(5) **Today**

Sections 11.1 - 11.6: Substitution Reactions

Sections 10.5, 17.6: Alcohols in Nucleophilic Substitution Reactions

Next Class (6)

Sections 11.7 - 11.11: Elimination Reactions

(7) **Second Class from Today**

Sections 11.7 - 11.11: Elimination Reactions

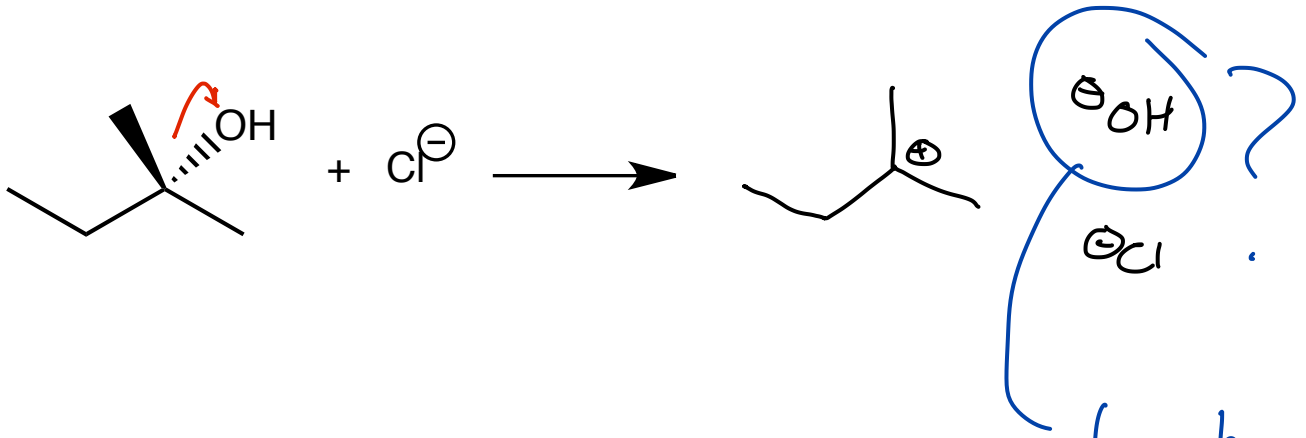
Section 17.6: Alcohols and Elimination Reactions

