



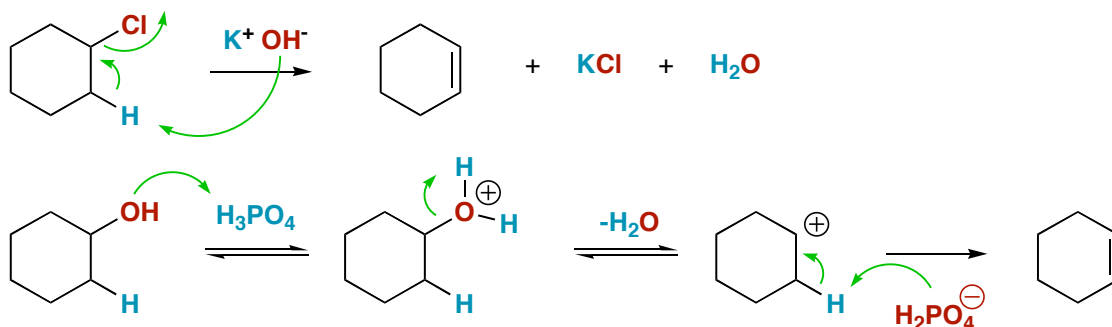
# Chem 341 • Organic Chemistry I

Lecture Summary 18 • October 05, 2007

## Chapter 7 - Alkenes: Reactions and Synthesis

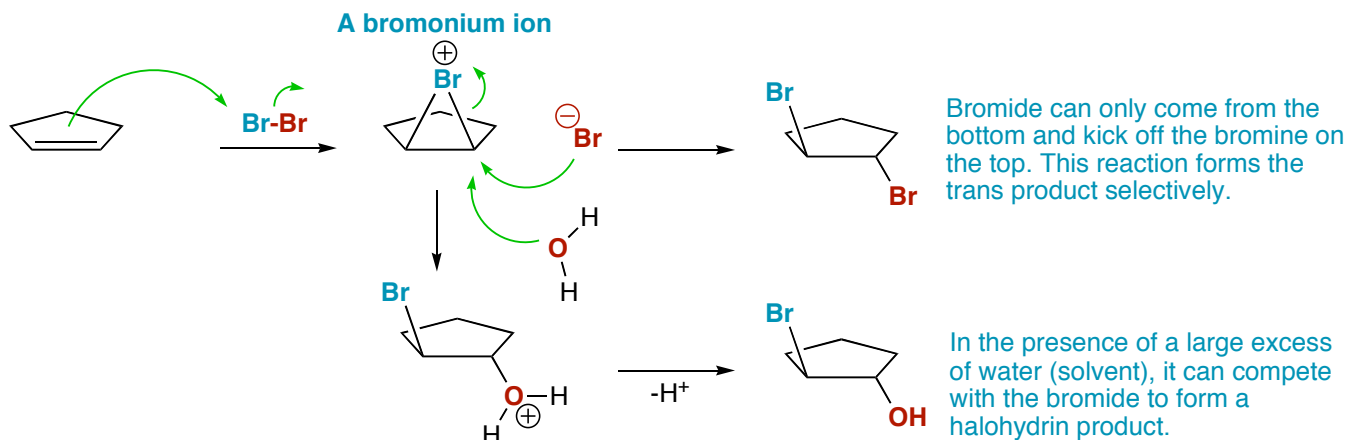
### Preparation of Alkenes

Alkenes are most commonly prepared by elimination reactions. Note that these are the opposite of additions reactions. For example, a halogenated alkane will undergo a dehydrohalogenation reaction in the presence of a good base. Alcohols, in the presence of a strong acid, will also undergo a stepwise elimination of water (dehydration) to produce an alkene.

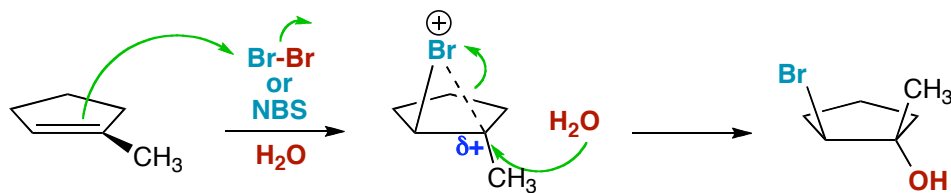


### Electrophilic Addition of $X_2$ to Alkenes

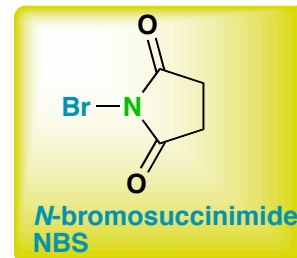
Alkenes will react with many different electrophiles. Molecular bromine, chlorine or iodine is no different. You can think of these reagents as equivalent to an  $X^+$  and an  $X^-$ . Unlike the addition of  $HX$ , the halogens have the ability to share one of their lone pairs to form a bridged halonium intermediate. This is more stable than a carbocation intermediate. The result of this is that one face of a ring is blocked, so the second halide addition step can only occur trans to the first halogen. This is called an anti addition. Other nucleophiles such as water can trap the bromonium intermediate.



When alkenes are presented with both an electrophilic bromine source AND water, the water will react in the second step to form a bromohydrin. You can do this with  $\text{Br}_2$  or with NBS as the electrophilic bromine source. Note that even with the bridged bromonium ion, the reaction occurs with Markovnikov selectivity placing the nucleophile (water) on the more substituted carbon.

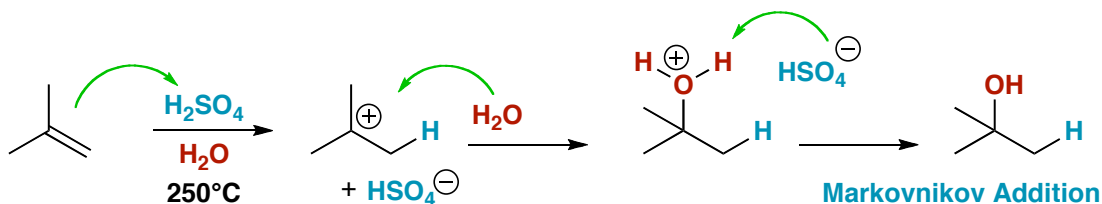


More (+) charge on the more substituted carbon. Water preferentially adds here to unsymmetric bromonium ions.



## Hydration of Alkenes

The electrophilic addition of water to a double bond is a more difficult reaction than halohydrin formation. By itself, water is not electrophilic enough to react and it requires a strong acid catalyst and high heat.



## Quiz of the day

<p><b>Q:</b> What is the major organic product of the following reaction?</p>	<input type="checkbox"/> <b>1:</b>
	<input type="checkbox"/> <b>2:</b>
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