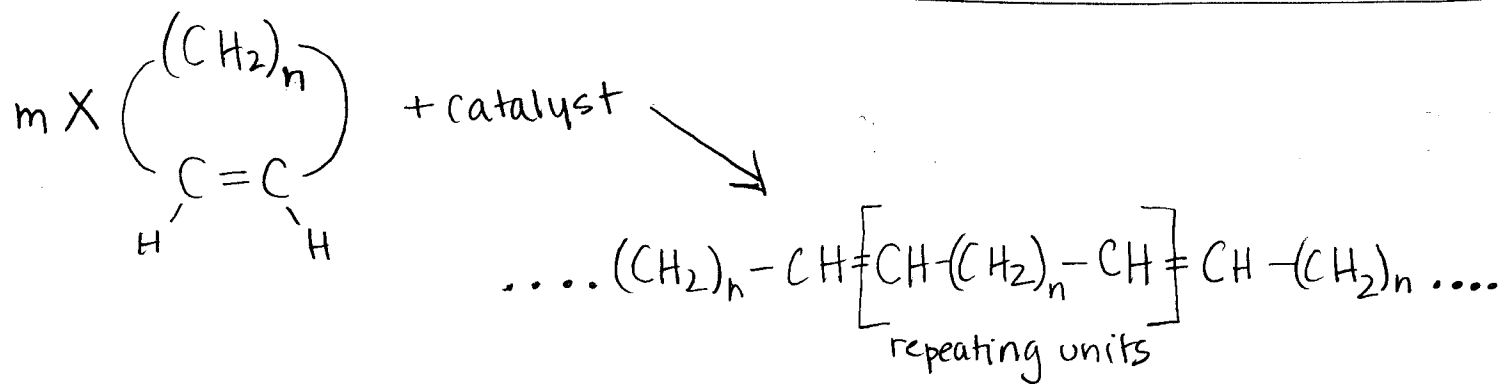
This is an entropy-driven reaction. The double bond is likely to be cis. The leaving alkene is driven away so the reaction is not reversible.

The ring has  $\geq 5$  carbons.



**3. ROMP (Ring Opening Metathesis Polymerization)**

Forces open the double bonds of the ring and the alkene, and then new double bonds form between the ends of the former ring and the former alkene. This reaction occurs multiple times forming a long chain.

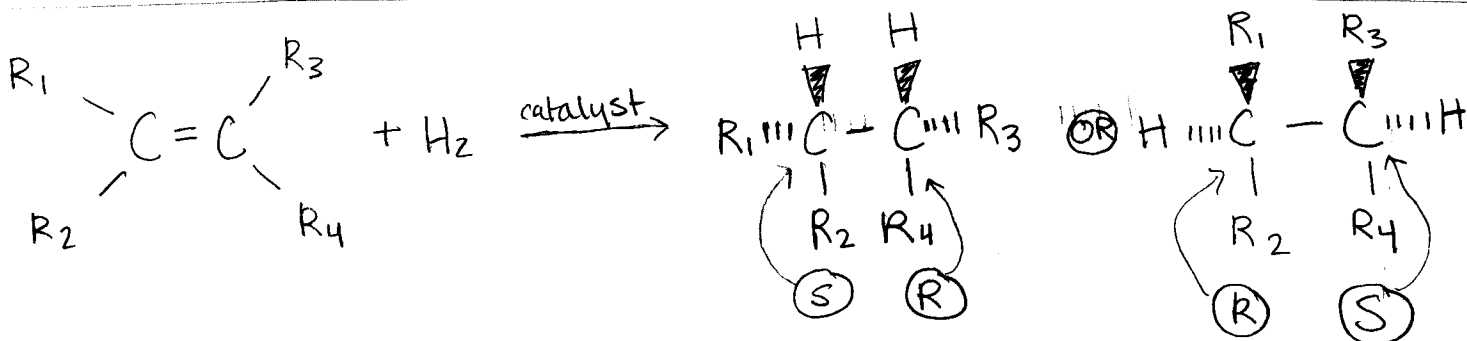


#### 4. Syn Addition

The hydrogens come in on the same side, saturating the alkene.

