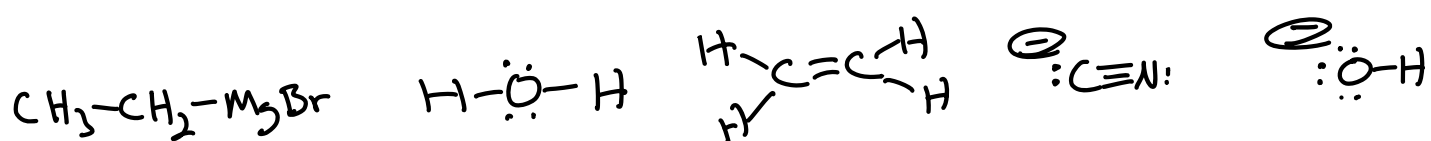


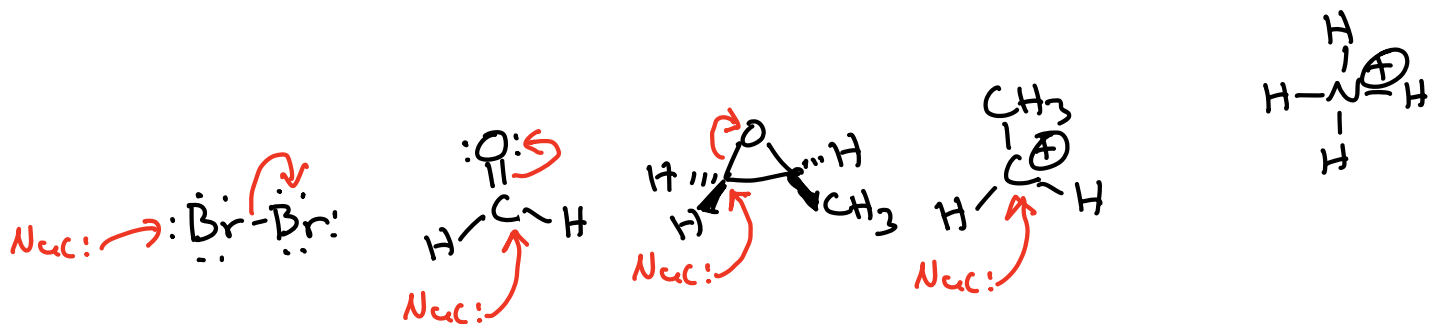
Nucleophiles react with electrophiles
to MAKE A BOND

When trying to recognize nucleophiles:



The O atom of a carbonyl is NOT a nucleophile
because reacts at the lone pair and cannot
make a stable bond

When trying to recognize electrophiles:

