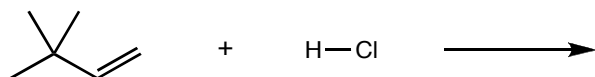


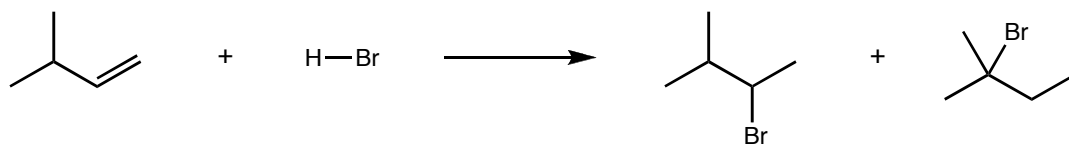
Carbocations Do Funky Things

- Predict the product of the following reaction:



- What is the *actual* product of the reaction? What happened?

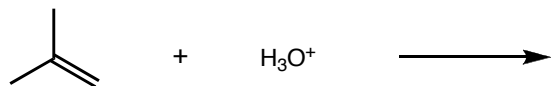
- Here's another example. What's going on here?



Reading: Section 4.7

More Reactions of Alkenes

- Can you *predict* the product of the following reaction?

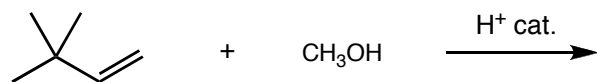


- What's really going on here? Why would this reaction be described as “the acid-catalyzed addition of water to an alkene”? How would we ordinarily write this reaction?
- What is meant by “acid-catalyzed”?

Reading: Section 4.9

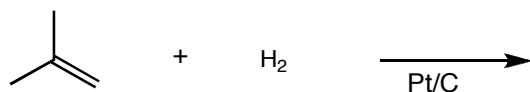
Still More Reactions of Alkenes

- You try this one: Can you predict the product of the following reaction?



Wow, There Are Lots of Reactions of Alkenes

- Consider the following reaction:



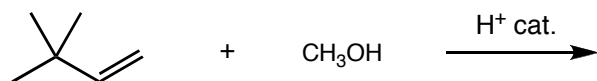
- Is there any way you could have predicted the product of this reaction? Does this reaction even make sense?
- How does this reaction take place? What is the *mechanism* of this reaction?

Reading: Section 4.9

How Can I Possibly Learn All of These Reactions?

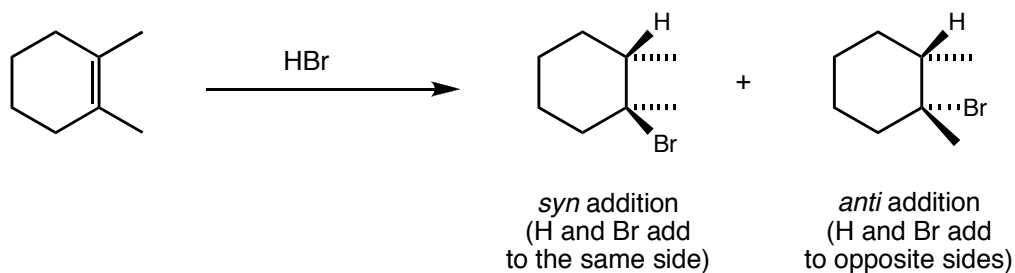
Test Yourself Now!

- Can you write a curved-arrow mechanism and predict the product of the following reaction?



Stereochemistry of Alkene Additions

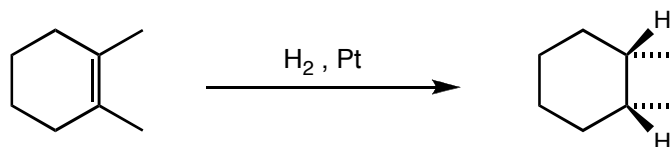
- Consider adding HBr to a *cyclic* alkene, like the one shown below. The two new groups that are added (H and Br) could be added in two different ways: *syn* (both added to the same face of the alkene) or *anti* (added to opposite faces of the alkene):



(Recall that we used the term *stereoisomers* before to refer to *cis* and *trans* alkenes.)

- Work through the mechanism of HBr addition. Which is preferred: *syn* or *anti*?

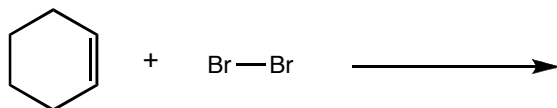
- The addition of H₂ to the same cyclic alkene gives *only one* product. What type of addition is this, and why is only one product observed?