A 50:50 racemic mixture is formed

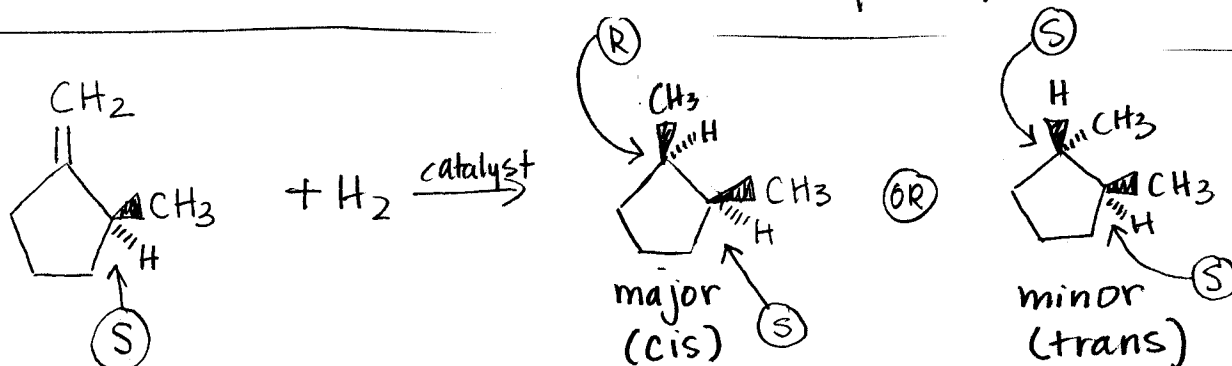
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#### 5. Asymmetric Induction

The hydrogen prefers to come in from the less crowded side. Thus, the products (which are diastereomers) are not formed in equal amounts.

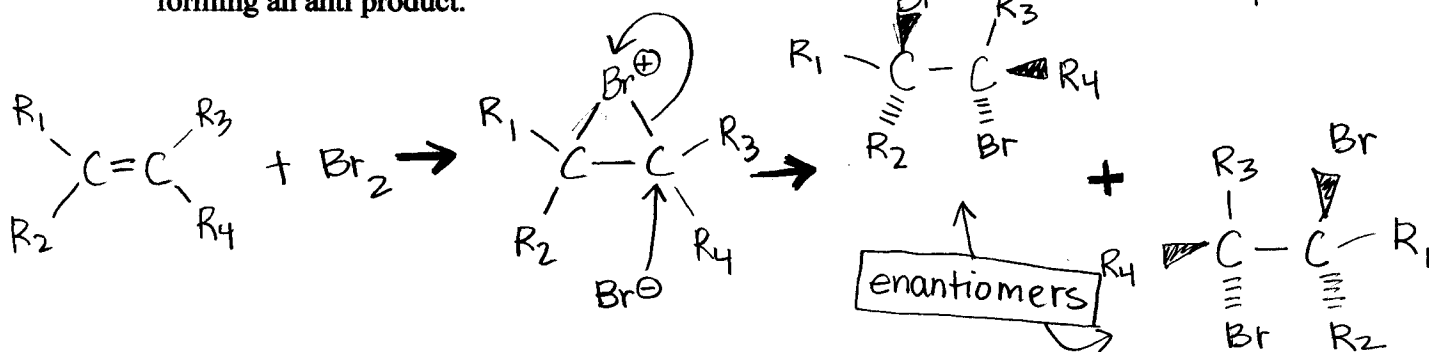
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#### 6. Anti Addition of Bromine

Bromine adds to a double bond so that a three-membered bromonium ion ring transition state forms. Then the second bromine attaches from the back, breaking the ring and forming an anti product.

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The converse E2-like debromination with Zn which restores the original stereochemistry was also shown.

