

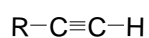
Chap 9

Alkynes

1. Nomenclature- replace -ane with -yne.

miners lamps $\text{CaC}_2 + 2\text{H}_2\text{O} \rightarrow \text{C}_2\text{H}_2 + \text{Ca(OH)}_2$ lights methane in the mines.

2. Formation of acetylide ions

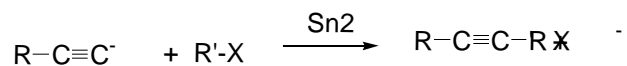


acidic proton Acidity - $sp^3 < sp^2 < sp$ close to nucleus- charge

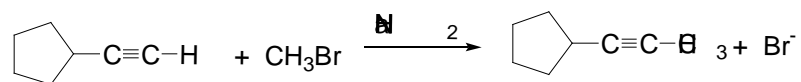
less charge separation

Need NH_2^- to pull off H . $\text{NaNH}_2 =$ sodium amide

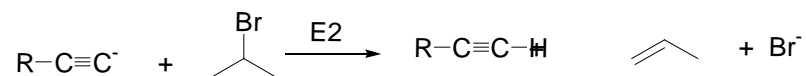
a) Can use acetylide ion as a nucleophile.



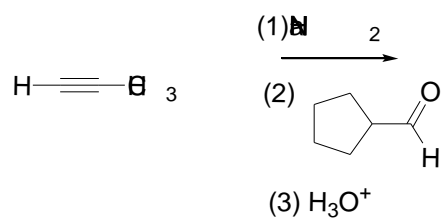
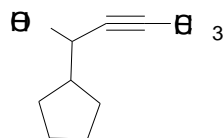
Alkylation



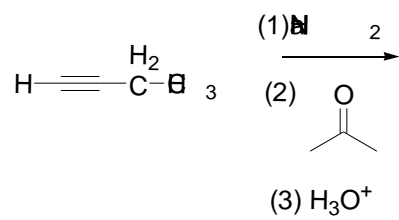
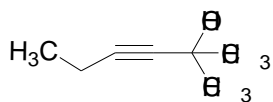
b) can act as a base



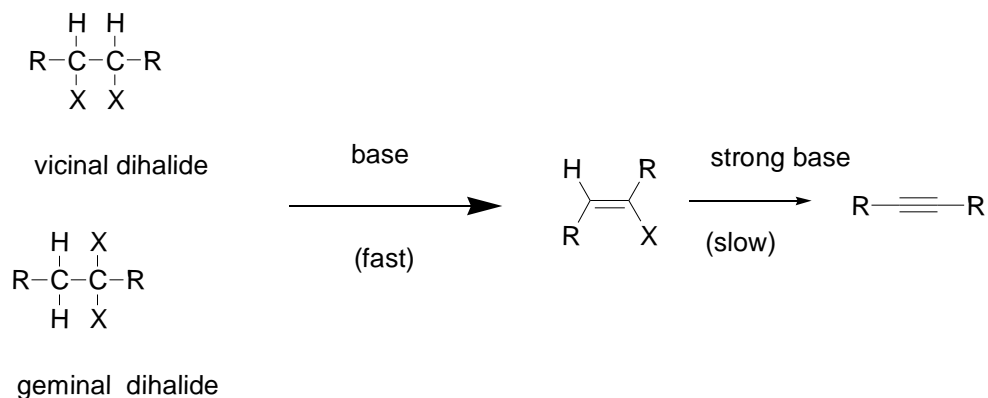
Synthesize:



synthesize:



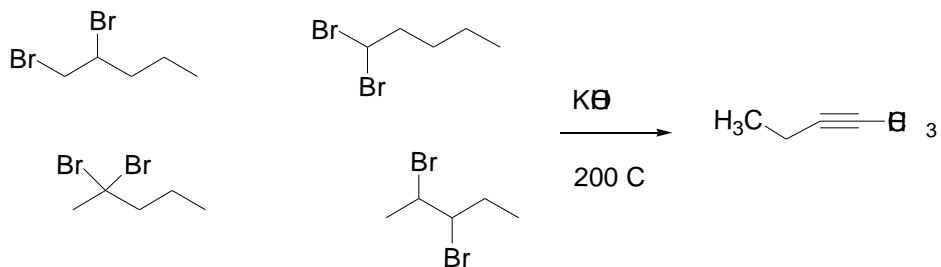
2) synthesis of alkynes by elimination rxns.



