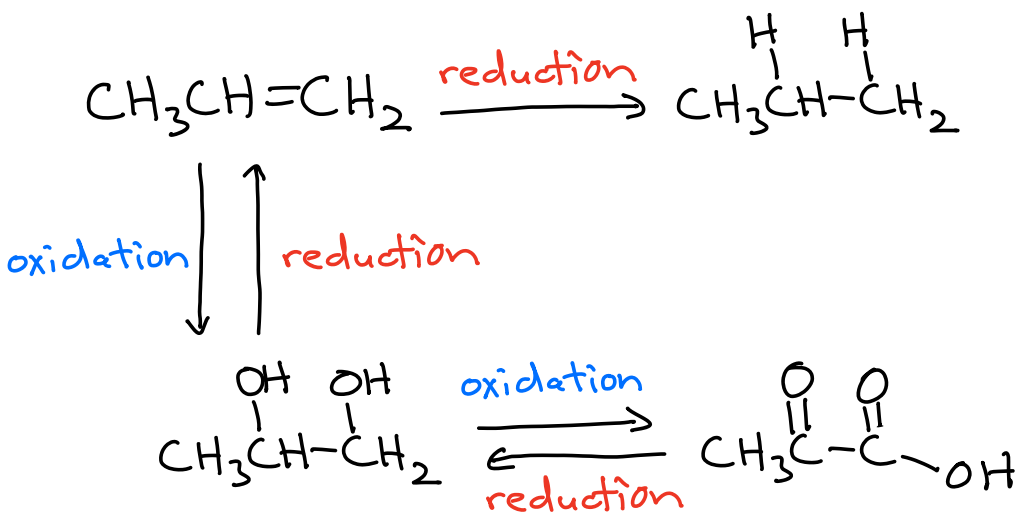
Important definitions for organic chemistry

Oxidation Reaction → Net loss of electrons

↳ A reaction involving loss of bonds to H atoms and/or increase in the number of π bonds or bonds to O atoms

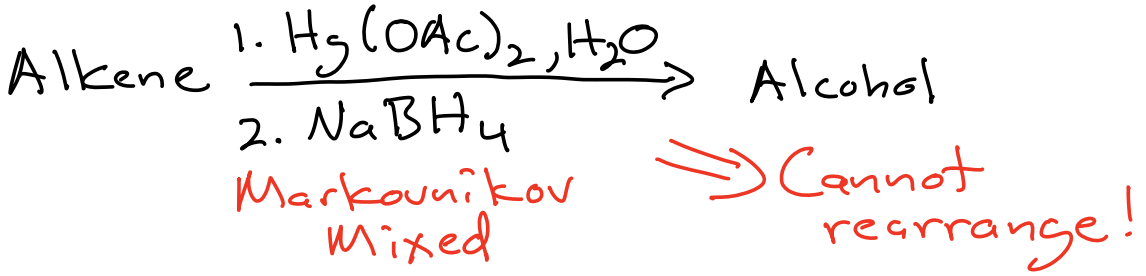
Reduction Reaction → Net gain of electrons

↳ A reaction involving an increase in bonds to H atoms and/or a decrease in the number of π bonds or bonds to O atoms