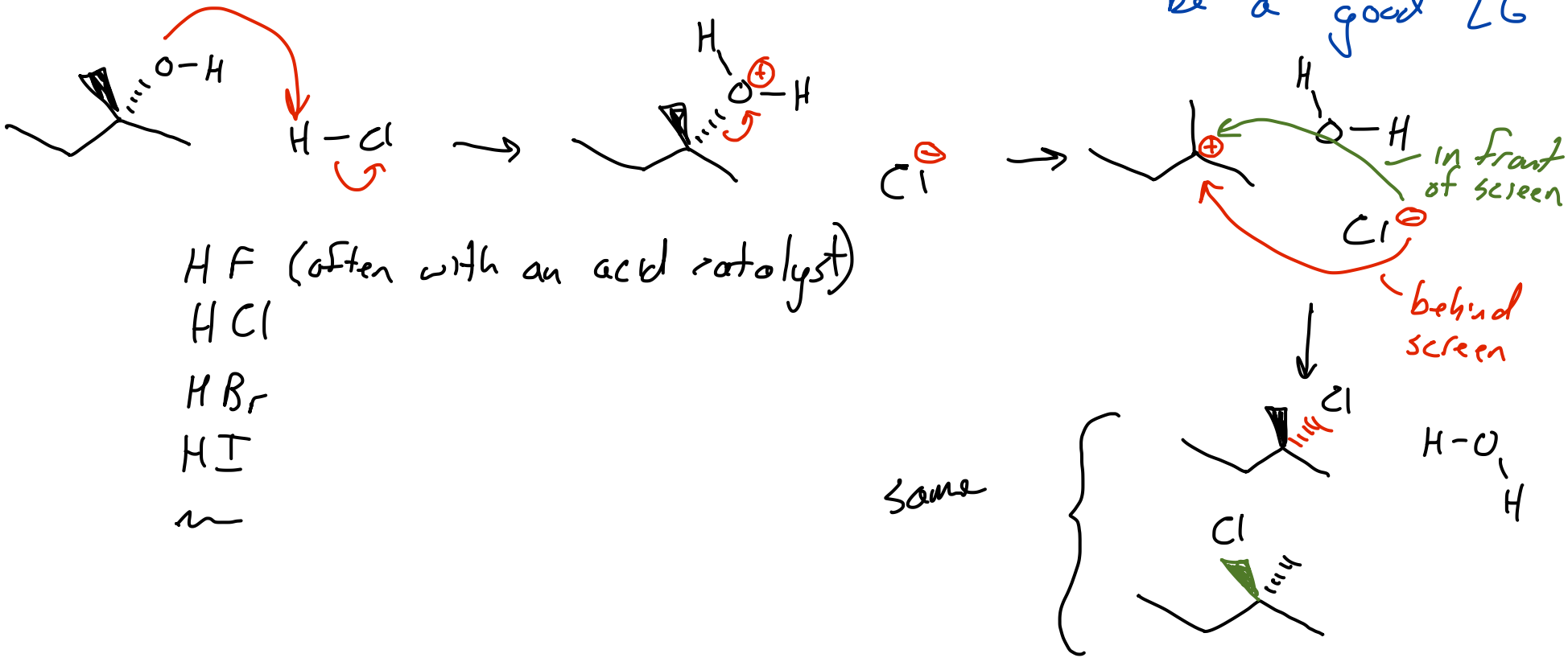
Third Class from Today (8)

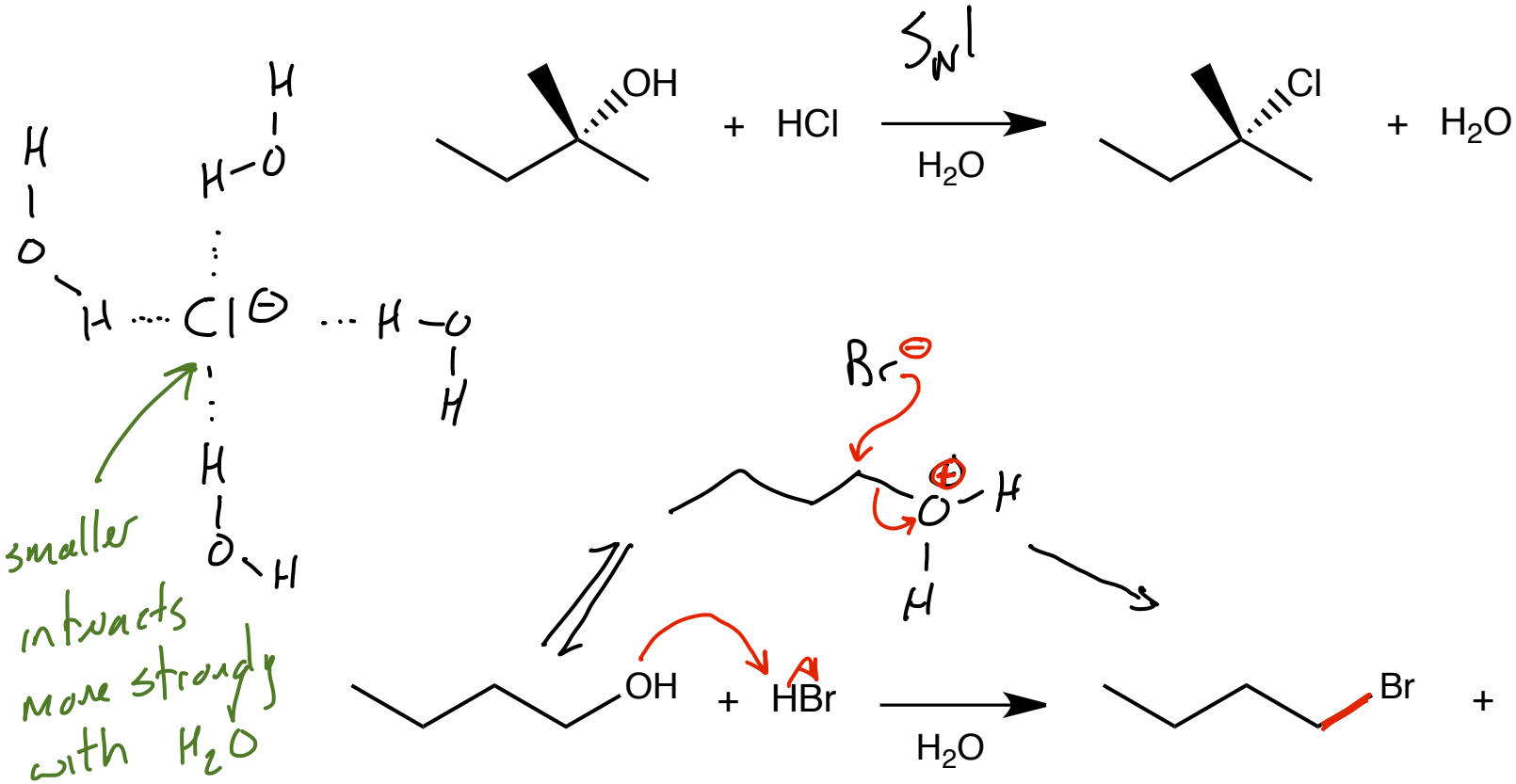
Chap 12: Mass Spectrometry and Infrared Spectroscopy

