



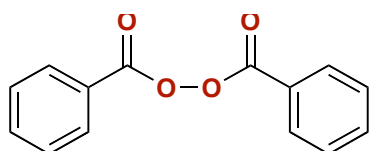
Chem 341 • Organic Chemistry I

Lecture Summary 22 • October 15, 2007

Chapter 7 - Alkenes: Reactions and Synthesis

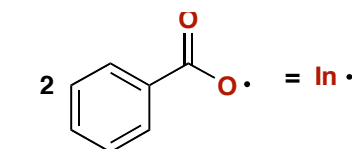
Alkene Polymerization

Polymers can be produced from alkenes by chain reactions using either radical or cationic polymerization. These reactions are initiated by either a radical source, like benzoylperoxide, or a cation source like a strong acid.

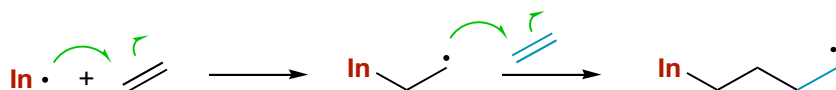


benzoylperoxide

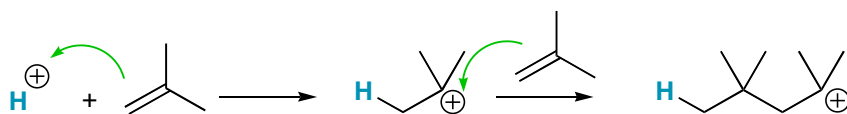
heat



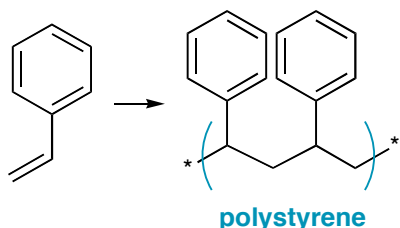
radical polymerization is often initiated by the formation of benzoyl radicals from benzoyl peroxide.



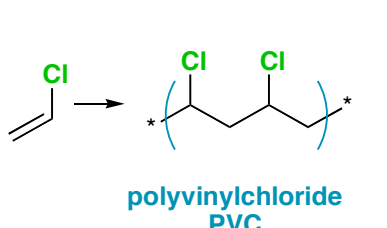
The chain grows by sequential addition of radicals to ethylene.



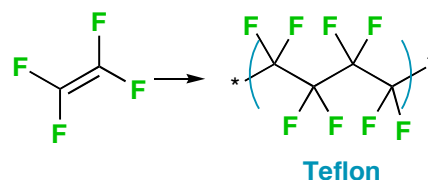
Cationic polymerization grows chains in the same fashion.



polystyrene



polyvinylchloride
PVC

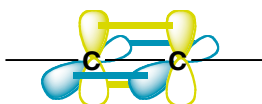


Teflon

Chapter 8 - Alkynes: An Introduction to Organic Synthesis

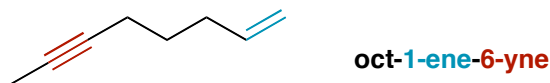
Alkyne Structure

Alkynes are sp hybridized and have linear geometry. In general, the π -bonds of alkynes are more reactive than alkenes. Much of the chemistry of alkynes mirrors alkenes with a few twists. The difference stems from the presence of the second π -bond which can react further in a particular transformation. For, example, addition reactions often occur twice on alkynes.



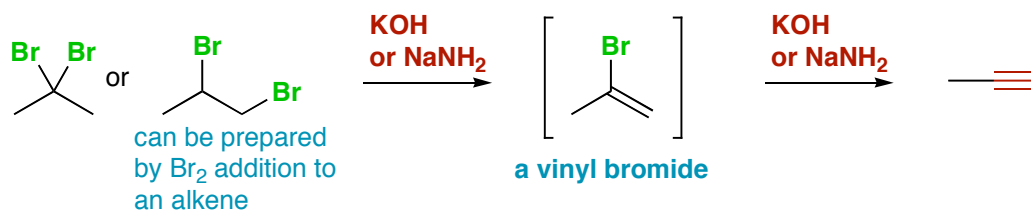
Naming Alkynes

Alkynes are named similar to alkenes. Alkenes will have priority for the lowest number if it is equidistant from the end of the chain, otherwise, whichever is closest to an end gets the lowest number.