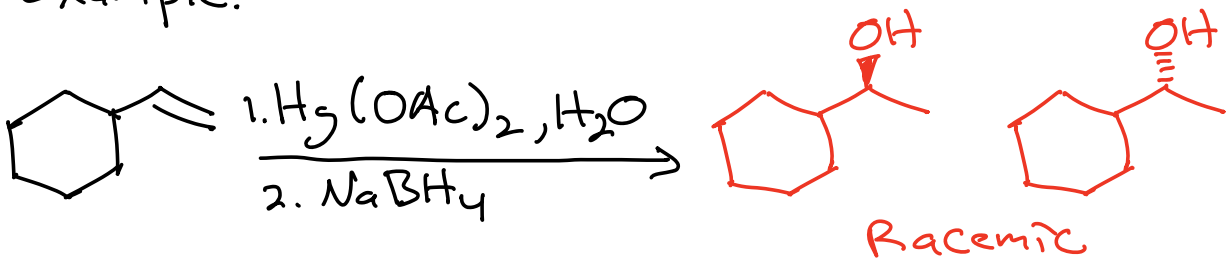


Exam 2 will not cover anything below the line

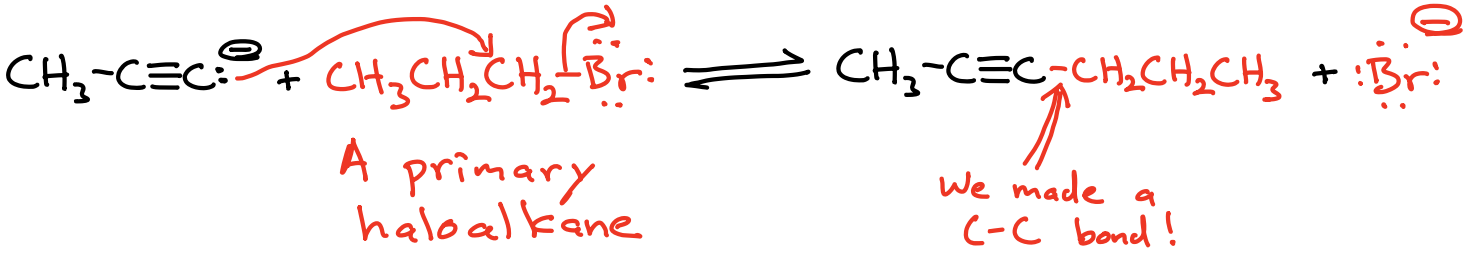
You do not need to know this next reaction, but I am going to show it to you for reference



Example:



Epic New Reaction

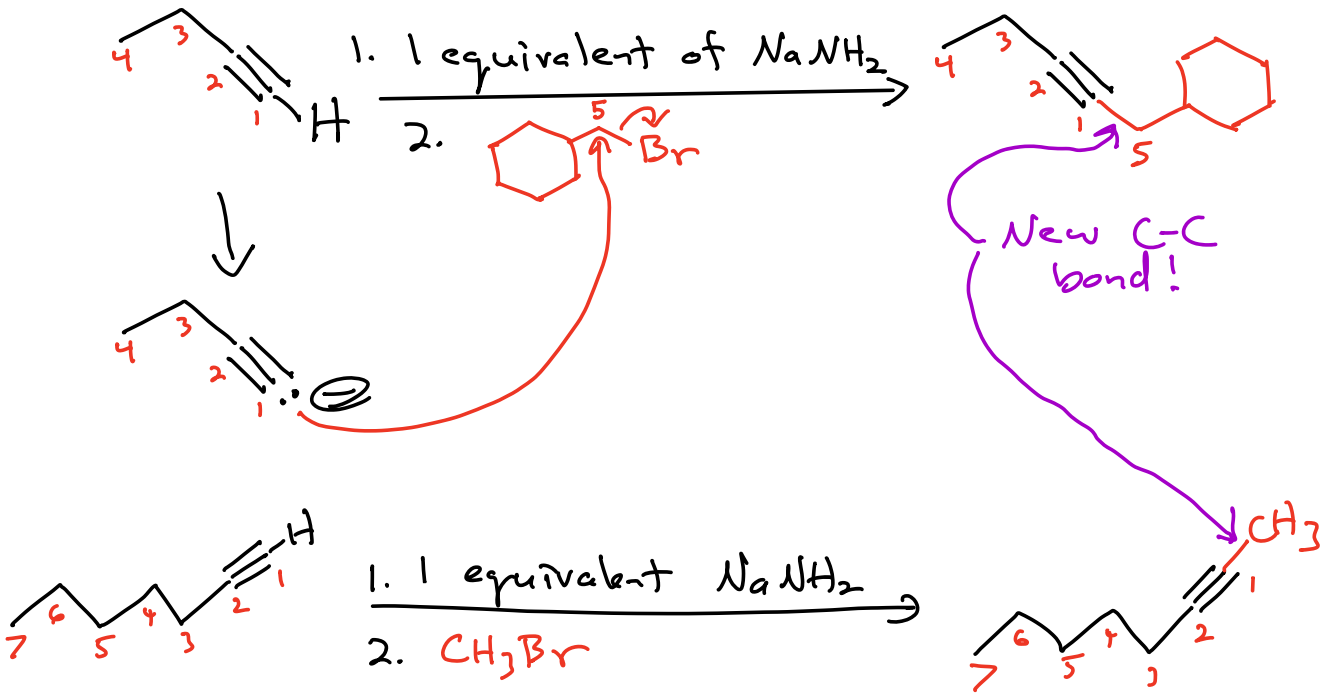


Time capsule: This is an S_N2 reaction. The haloalkane must be primary to avoid an E2 reaction.

Making C-C bonds allows us to construct larger molecules from smaller ones!

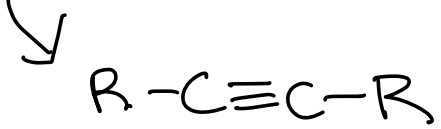
A major goal of organic synthesis

Example:


1. 1 equivalent of $NaNH_2$
2.
Br
New C-C bond!
CH_3

1. 1 equivalent $NaNH_2$
2. CH_3Br

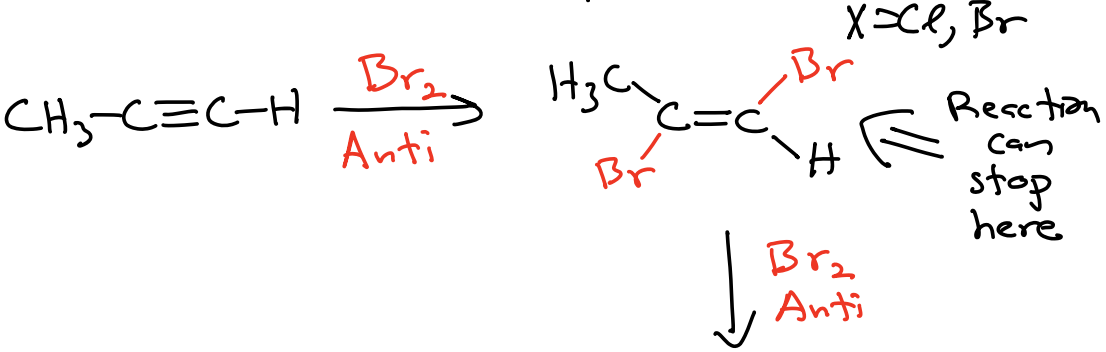
Alkynes ⇒ The two orthogonal pi bonds define alkyne reactions



R–C≡C–R → Same overall personality as alkenes

A) Reaction with 2 equivalents of X_2

X = Cl, Br



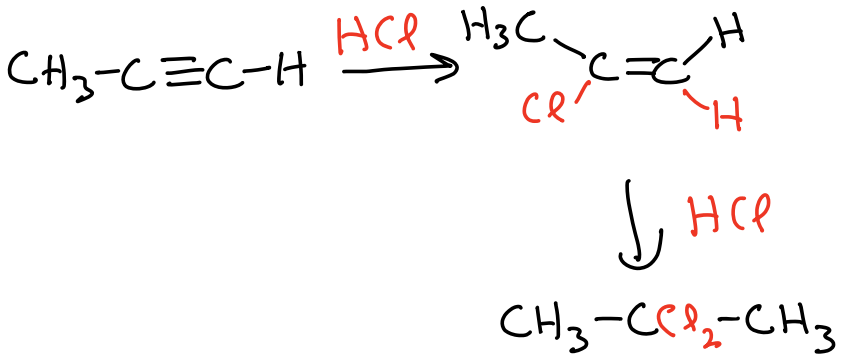
$CH_3-CBr_2-CHBr_2$

Vicinal tetrahalide

"on adjacent carbon atoms"

