

Reaction List - Ch 13

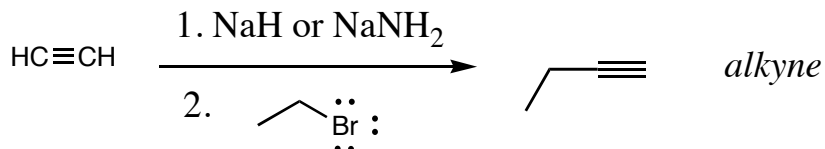
Reactions of Alkynes

Formation of alkynes by substitution

alkyne must be deprotonated, then treated with an alkyl halide

alkyl halide must be 1°, or E2 will interfere

internal alkynes must be formed in 4 steps from acetylene

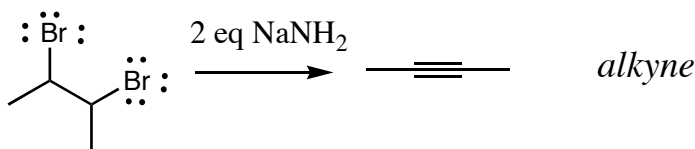


Formation of alkynes by elimination

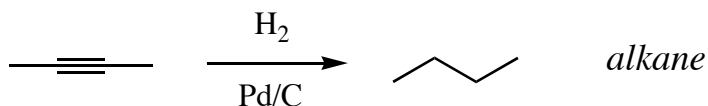
vicinal or geminal dihalides can be used

a much stronger base is needed for elimination of the vinyl halide

if a terminal alkyne is formed, three equivalents of base and a second step of water are needed

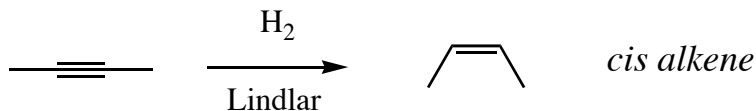


Reduction of alkynes to alkanes



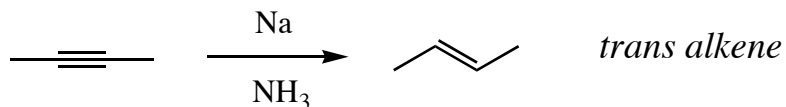
Reduction of alkynes to cis alkenes

Lindlar catalyst contains Pd/BaSO₄, quinoline and/or lead acetate
only way to make the cis alkene exclusively



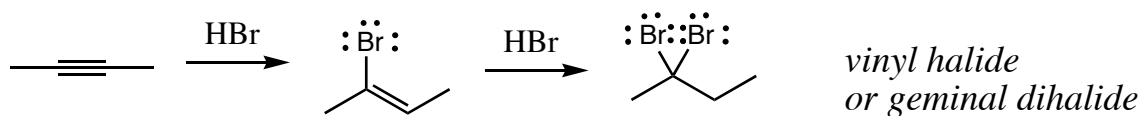
Reduction of alkynes to trans alkenes

only way to make trans alkene exclusively



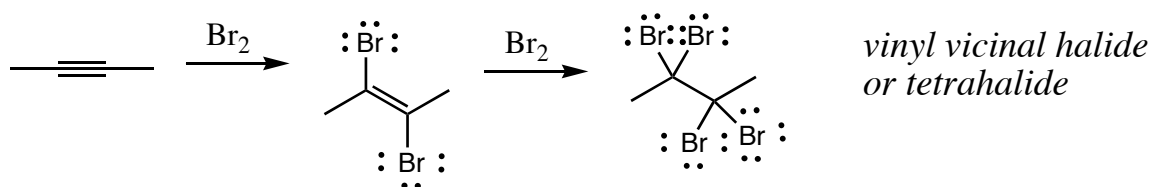
Addition of HX to an alkyne

halogen goes to the more substituted side of an internal alkyne
both halogens are added to the same carbon



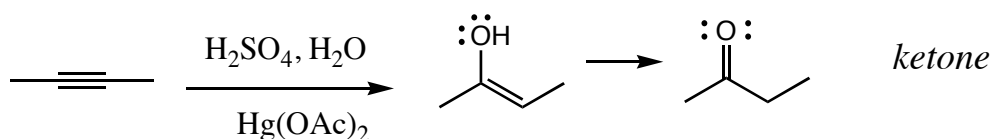
Addition of X₂ to an alkyne

Br₂ and Cl₂ may be used
different result depending on 1 or 2 equivalents used
anti addition is observed



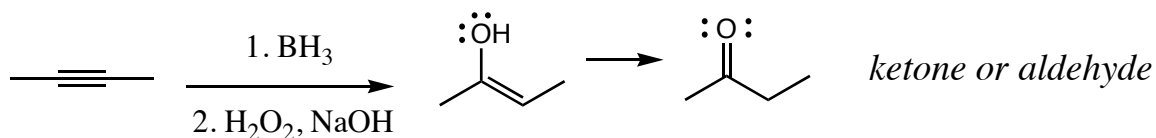
Acid and mercury catalyzed hydration of an alkyne

OH goes to more substituted side of an internal alkyne
enol tautomerizes to a ketone

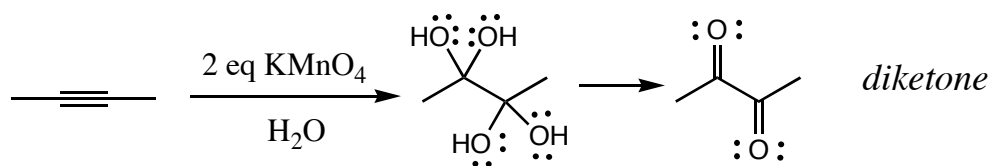


Hydroboration-oxidation of an alkyne

terminal alkynes require a sterically hindered borane such as disiamyl borane or dicyclohexyl borane
OH goes to the less substituted side
enol tautomerizes to a ketone or aldehyde C=O the OH (then C=O)



Permanganate oxidation of an alkyne



Oxidative cleavage of an alkyne