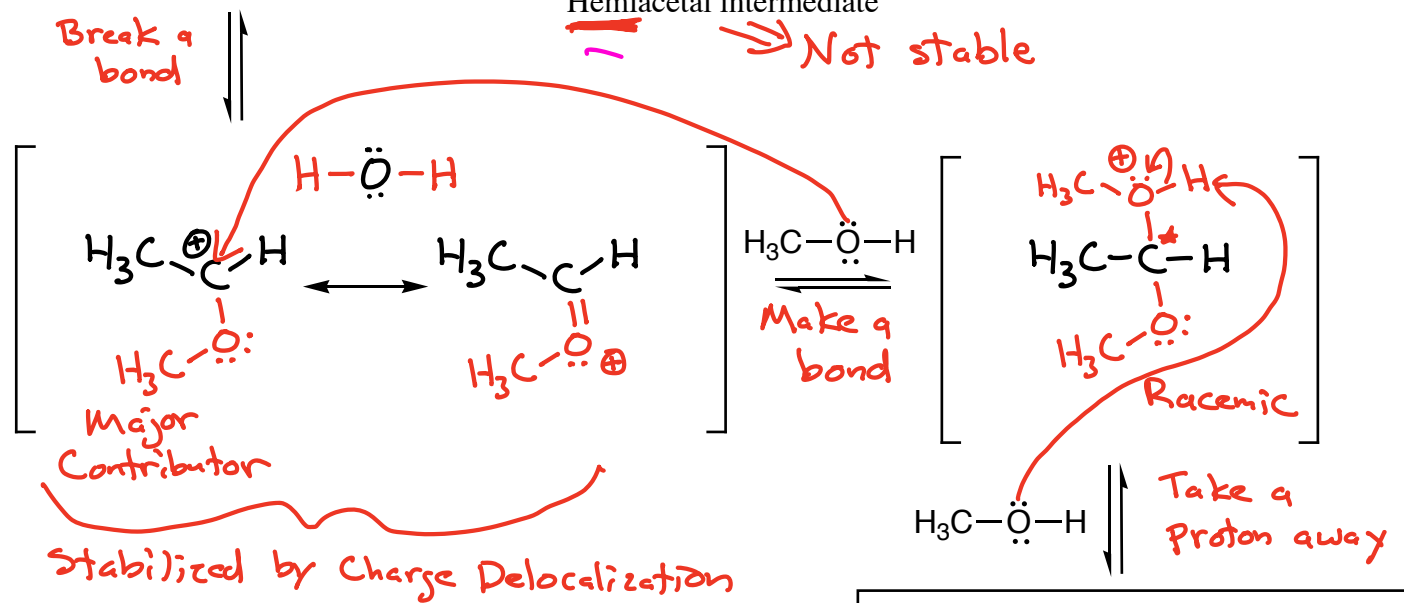
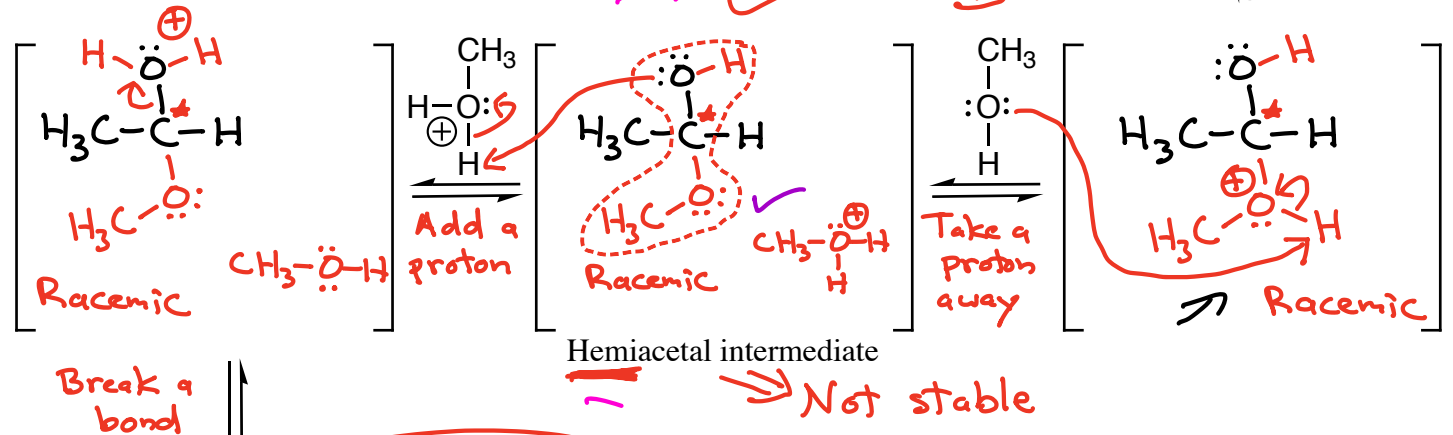
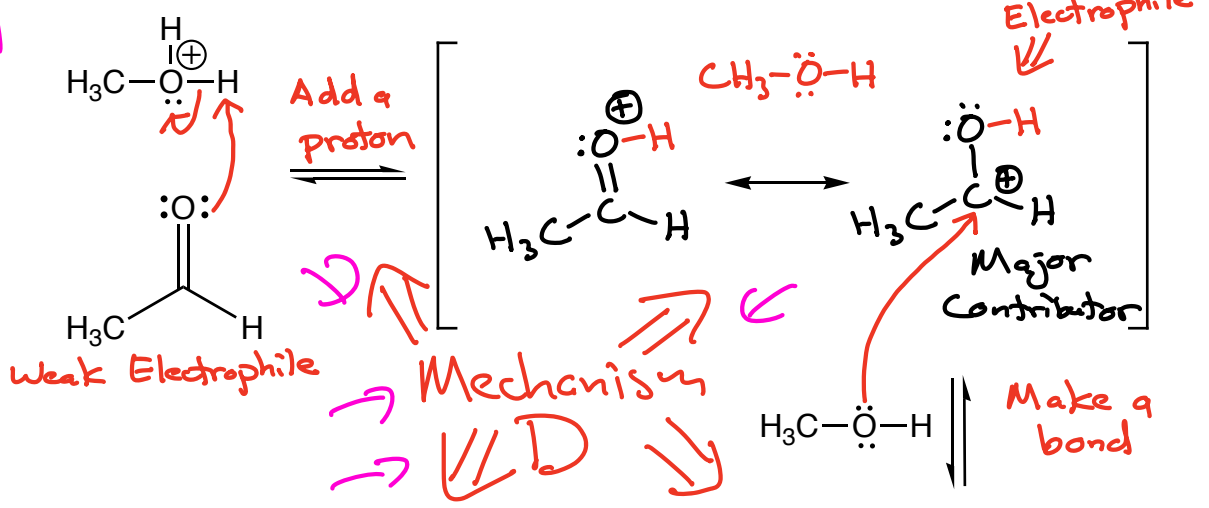
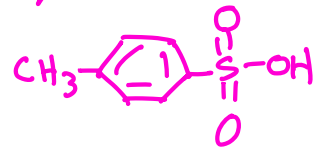