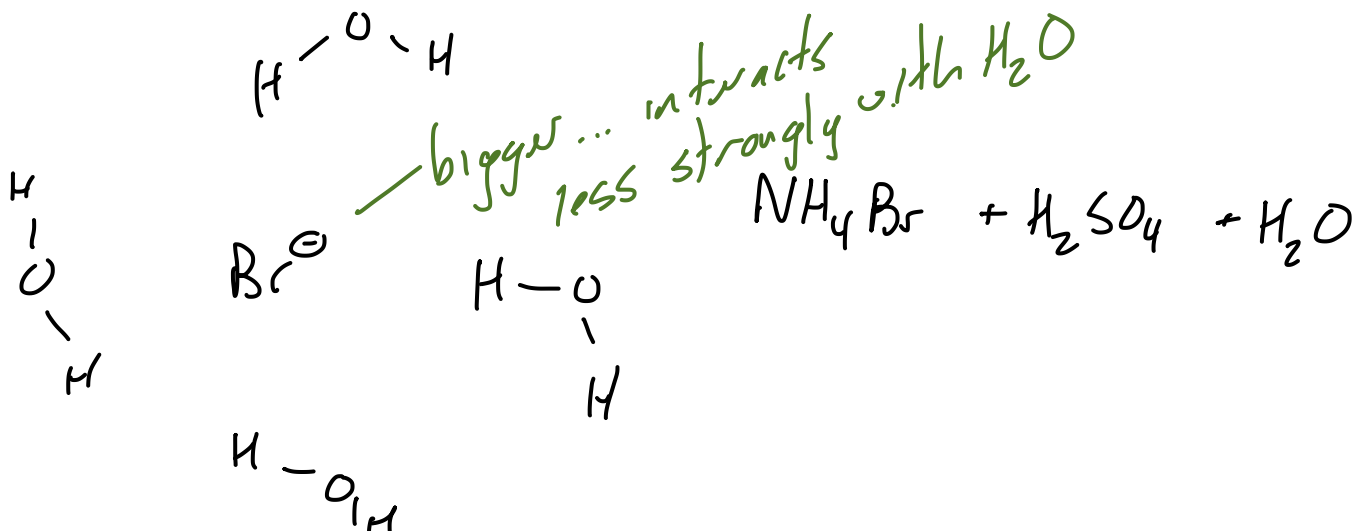
Hydroxide is **not** a good leaving group