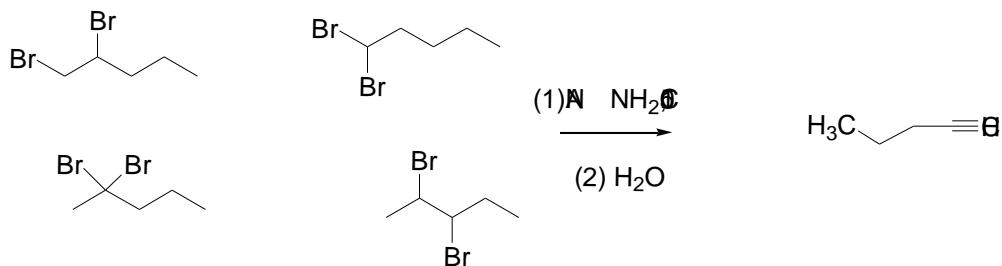
strong base includes KOH at 200°C or NaNH₂ at 150°C.

Rearrangement-

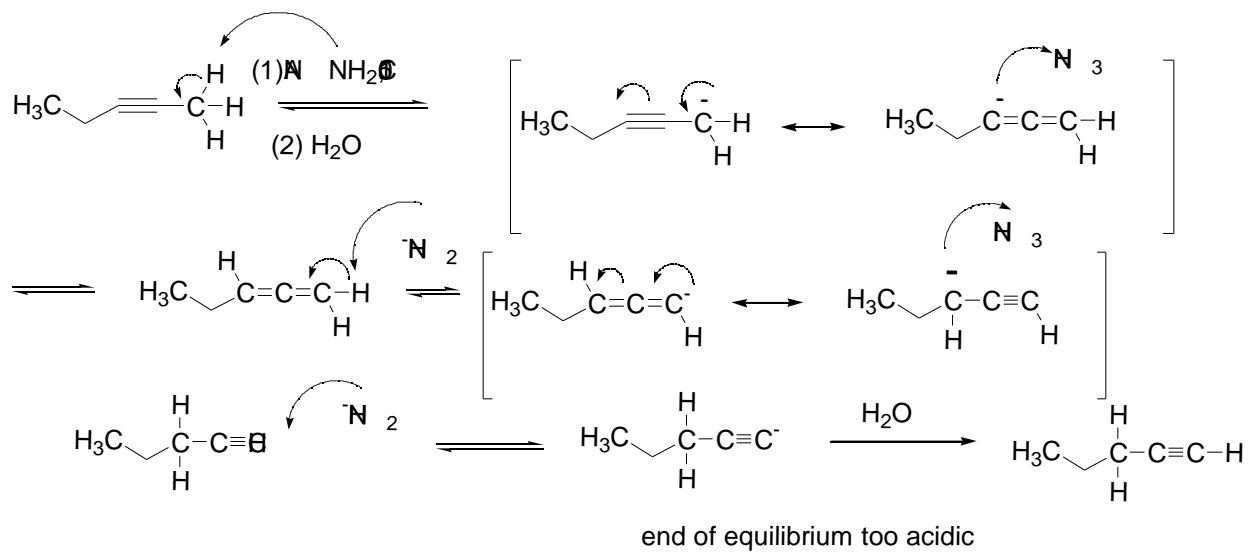
a) With KOH get terminal alkyne (more stable product)



b) With NaNH₂ get terminal alkyne, equilibrium product.



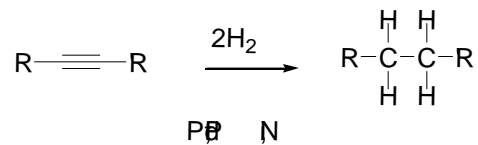
mechanism



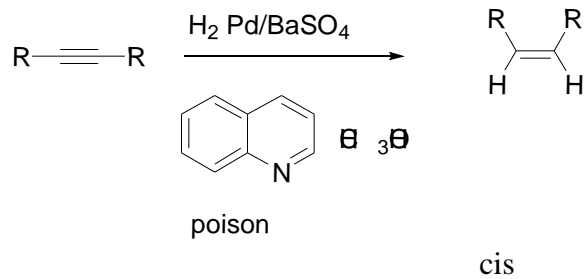
sodium amide is such a strong base it pulls of terminal proton.

3) Reduction of Alkynes.

