Final Exam - Tuesday May 15 2:45 pm

Rooms A-H 1361 Chemistry
I-Z 1351 Chemistry

Review Session Wed 5-6 pm 1351 Chemistry

Recall from last lecture

\[ \text{H-Br} \rightarrow \text{D-Br} \]

(denoteded)

\[ \begin{array}{c}
\text{\text{[A]} 1} \\
\text{3}
\end{array} \]

We call B the thermodynamic product. Why? Eyring's rule states that an internal alkene is more stable than an external alkene.

The kinetic product is the one formed fastest (having the lower activation energy).

Note: Mistake made in last lecture's web notes.

\[ \text{[C] = [C]} \text{ actually should be written} \]

\[ \text{[C] = [C]} \text{ Resonance, Not an equilibrium.} \]
Thinking about the allylic cation intermediate:

\[ \text{A} \quad \text{B} \]

which is favored? A, B or are they equal?

Experiment done

\[ D-\text{Br} \quad \rightarrow \quad D^{+} \]

this is favored product, using a "proximity" rationale.

Be sure to know the difference between thermodynamic and kinetic products.
New Reaction: **DIELS-ALDER reaction**

Involves reaction between

a "DIENE" and a "DIENOPHILE"

\[
\begin{array}{c}
\text{(Diene)} \\
\text{+} \\
\text{(Dienophile)}
\end{array}
\xrightarrow{4+2} \text{Cycleaddition}
\]

Note: using 3 \( \pi \) bonds to make 2 new C-C \( \sigma \) bonds and one new C-C \( \pi \) bond.

This is a **concerted** process. There are no intermediates.
This reaction \( \square + \square \rightarrow \square \) is actually quite slow. Usually needs high temperatures.

Factors that facilitate the Diels Alder reaction:
- Add electron-donating groups to one reagent and electron-withdrawing groups to another reagent,
- i.e., Dienols with electron donating groups

\( \text{or} \) \( \text{oct-1-en-3-one} \)

Also, Dienophiles with electron withdrawing groups:

\( \text{oct-1-en-3-one} \) or \( \text{oct-2-en-1-one} \)

\((\text{Lewis - acid catalysis})\)
Characteristics of Diels-Alder Reaction.

1) Stereospecific Syn Addition

- What does this mean?

\[ \text{(cis double bond)} \]

Both enantiomers are formed.

Notice that if substituents are on the same side in the dienophile, they end up on the same side in the product (and vice versa).

2) Diene only reacts when in s-cis conformation

s-cis \[ \rightarrow \] s-trans

s-cis \[ \text{reactive} \]

s-trans \[ \text{unreactive} \]
Think about reaction between

another way to draw this product is

will continue this in next class.