Sections 10.5 and 17.6

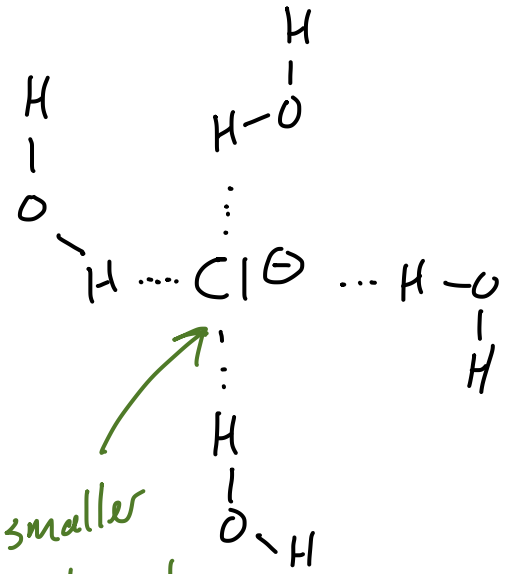





OH
+ HCl
S_N1
H_2O
Cl
+ H_2O
3° α-C
protic solvent
so so Nu
S_N1
smaller
interacts
more strongly
with H_2O
Br
OH
+ HBr
H_2O
Br
+ H_2O
1° α-C
protic solvent
Br^- is a
bit better
S_N2

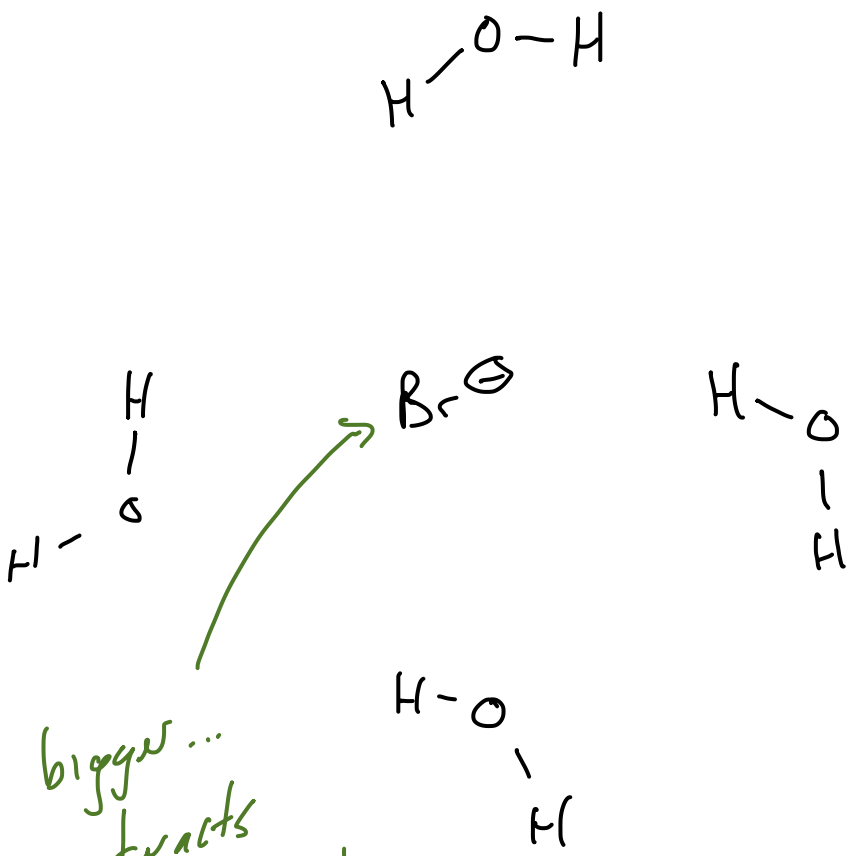

bigger ... interacts
less strongly with H_2O
$NH_4Br + H_2SO_4 + H_2O$

Why doesn't HCl work well for 1° α-C but H-Br does?



