(28) **Today**

Chap 16.1 - 16.5: Electrophilic Aromatic Substitution

Next Class (29)

Chap 15.2 – 15.6: Aromaticity

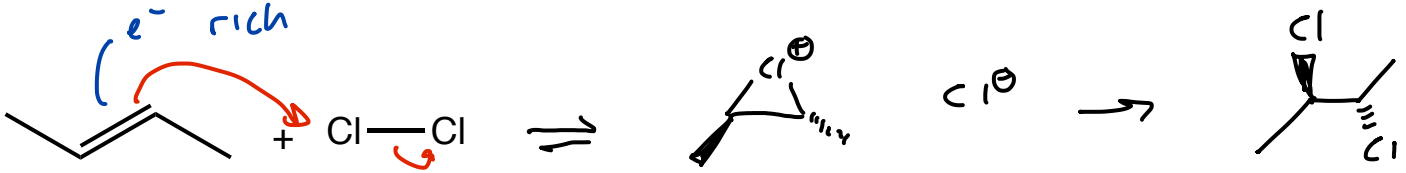
Chap 16.1 - 16.5: Electrophilic Aromatic Substitution

(30) **Second Class from Today**

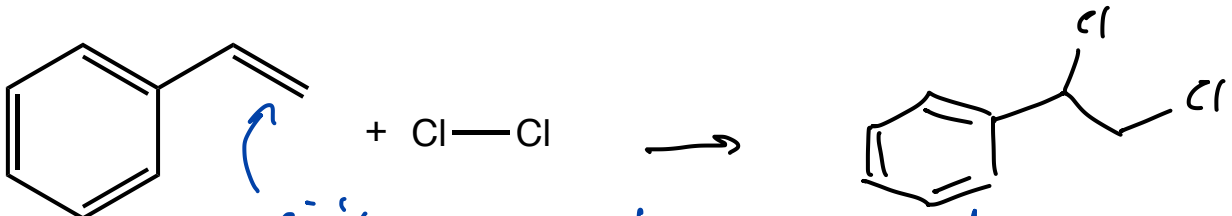
Chap 16.1 - 16.5: Electrophilic Aromatic Substitution

Third Class from Today (31)

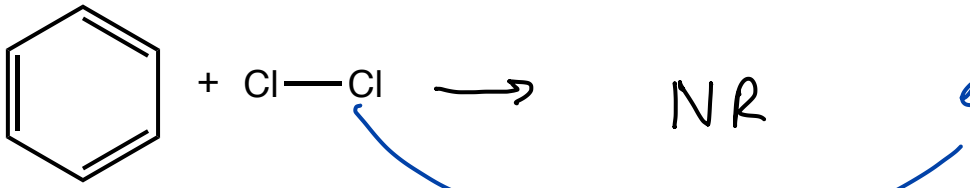
Chap 16.1 - 16.5: Electrophilic Aromatic Substitution



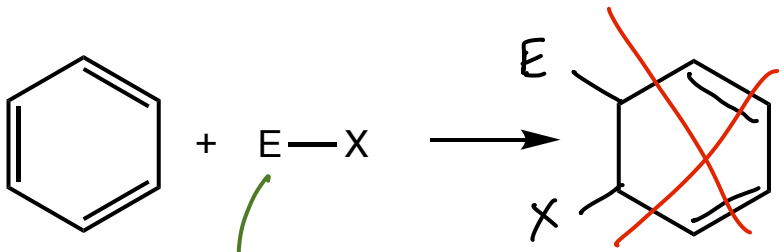
two eneg atoms "fighting" over e⁻'s in the bond = electrophile



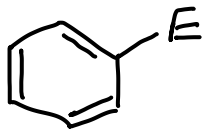
e⁻'s in C to C π bond are more reactive than e⁻'s in aromatic π bonds



