Today

Reactions with Carbon Nucleophiles
Section 16.4

Reductions and Reactions with Hydride
Sections 16.5 - 16.7

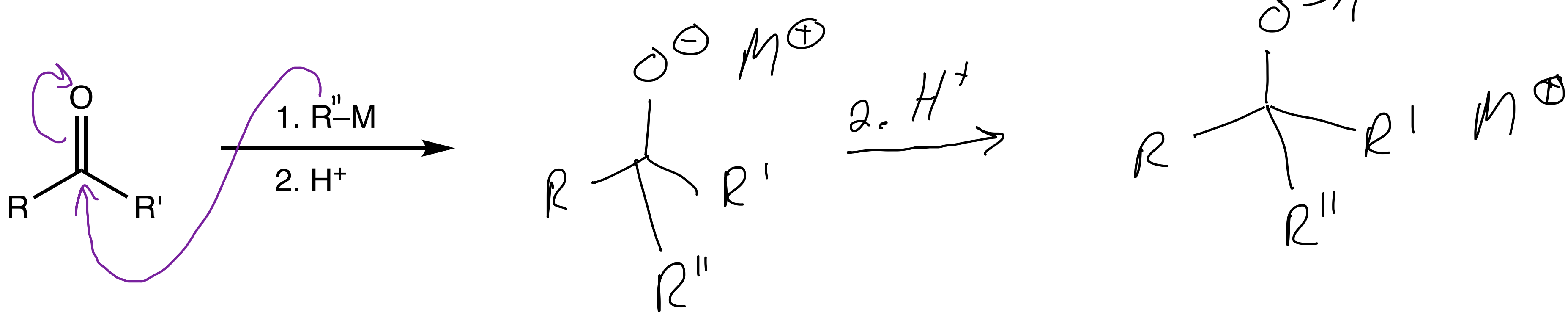
Next Class

Reactions with Nitrogen Nucleophiles
Section 16.8

Reactions with Oxygen Nucleophiles
Section 16.9

Protecting Groups
16.10

Nucleophilic Addition: Generic Reaction with a C Nucleophile Section 16.4



M = metal Li, Na, K

M is +1

if M is +1 then R is −1

RMgBr

NaC≡CH

NaC≡CR

NaC≡N

$^{\ominus}$C≡N is a weak base