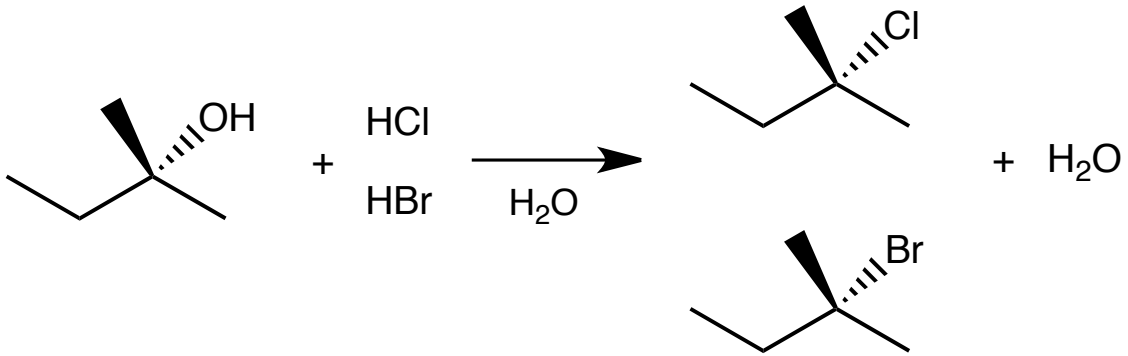
smaller interacts more strongly with H_2O