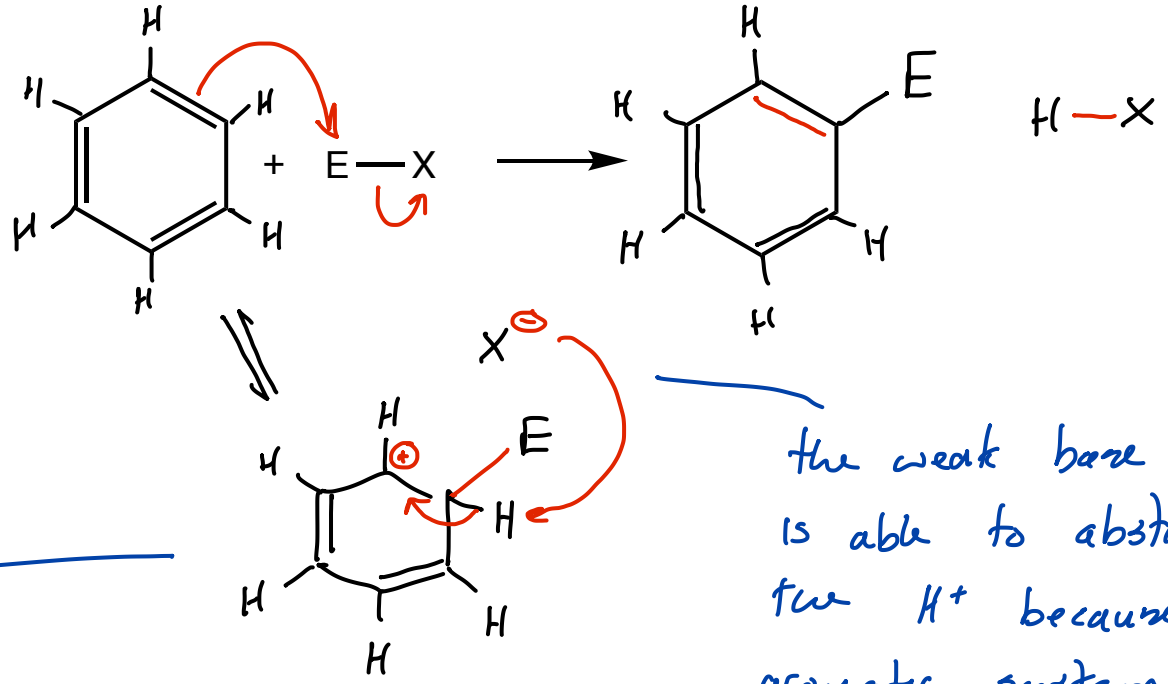
electrophiles stronger than Cl_2 are needed to crack into the aromatic system