Preparation of Alkynes

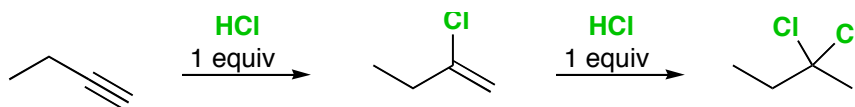
Alkynes are prepared by elimination reactions of vinyl halides. These can be prepared by elimination of dihalides. Thus, you could do sequential eliminations to form a triple bond.



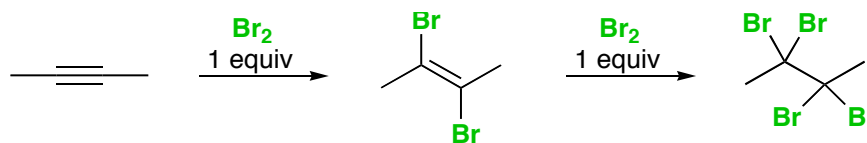
Electrophilic Addition to Alkynes

The addition of electrophiles to alkynes is very similar to alkenes, but the reaction can occur twice. Terminal alkynes (on the end of a double bond) will generally proceed with Markovnikov addition whereas internal alkynes often give mixtures of regioisomers.

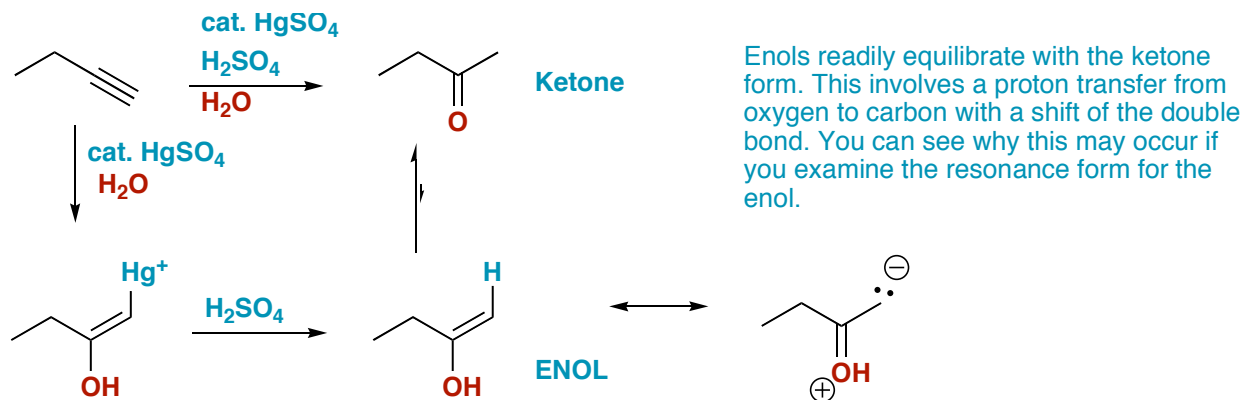
The addition of HX can be controlled by limiting the electrophile to one equivalent. A second equivalent, if present will add again to form a dihalide.



The addition of bromine or chlorine will proceed just like with an alkyne. The initial addition of one equivalent will selectively form the trans dihalide due to the bridging intermediate.



The hydration of alkynes occurs in a slightly different fashion than with alkenes. First, only a catalytic amount of mercury salt is required as the intermediate vinyl mercury species readily protonates in the presence of acid. Secondly, the product of the hydration, an enol, readily isomerizes (tautomerizes) to the more stable ketone form.



Quiz of the day

<p>Q: Which of the set of reagents listed would accomplish the reaction shown below?</p>	<p><input type="checkbox"/> 1: 1) O₃ 2) Zn / HOAc</p> <p><input checked="" type="checkbox"/> 2: KMnO₄</p> <p><input type="checkbox"/> 3: 1) OsO₄ 2) NaHSO₃ 3) HIO₄</p> <p><input type="checkbox"/> 4: H₂O₂ / NaOH</p>
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