nucleophilicity reduced due to interaction

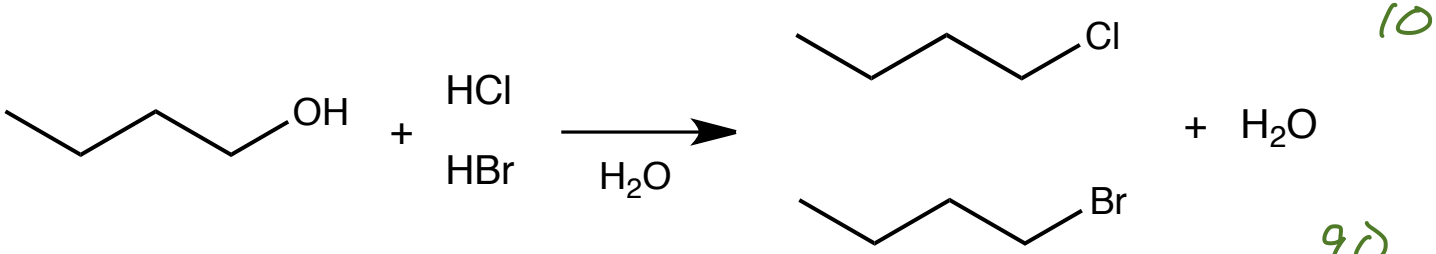


bigger ... interacts less strongly with H_2O

nucleophilicity not reduced as much because interaction with solvent is weaker



roughly 50:50 mixture because nucleophile quality is not important in S_N1

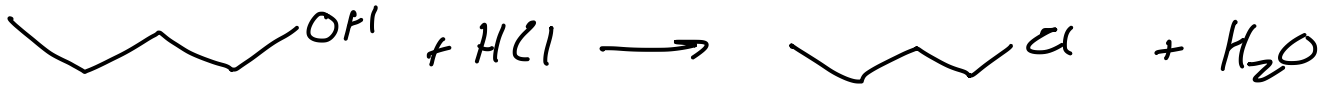


10

90

high temp

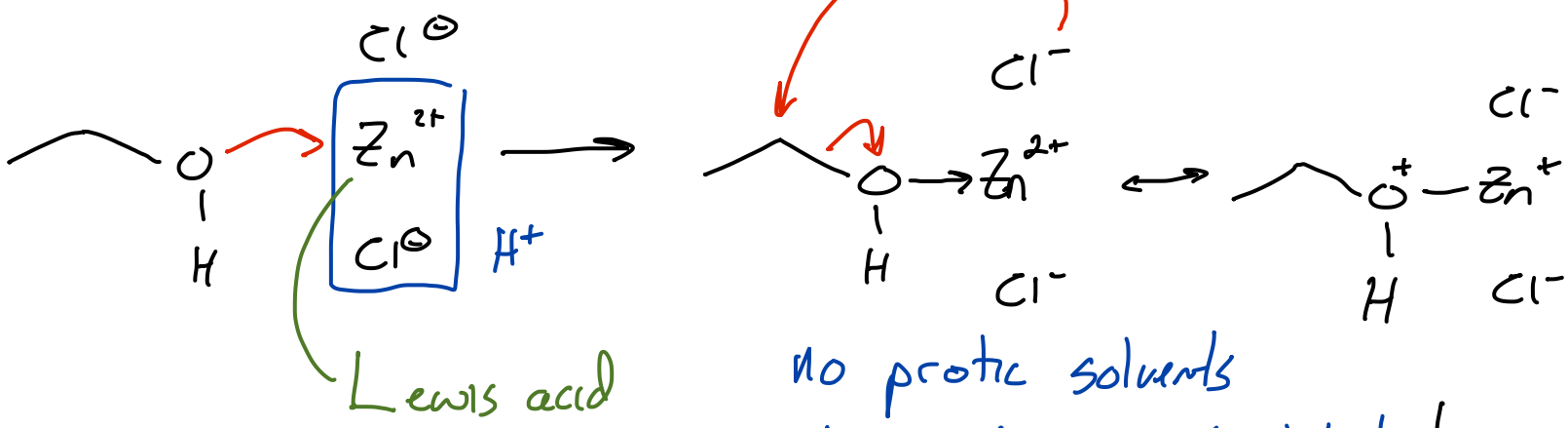
don't use HCl, it doesn't work well



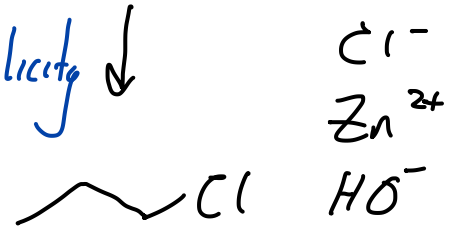
Other ways to convert OH^- to a good leaving group and do subsitution?

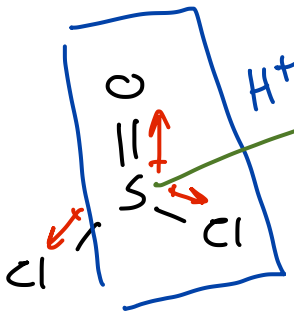
Sections 10.5 and 17.6

Use Lewis acids instead of H^+...

