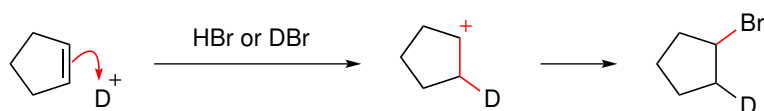

CHEM1201: Section 1

Alex Ganose

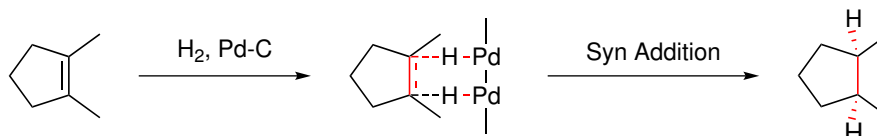
December 18, 2012

1 Alkenes

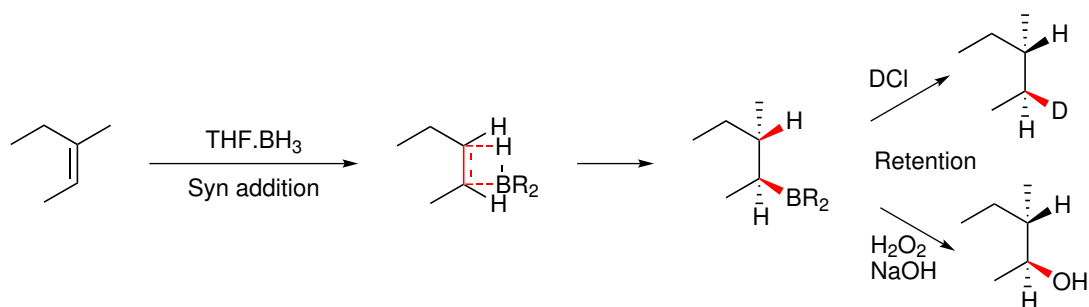
1.1 General



Carbocation mechanisms rarely permit stereocontrol.



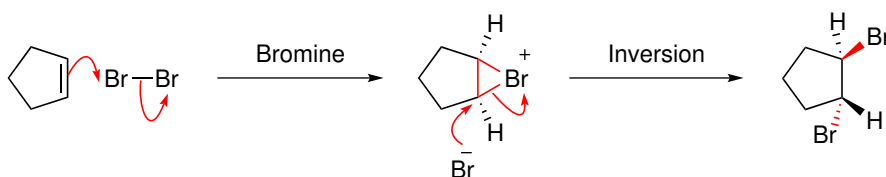
Carbocation mechanisms rarely permit stereocontrol.



1.2 Oxidations

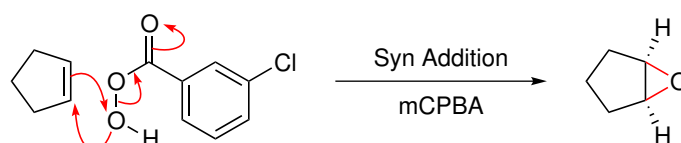
For each reaction, the first step involves synchronous bond formation.

1. Bromination

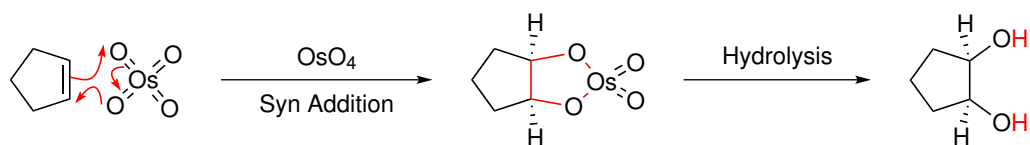


Overall an addition.

2. Epoxidation with mCPBA

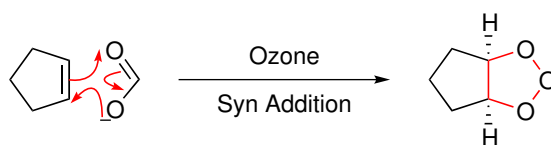


3. Formation of 1,2 Diols:



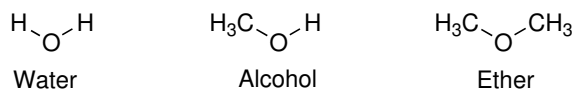
Proceeds with syn addition of osmium tetroxide.