a generic super electrophile

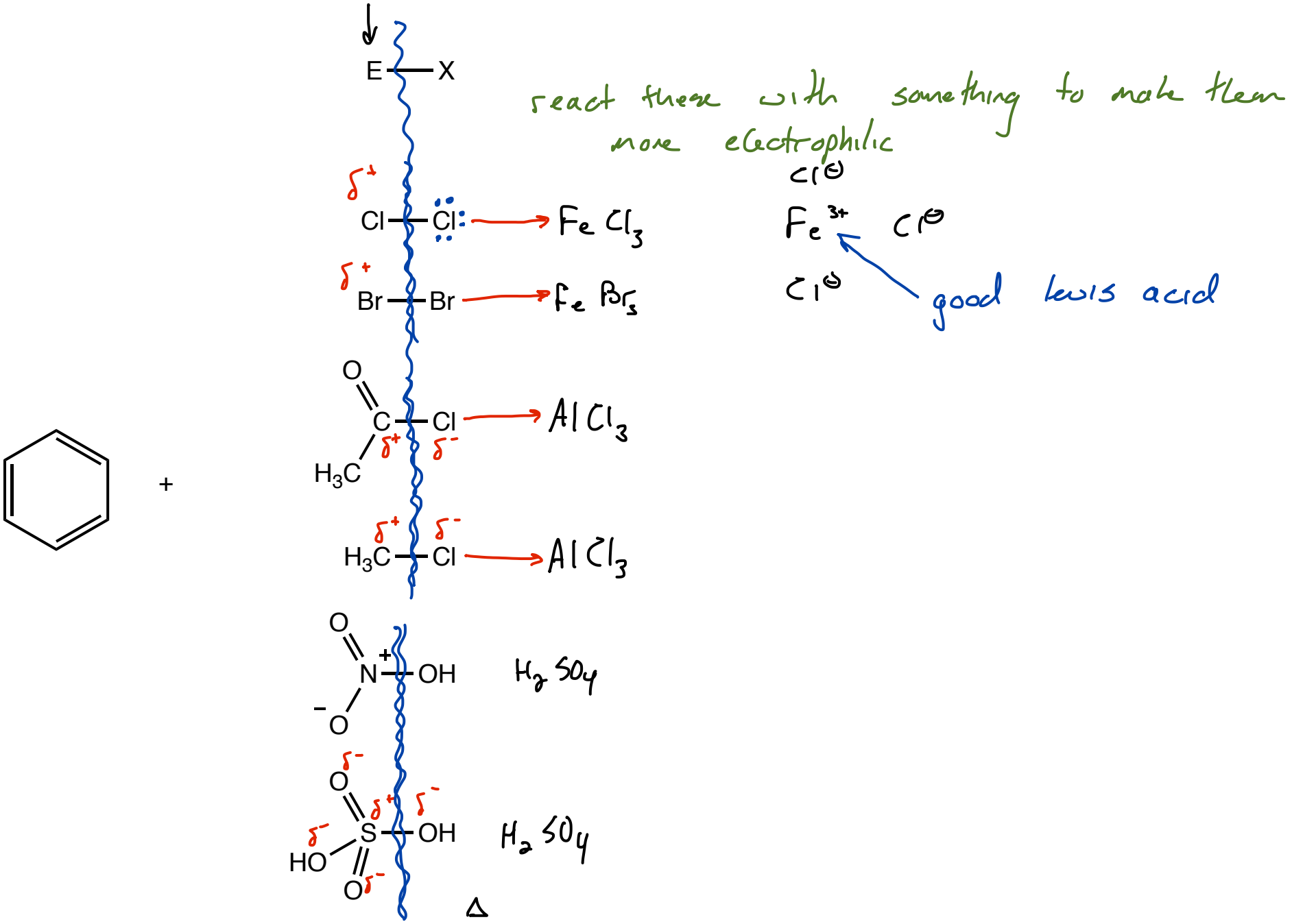


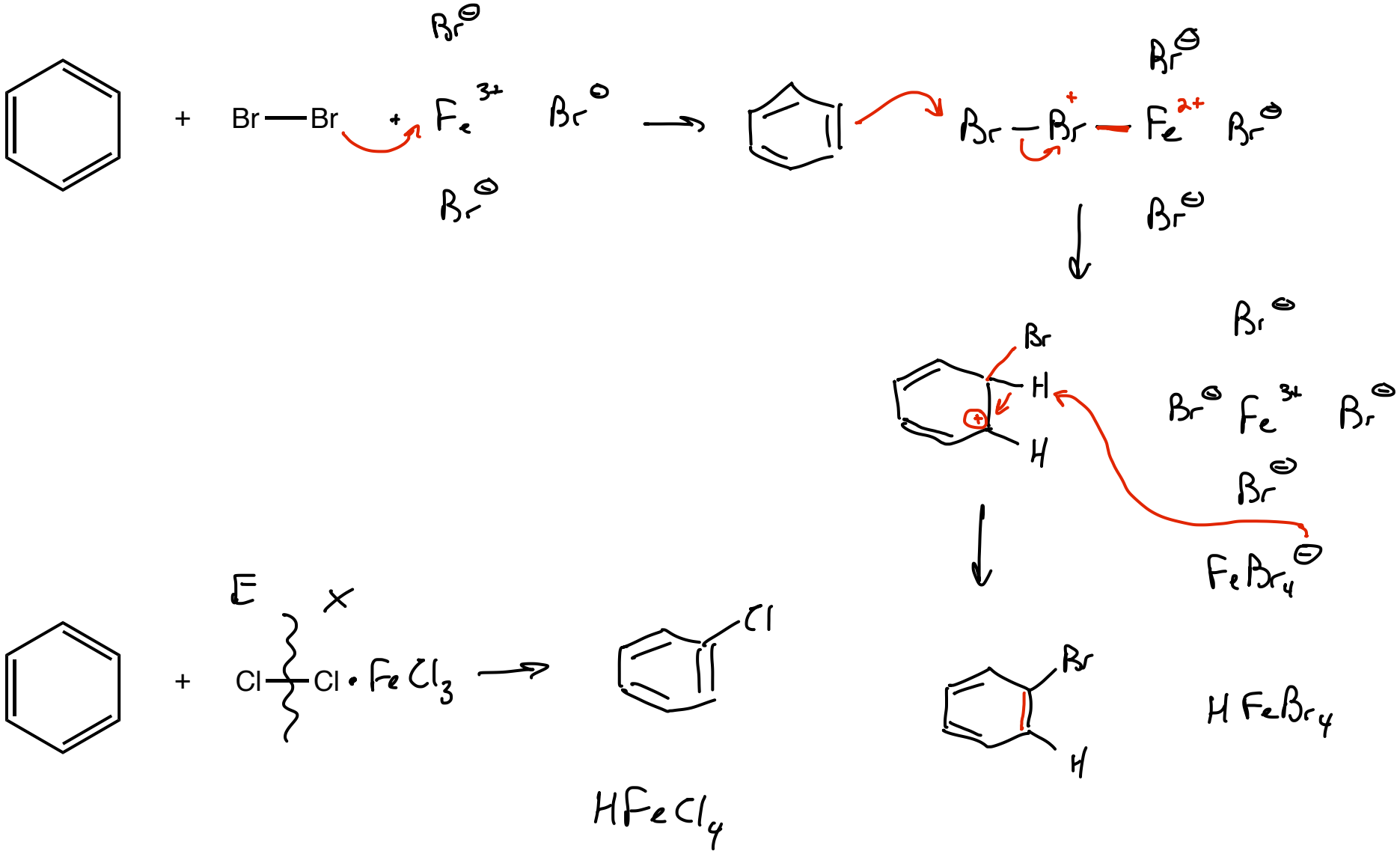
H-X used to be on the benzene ring



aromaticity is lost when intermediate forms

the weak base is able to abstract the H^+ because an aromatic system forms once H^+ is remove

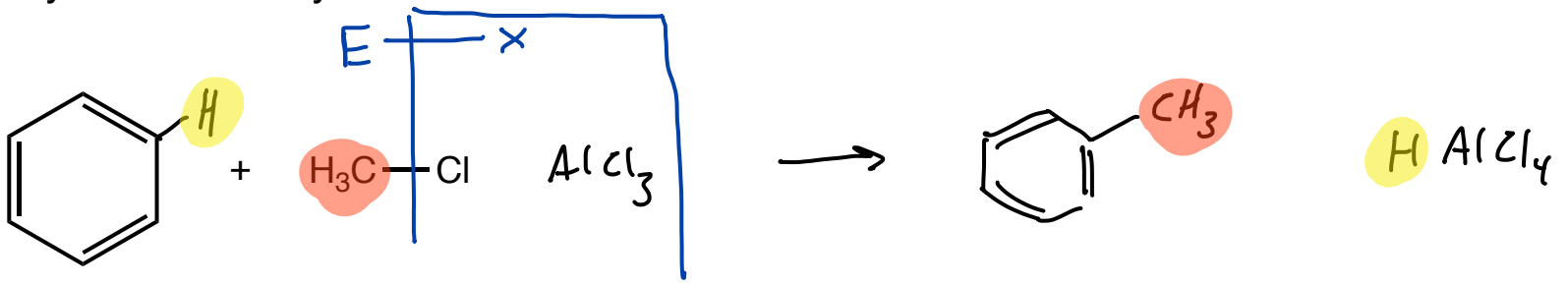

E X
react these with something to make them more electrophilic
Cl Cl
FeCl3
Br Br
FeBr3
AlCl3
AlCl3
H2SO4
H2SO4
Cl⊖
Fe3+ Cl⊖
Cl⊖
good lewis acid