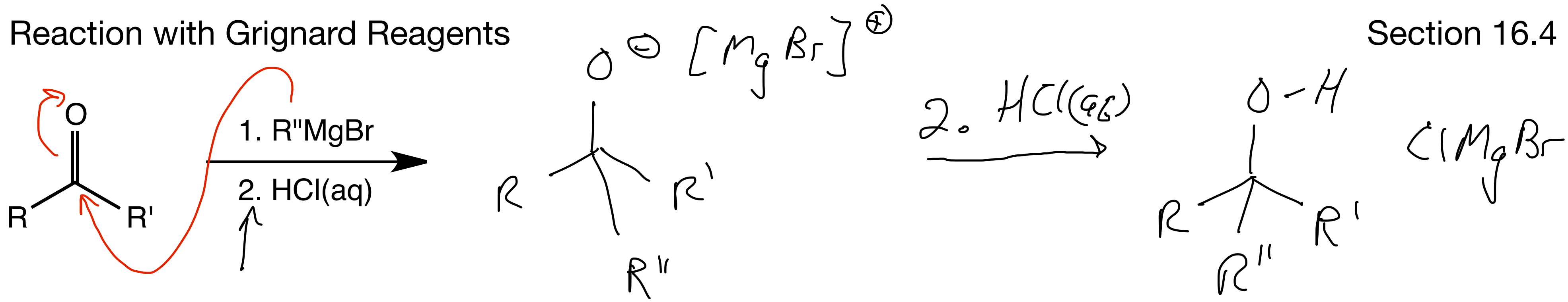
R − Br + Mg

↓

−1 [+2 −1]$^{+}$

R − MgBr

how does having a C to C triple bond affect the reaction



R⊖ is a good nucleophile but also a good base

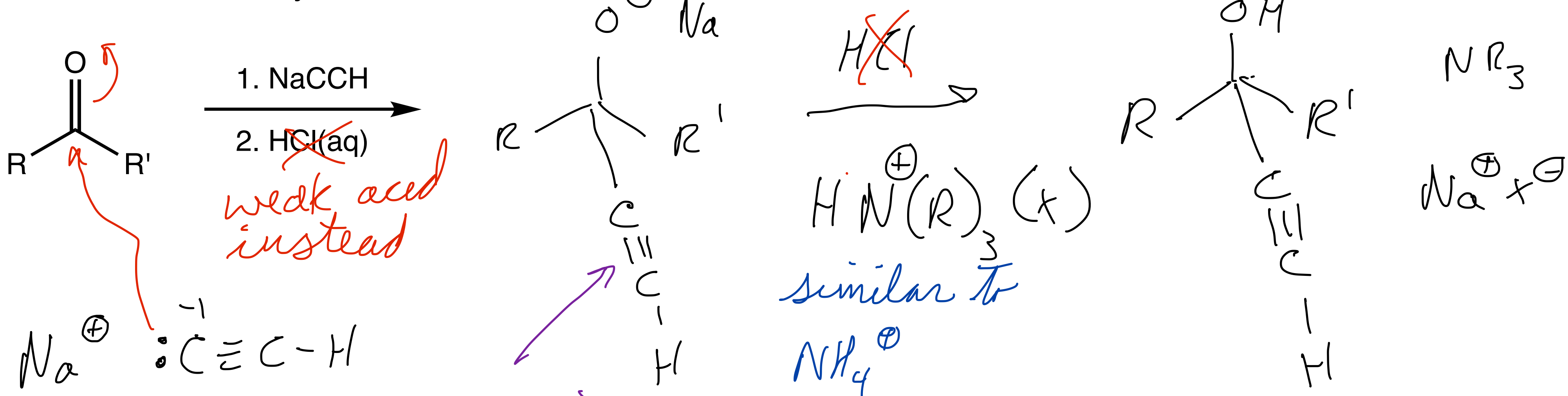
$RMgBr + HCl \longrightarrow RH + ClMgBr$

H⊕ reacts with Grignard reagents to make C–H bonds

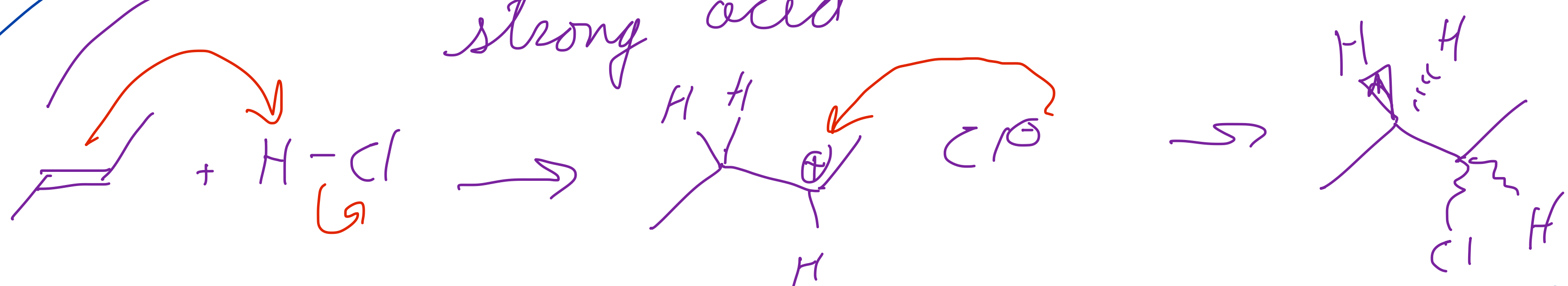
Because Grignard reagents are strong bases the ketone/aldehyde can not have an acidic H+ on it