4. Ozonolysis

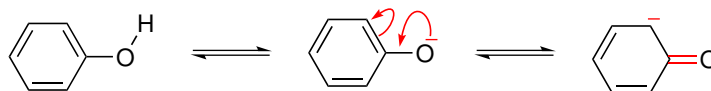


2 Alcohols

2.1 General



Owing to conjugation of O via the sp^2 carbon, phenols and enols behave differently and neither is referred to as an alcohol.



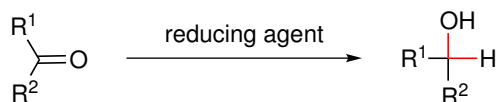
$\text{CH}_3\text{CH}_2\text{OH}$ cannot be oxidized as there is no $\alpha\text{-H}$

2.1.1 Physical Properties

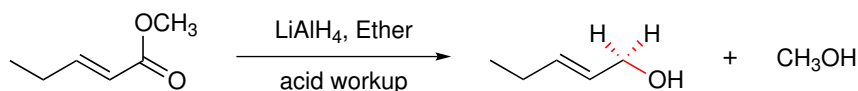
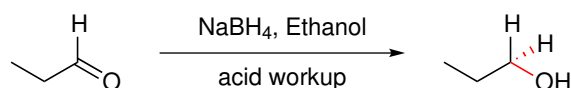
The electro-negativity of O means that alcohols are feebly acidic unlike amines that are only ever feebly basic. Alcohols are also feebly basic (O is less nucleophilic than N). They are also extensively hydrogen bonded which gives them much higher boiling points than alkyl halides.

2.2 Preparation of Alcohols

1. Reduction of $\text{C}=\text{C}$ compounds.



Examples:

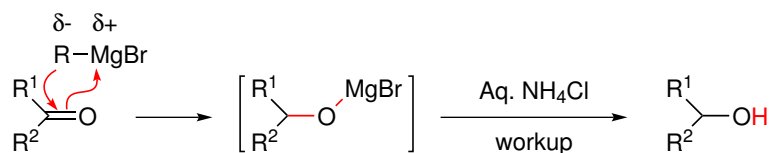


Note the double bond is unaltered.

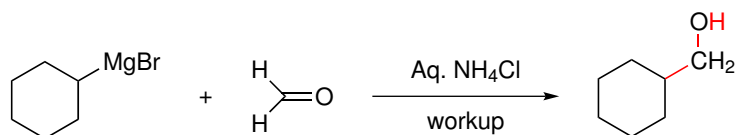
2. Addition of grignard (RMgX) to a carbonyl compound.



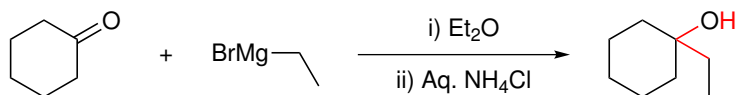
Mechanism



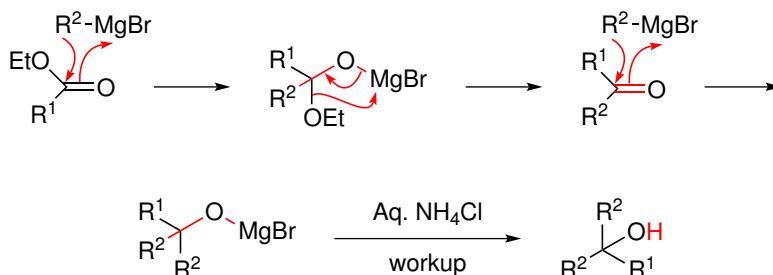
Example 1. Alcohols from aldehyde's.



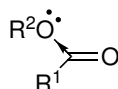
Example 2. Alcohols from ketone's.



Example 3. Alcohols from esters.