Br—Br
$FeBr_4^-$
$HFeBr_4$
$HFeCl_4$

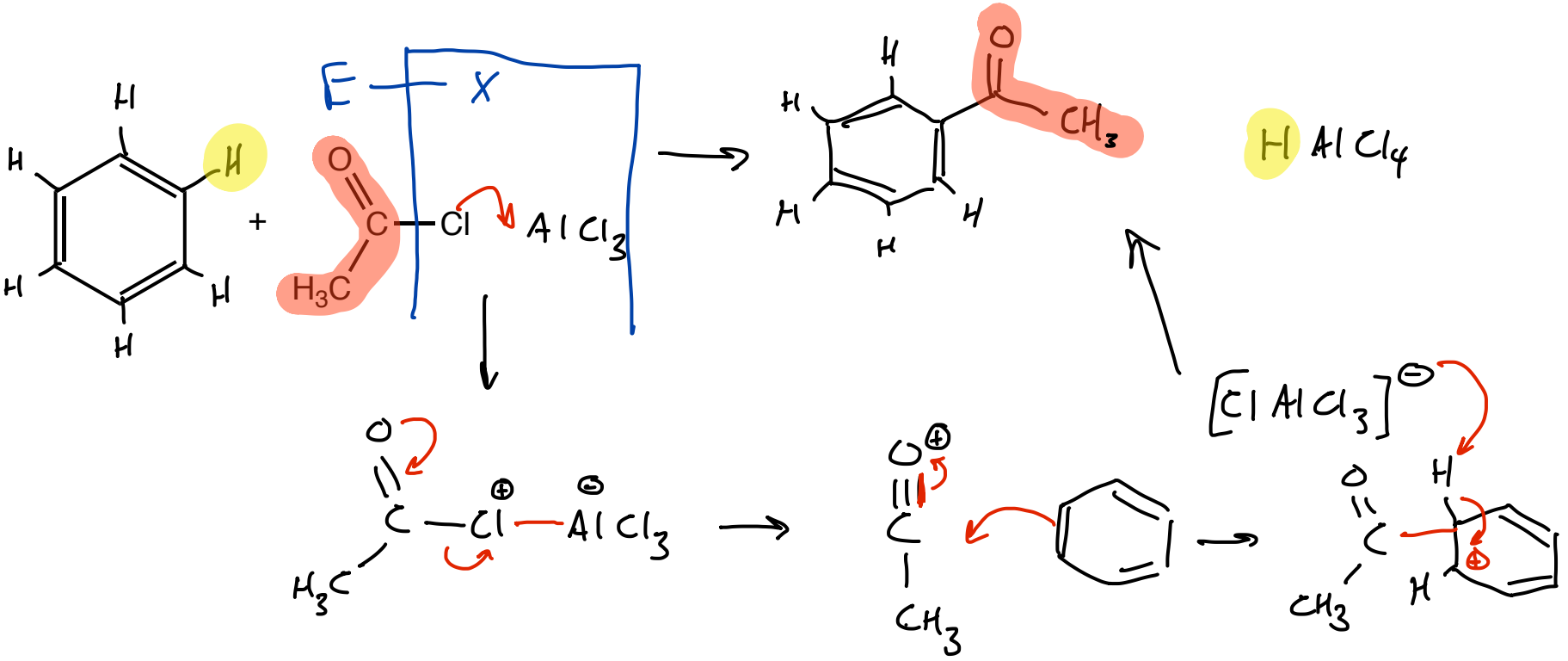
Friedel-Crafts

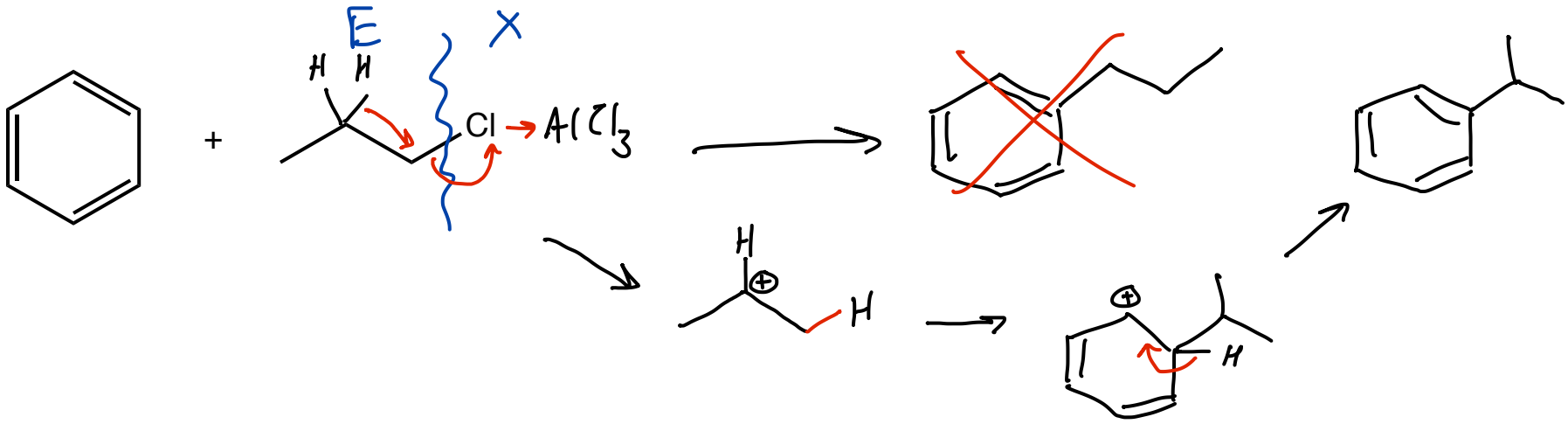
Alkylation and Acylation

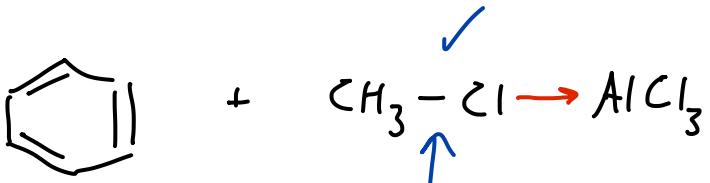
Section 16.1 - 16.3



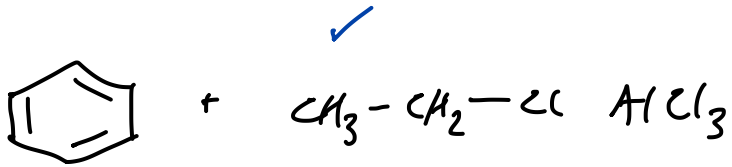