 would be a problem too

Reaction with Acetylide Ions

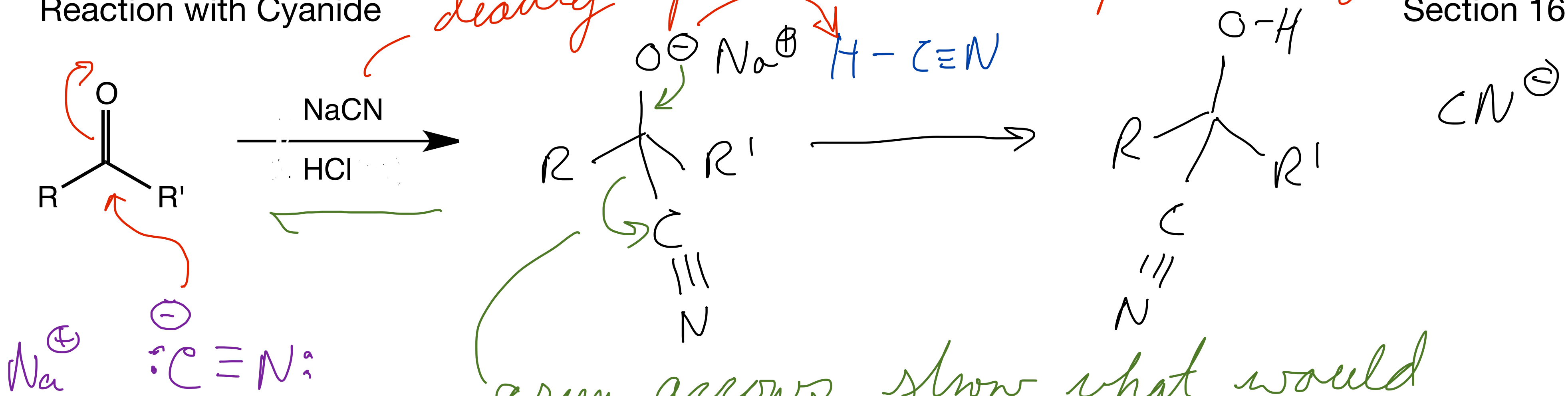


this is reactive toward strong acid



so we cannot use HCl because the alkyne will do an E Add with the strong acid.

deadly poison be super careful



green arrows show what would happen if O⊖ wasn't converted to OH immediately

CN⊖ is a weak base which means the reaction is reversible

an acid is added so that some of the [C≡N]⊖ is protonated

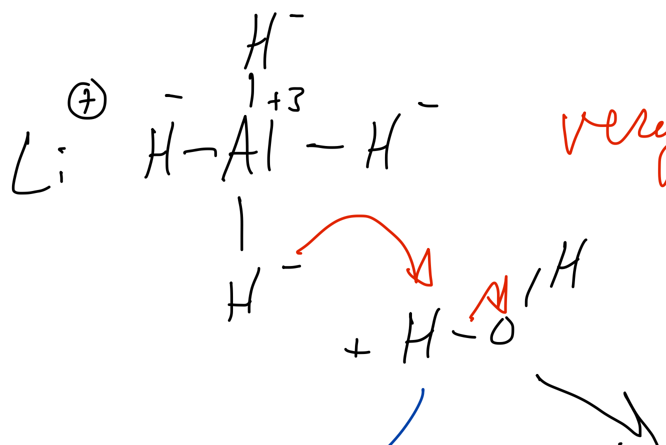
LiAlH4	NaBH4	Li[OC(CH3)3]3H
lithium aluminum hydride	sodium borohydride	lithium tri-tertbutoxyaluminum hydride

very dangerous
only use when
necessary

make certain you are
properly trained

H_2 + heat +
flamable
solvent would
be bad

very strong bases



$Li(Al(OH)H_3)$ + $H_2(g)$ + heat

fire hazard

small amount of H_2O
in organic solvent can be a
problem