B) Reaction with 2 equivalents of H-X

X = Cl, Br

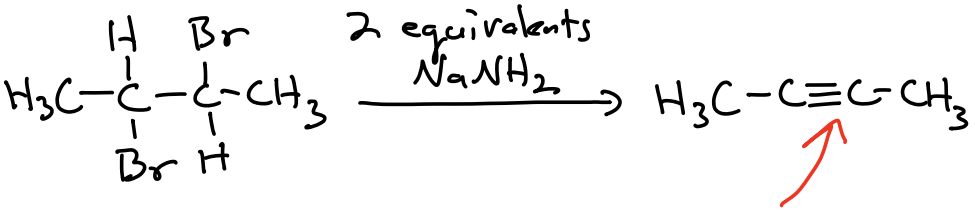


Mechanism involves a cation intermediate

⇒ Markovnikov's rule followed

However, the two X atoms always end up on the same carbon

c) Conversion of a vicinal dihalide into an alkyne

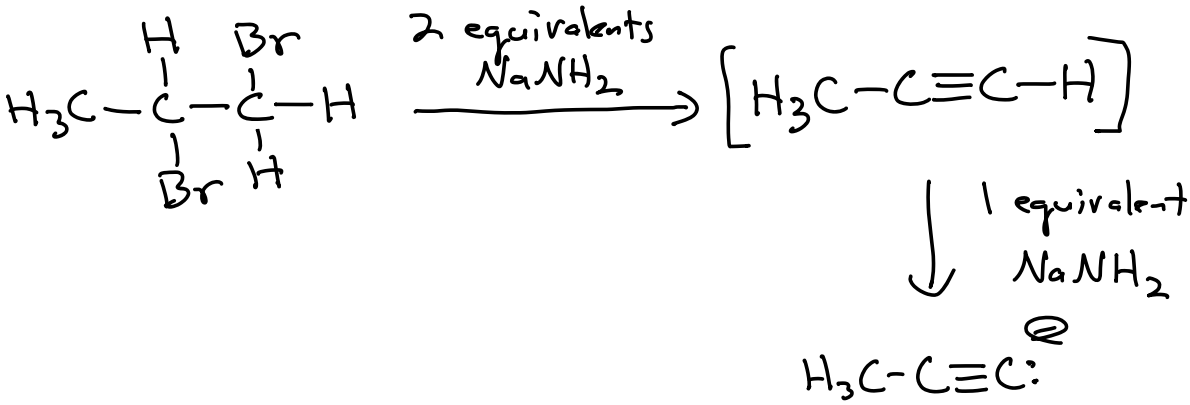


Vicinal dihalide

Note this alkyne is not terminal (it is not on the end)

Time capsule → This is a double E2 reaction

When creating a terminal alkyne you must use 3 equivalents of $NaNH_2$ as a first step → AND → you need a second step that is mild acid → HCl/H_2O