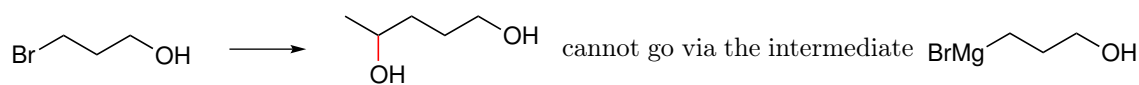


Esters only give alcohols with grignard reagents because the inductive effect increases reactivity but mesomeric effects are greater therefore the ketone's C=O is more reactive than an ester C=O.

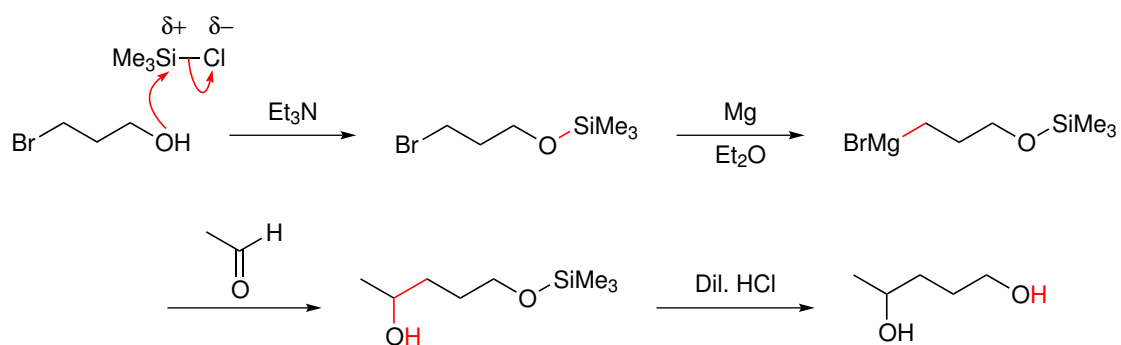


Grignard reagents are destroyed by groups with an exchangeable H e.g. OH, SH, NHR, COOH and thus require protective groups, e.g. silicon for an alcohol.

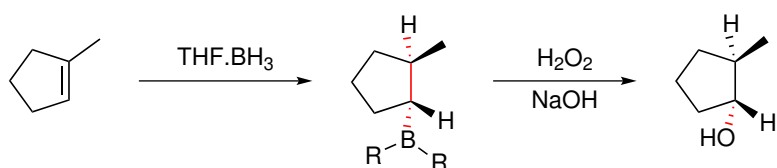
For example:



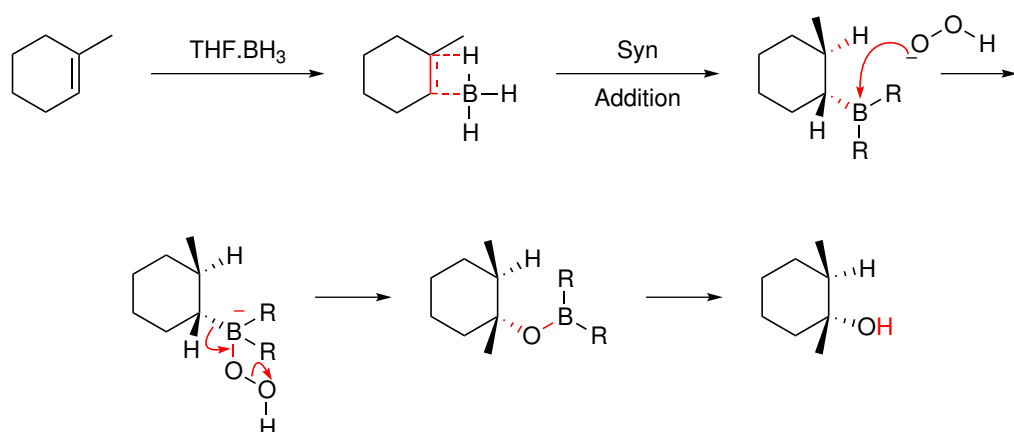
as the OH would destroy the grignard reagent formed. Therefore instead, silicon is used as a protective group.



3. Hydroboration of alkenes (delivers OH to the less substituted C).



Mechanism



2.3 Reactions of Alcohols

2.3.1 Reaction at the alcohol oxygen atom.