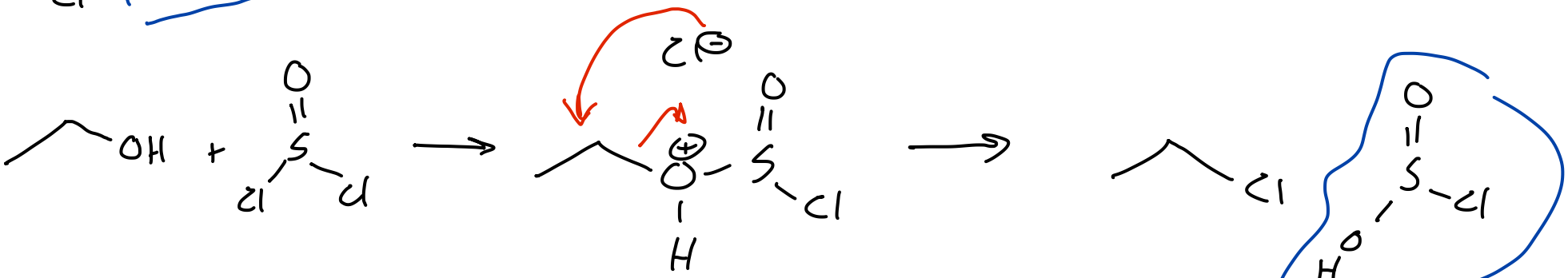


no protic solvents to reduce nucleophilicity ↓

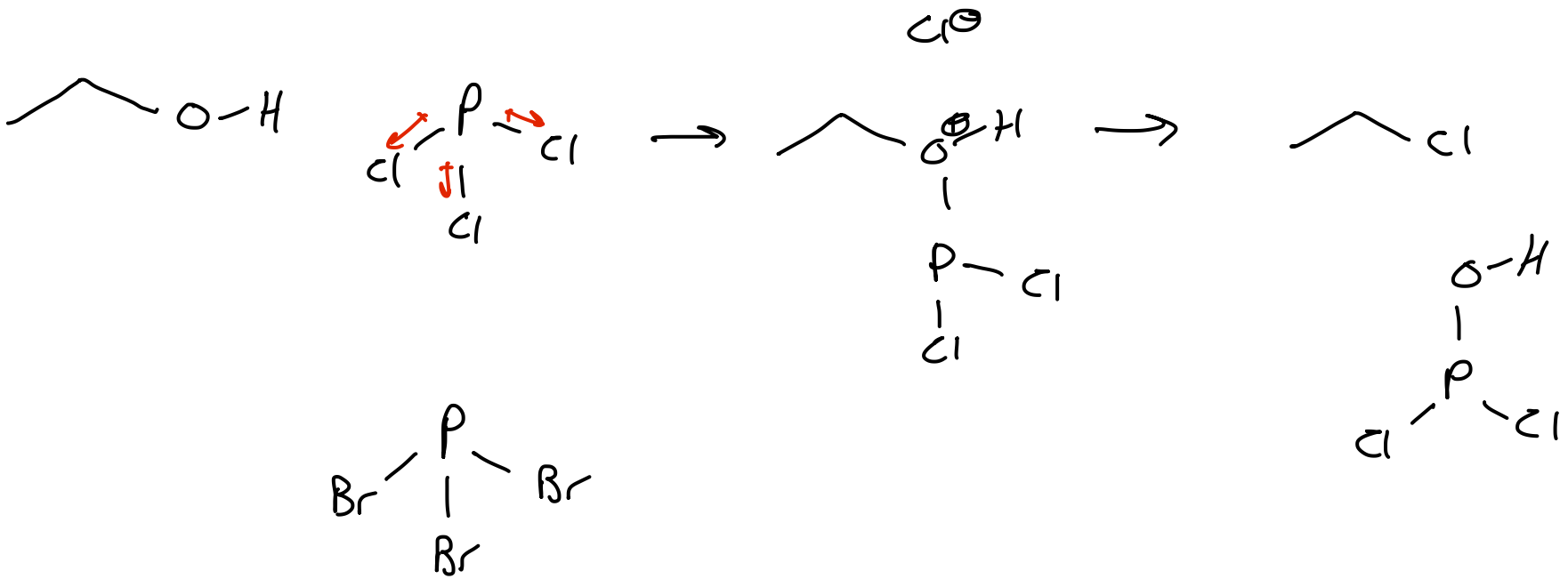




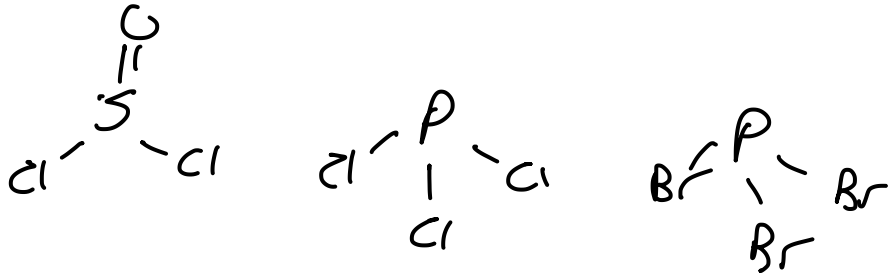
thionyl chloride (dangerous)



decomposes to SO_2 + HCl



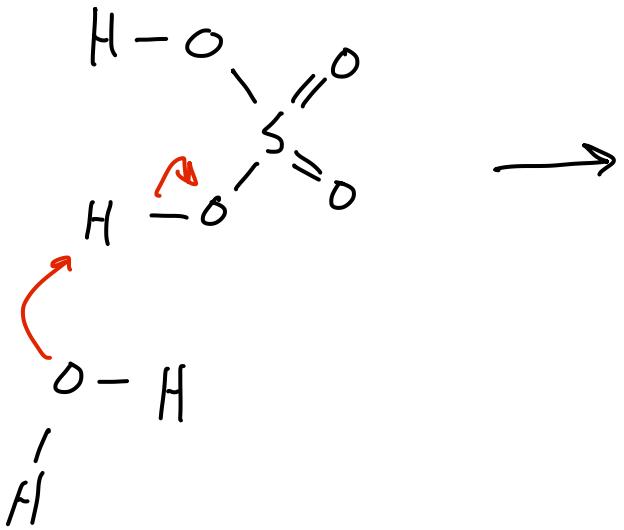
$ZnCl_2$

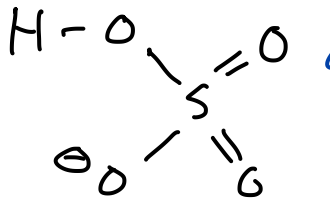


Lewis acids to convert bad $OH^{\ominus}$ LG to a good H-O-something LG and replace the alcohol with a halogen

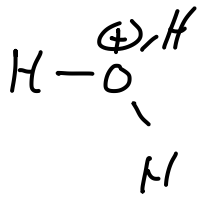