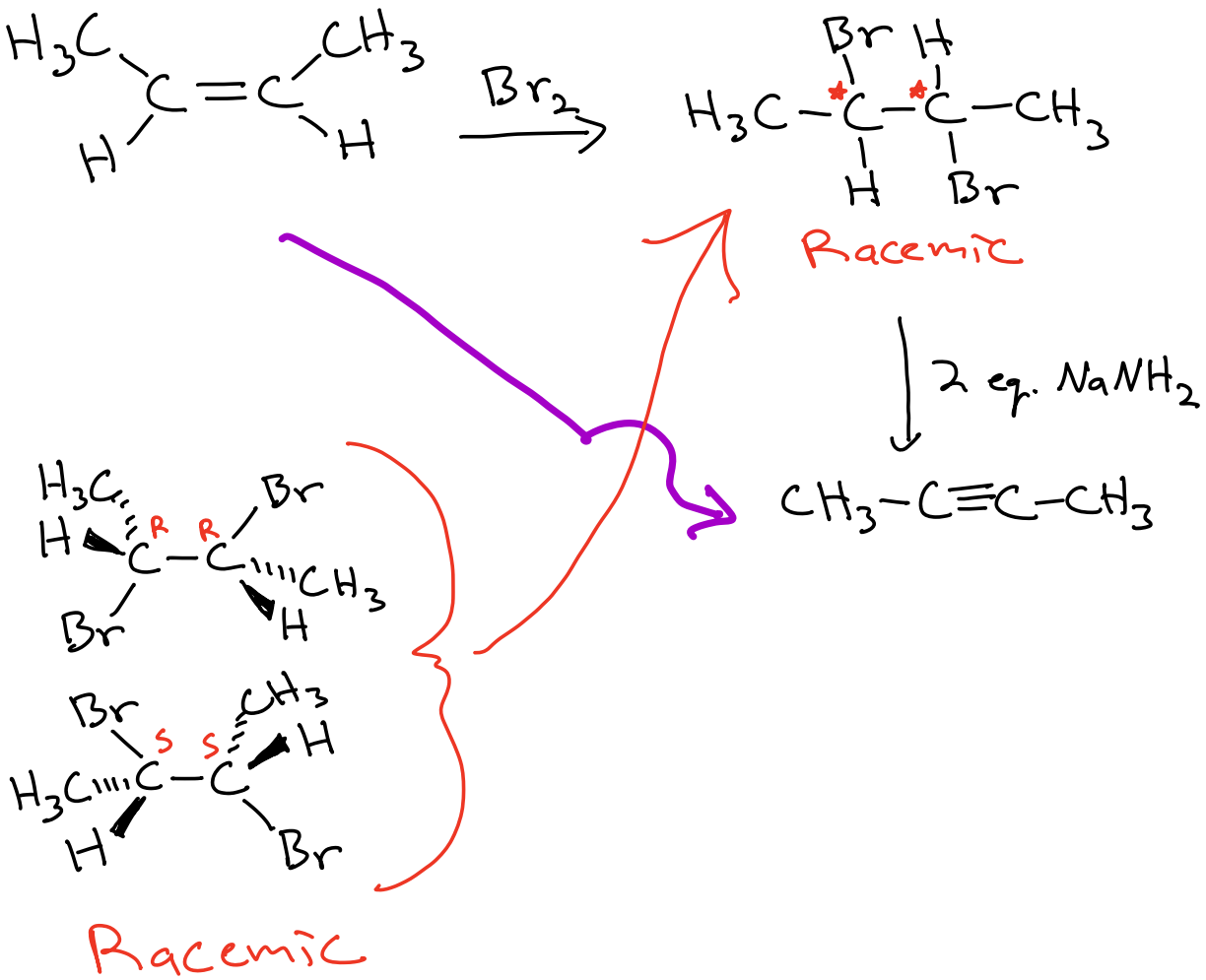
eq. = equivalent

$CH_3-CHBr-CH_2Br \xrightarrow[2.\ HCl/H_2O\ (mild)]{1.\ 3\ eq.\ NaNH_2} H_3C-C\equiv C-H$

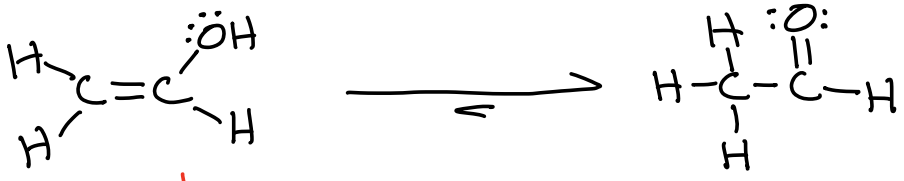
Internal alkyne example:

$CH_3-CHBr-CHBr-CH_3 \xrightarrow{2\ eq.\ NaNH_2} H_3C-C\equiv C-CH_3$

Big Deal → allows conversion of an alkane to an alkyne



New Concept → The following species are in equilibrium, and the more stable species is the "keto" form



enol form

keto form

Favored

(a C=O pi bond is stronger than a C=C pi bond)

This process is called "tautomerization" as in "keto-enol tautomerization"