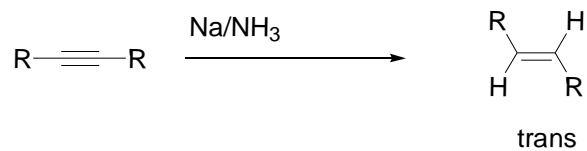
a) Hydrogenation. (No alkene)



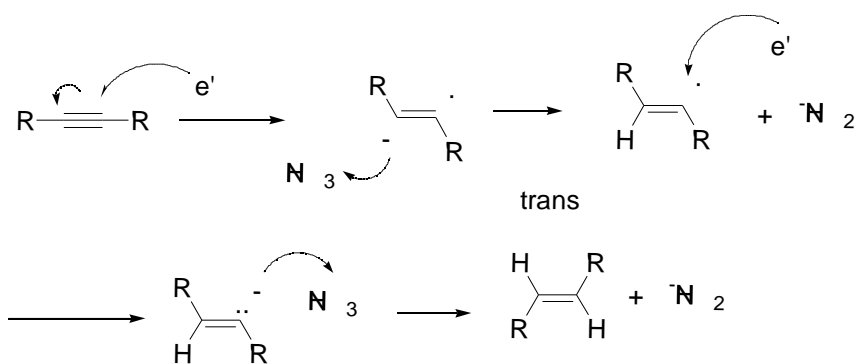
b) Lindlar's catalyst. (alkene)



c) Metal ammonium Reduction.

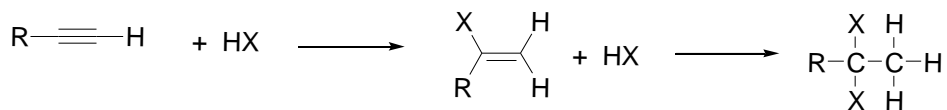


Mechanism.

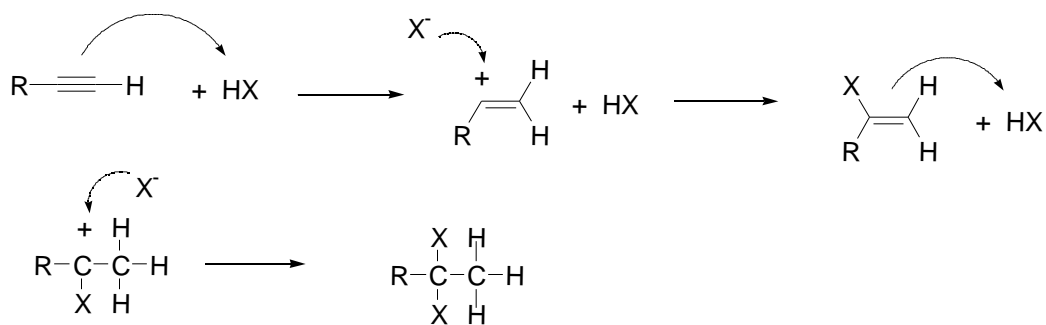


4) Addition of hydrogen Halide.

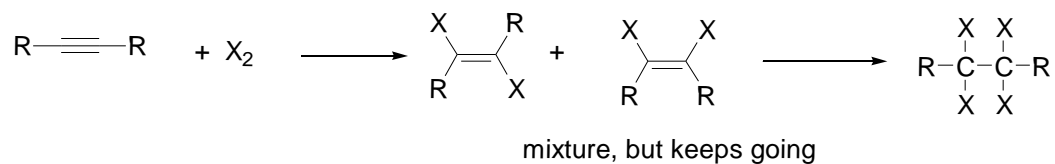
a) HX (HBr, HCl, HI)



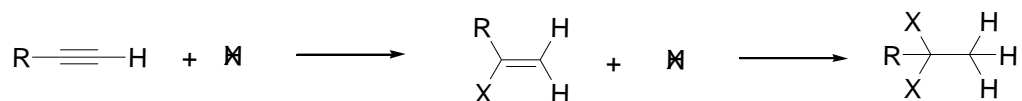
mark addition.



b) X_2 (X = Cl, Br)



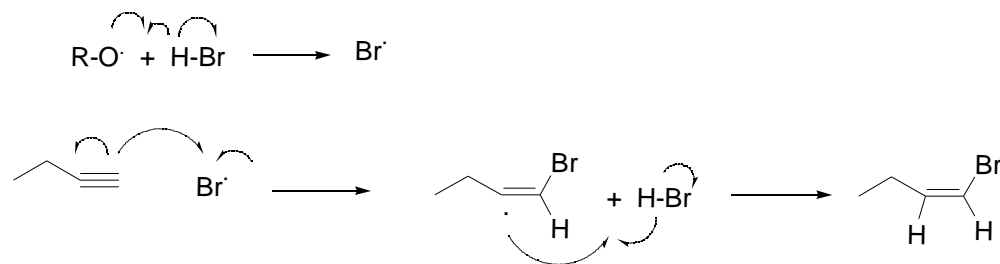
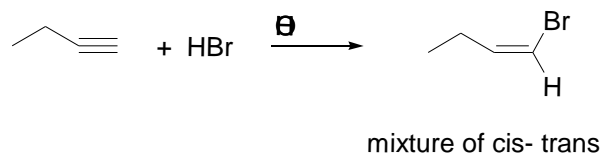
c) H-X (H-Br, H-Cl, H-I)