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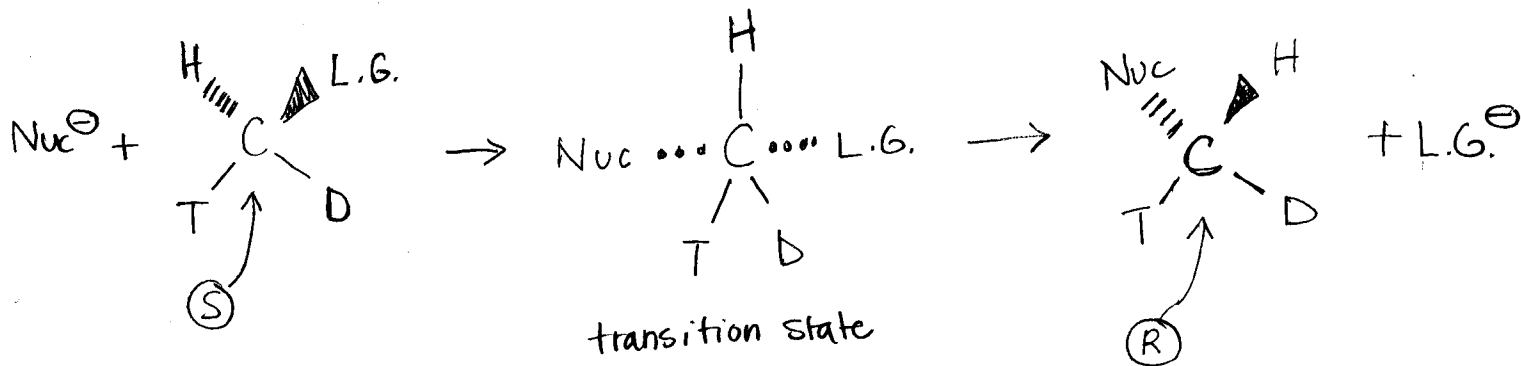
### 7. SN2 (Second Order Nucleophilic Substitution) (Nucleophilic Displacement)

When a nucleophile's attraction to a substrate is stronger than the attraction of the leaving group to the substrate, a concerted reaction occurs in which the leaving group leaves at the same time as the nucleophile back side attacks, inverting the substituents. The rate of the reaction depends on both the concentration of the substrate and of the nucleophile.

\*\*\*Not Hindered primary > secondary.

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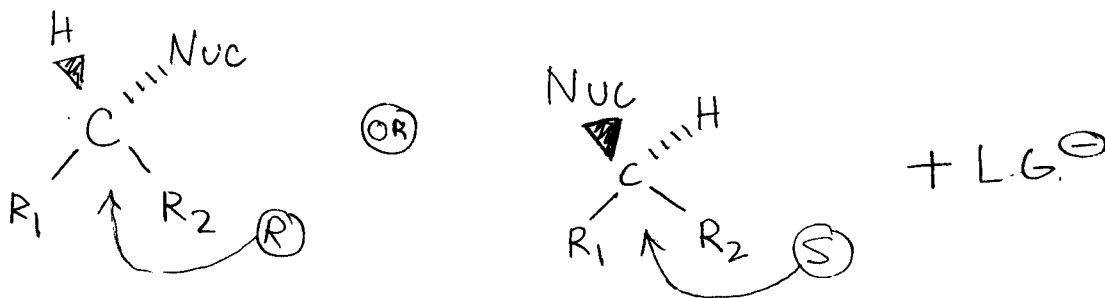
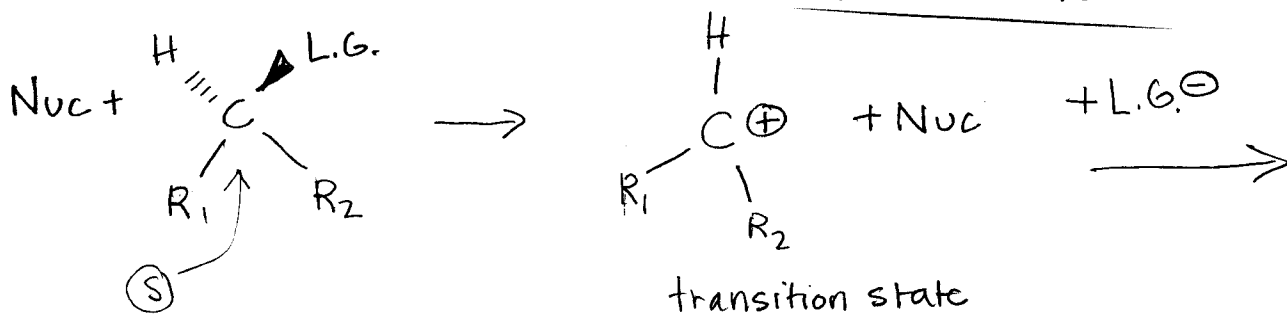
L.G. = leaving group  
Nuc. = Nucleophile