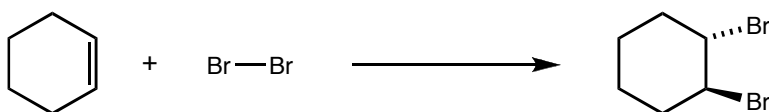
Reading: Section 7.9

Addition of Br₂ or Cl₂ to Alkenes

- First, let's *predict* what we expect to happen when an alkene reacts with Br₂. How do we make such a prediction?



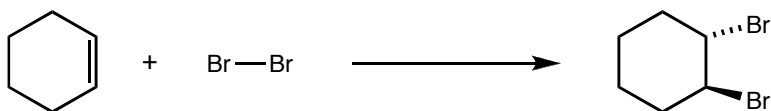
- What would your proposed mechanism predict about the *stereochemistry* of the outcome?
- The actual outcome of the reaction is shown below. What type of addition is this? Is this stereochemical outcome consistent with your proposed mechanism?



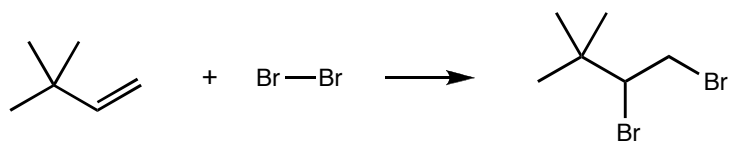
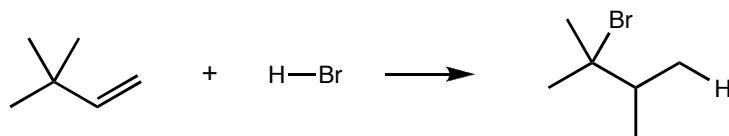
Reading: Section 5.1

The Mechanism of Br₂ or Cl₂ Addition

- Is there a mechanism of Br₂ addition that is consistent with the observed stereochemistry?



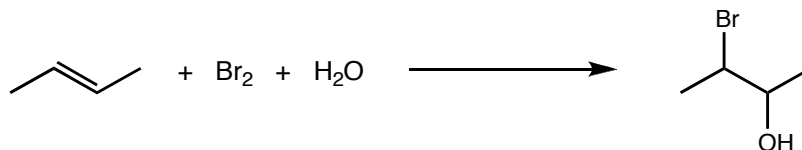
- Consider the following alkene additions. Rearrangement is observed in one case but not in the other. Can you explain why?



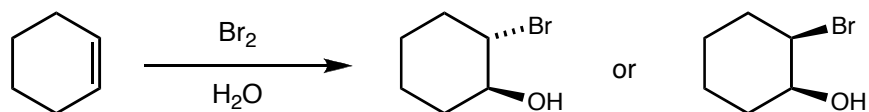
Reading: Section 5.1

Addition of X_2 with Water or Alcohols

- If Br_2 or Cl_2 is added to an alkene in the presence of water (HOH) or an alcohol (ROH), a different product is formed. Can you propose a mechanism for this reaction?



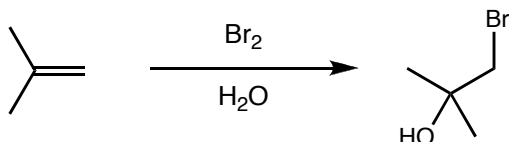
- Now that you've seen the mechanism, can you predict which of the following products will be produced in the reaction of cyclohexene with bromine in water?



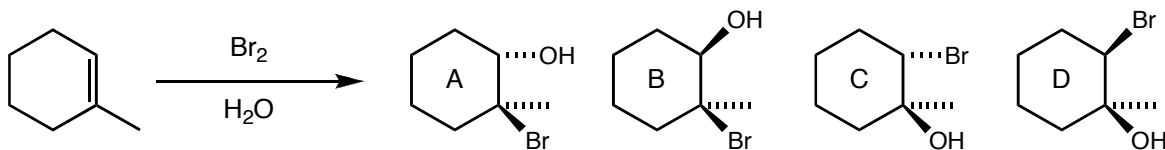
Reading: Section 5.1

The Structure of the Bromonium Ion

- Explain why *only one product* is observed in the following reaction:



- Is this observation consistent with Markovnikov's Rule? Why or why not?
- Given all that you know about the addition of Br_2 to alkenes, *predict* which of the four products shown below would be the main product observed in the addition of bromine to 1-methylcyclohexene in the presence of water:



Reading: Section 5.1