H_2O is weakly basic ... good LG.

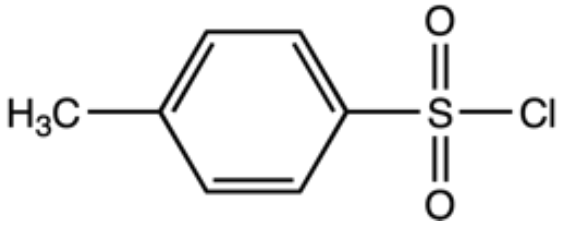
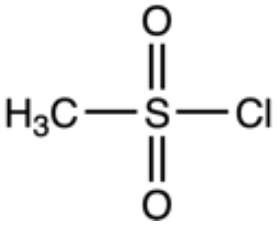
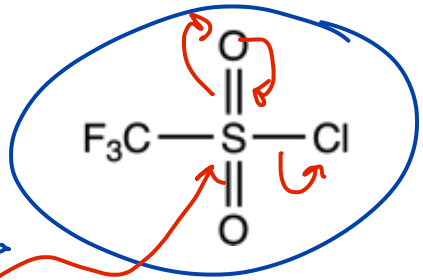
Things that are even weaker bases than H_2O would be even better leaving groups.





this is a weaker base than H_2O



p-toluenesulfonylchloride	methanesulfonyl chloride	trifluoromethanesulfonyl chloride
		
p-toluenesulfonate a.k.a. toscylate	methanesulfonate	trifluoromethanesulfonate a.k.a. triflate