### 8. SN1 (First Order Nucleophilic Substitution)

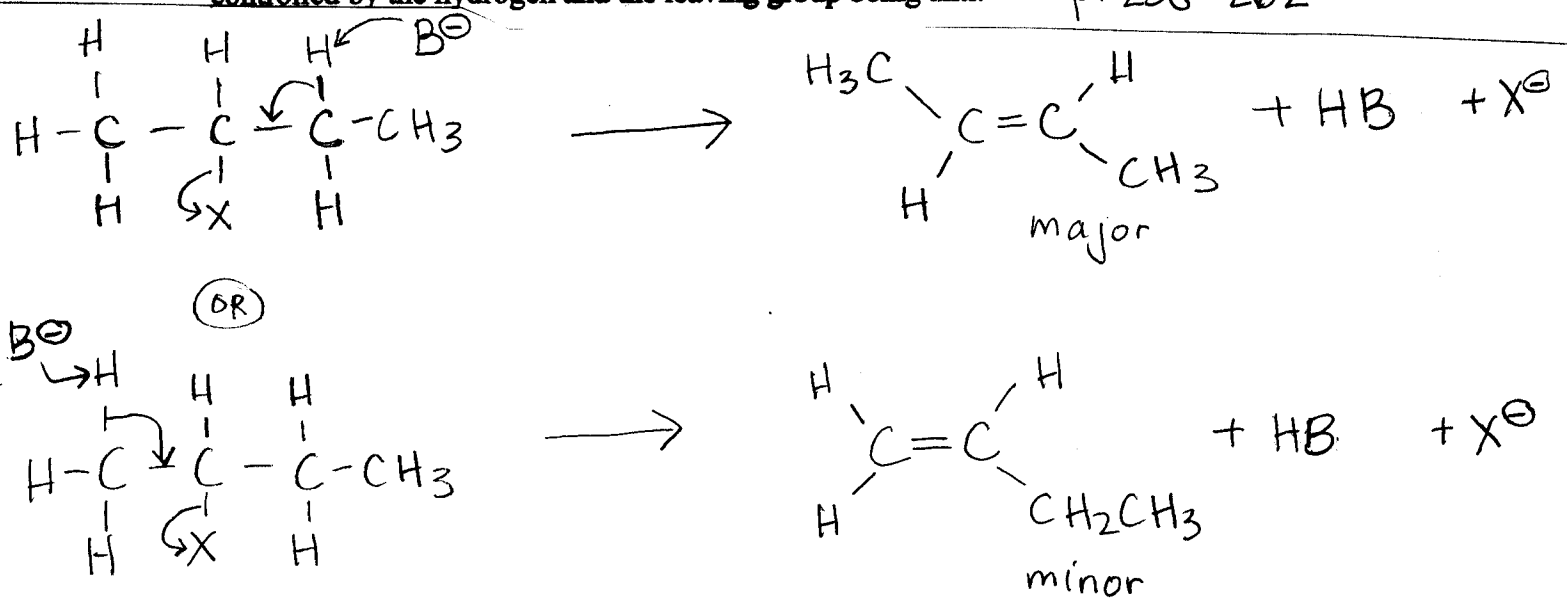
When the nucleophile is too weak to force a reaction itself, it waits until the leaving group leaves on its own (under the proper solvent or temperature conditions), creating a carbocation (sp<sup>2</sup> planar trigonal). A very fast reaction then results when the nucleophile bonds to the molecule from either side (either displaying inversion or retention) creating a 50:50 racemic mixture. \*\*\*primary << secondary < tertiary due to the stability of the carbocation. The rate only depends on the substrate's concentration (the reaction is first order)

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**9. E2 Second Order Elimination**

When a strong Nucleophile comes in contact with a hindered substrate, and the carbon cannot be reached, the nucleophile then acts as a base from the backside, taking a proton from a beta carbon. At the instant this happens, a double bond forms between the alpha carbon and beta carbon and the leaving group leaves to bond with the base. This is a concerted, second order reaction. The final stereochemistry of the alkene (cis or trans) is controlled by the hydrogen and the leaving group being anti. p. 258-262



**10. E1 (First Order Elimination) (not shown in the movie)**

When the nucleophile is weak and the substrate is hindered, the leaving group leaves, forming a carbocation in which tertiary > secondary > primary. When there is a carbocation the nucleophile acts as a base, taking a proton from the beta carbon, resulting in the formation of a double bond. Regiochemistry is a factor here. Like E2, there are cis and trans formations. Rearrangements can occur but they have not yet been taught. p. 252-258