both are Mark

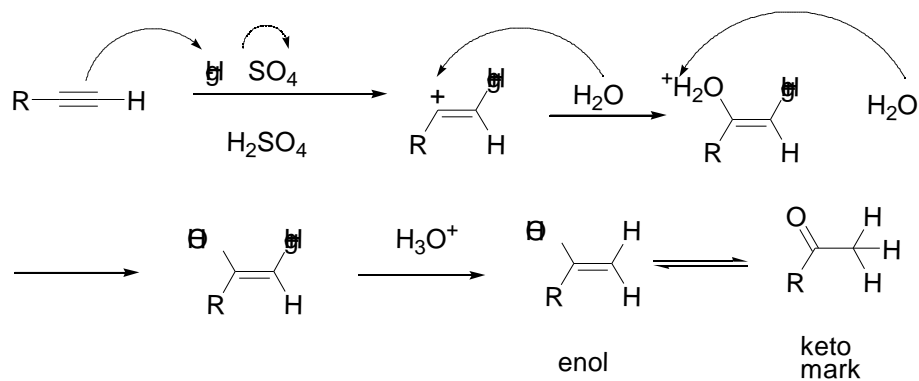
show mechanism.

d) H-Br, HOOH

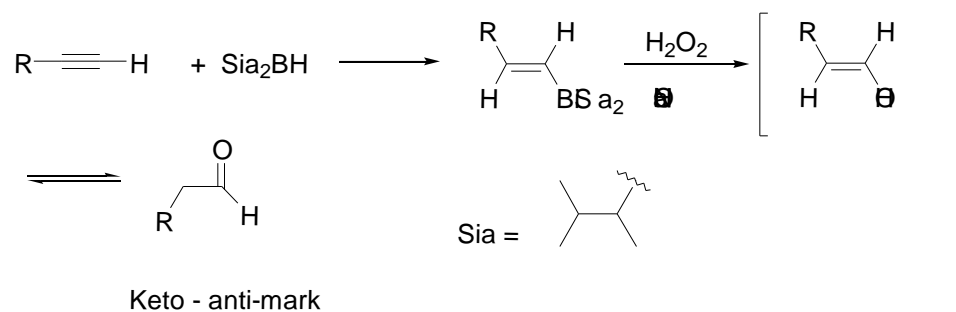


5. Formation of ketones and aldehydes.

a) Mercuric ion

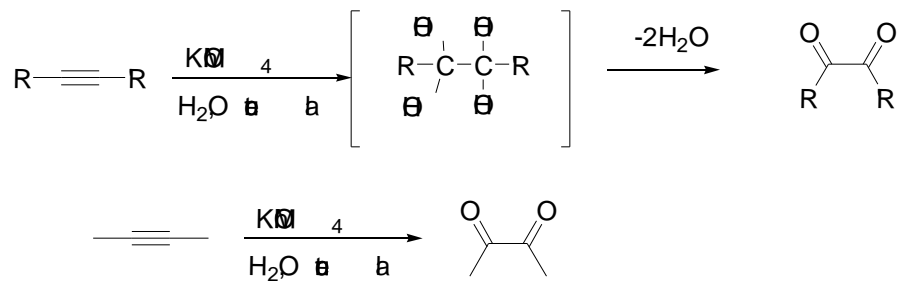


b) Hydroboration-oxidation

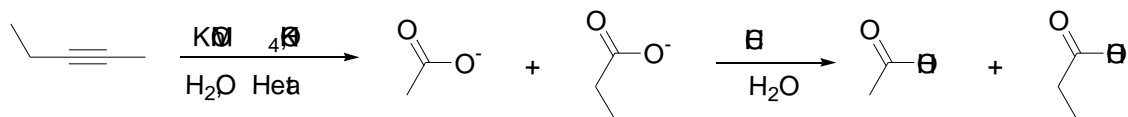


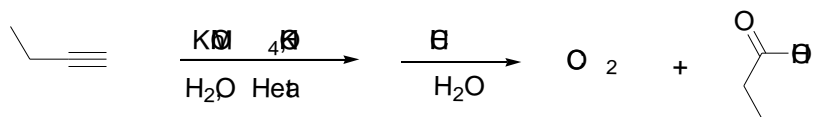
6. Oxidation of Alkynes

a) neutral KMnO_4



b) Hot, conc. KMnO_4





c) Ozonolysis-