TsOH
Tosylic Acid

H₂SO₄

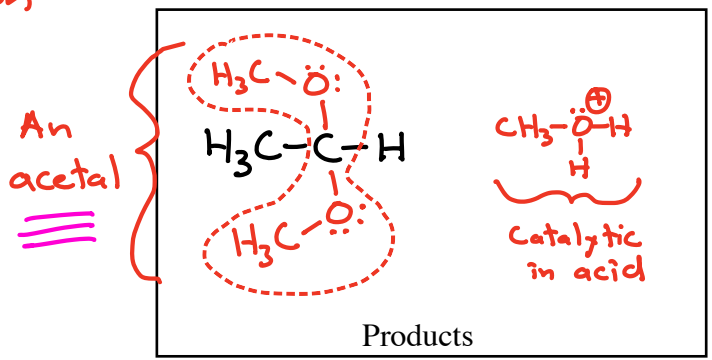
"Hey, does that thing have a hemi in it?" "SWEET!"

Acid Catalyzed Hemiacetal and Acetal Formation From an Aldehyde or Ketone



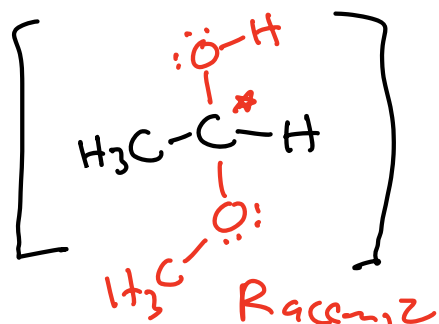
Key Recognition Element (KRE):

Two bonds to ether O atoms to an sp³ C atom

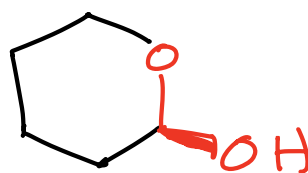


Recap

Hemiacetal → One alcohol and one ether on same C atom

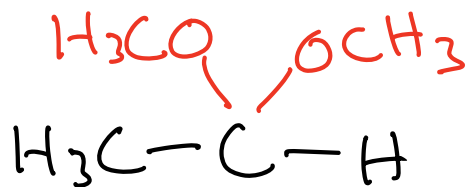


Not Stable

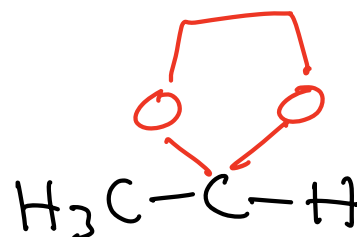


Stable
(Chelate effect)

Acetal → two ethers on same C atom

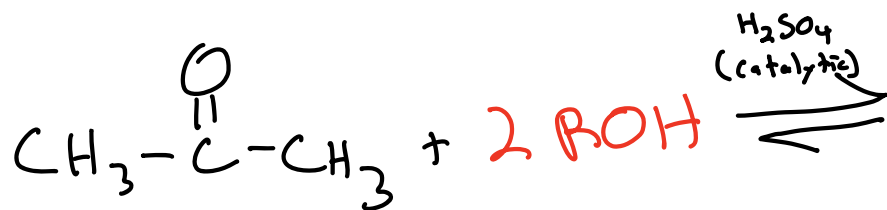


Stable



More Stable
(Chelate effect)

Acetal Formation is Reversible



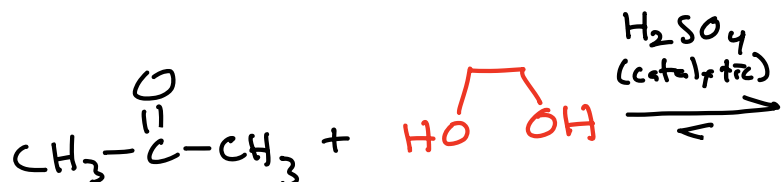
Add more
is favored.

and acetal side

Add more
is favored.

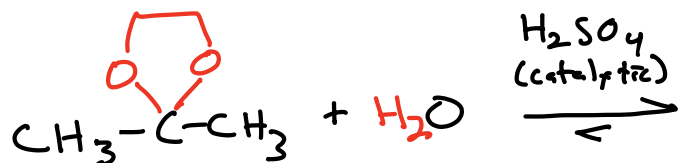
and ketone side

This is how cyclic acetal protecting
groups are to a carbonyl

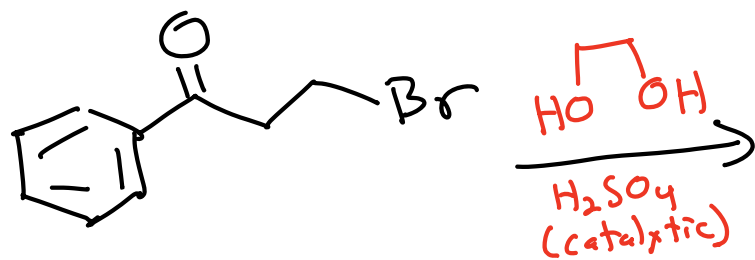


Le Chatlier's Principle

This is how cyclic acetal protecting
groups are to get back a carbonyl



Protecting Group "ON"



Protecting Group "OFF"