AlCl3 is Lewis acidic enough to cause C to Cl bonds to break if a reasonable cation forms

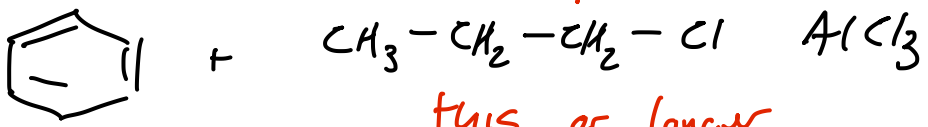




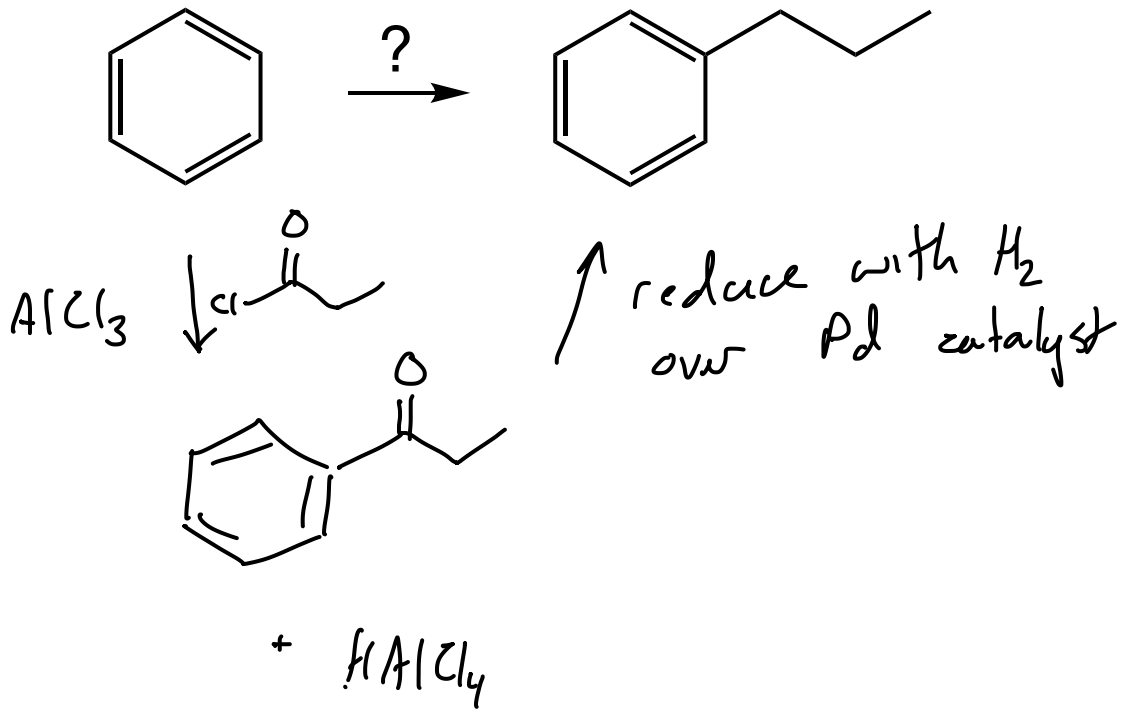


this bond is polarized but doesn't break until benzene reacts with it

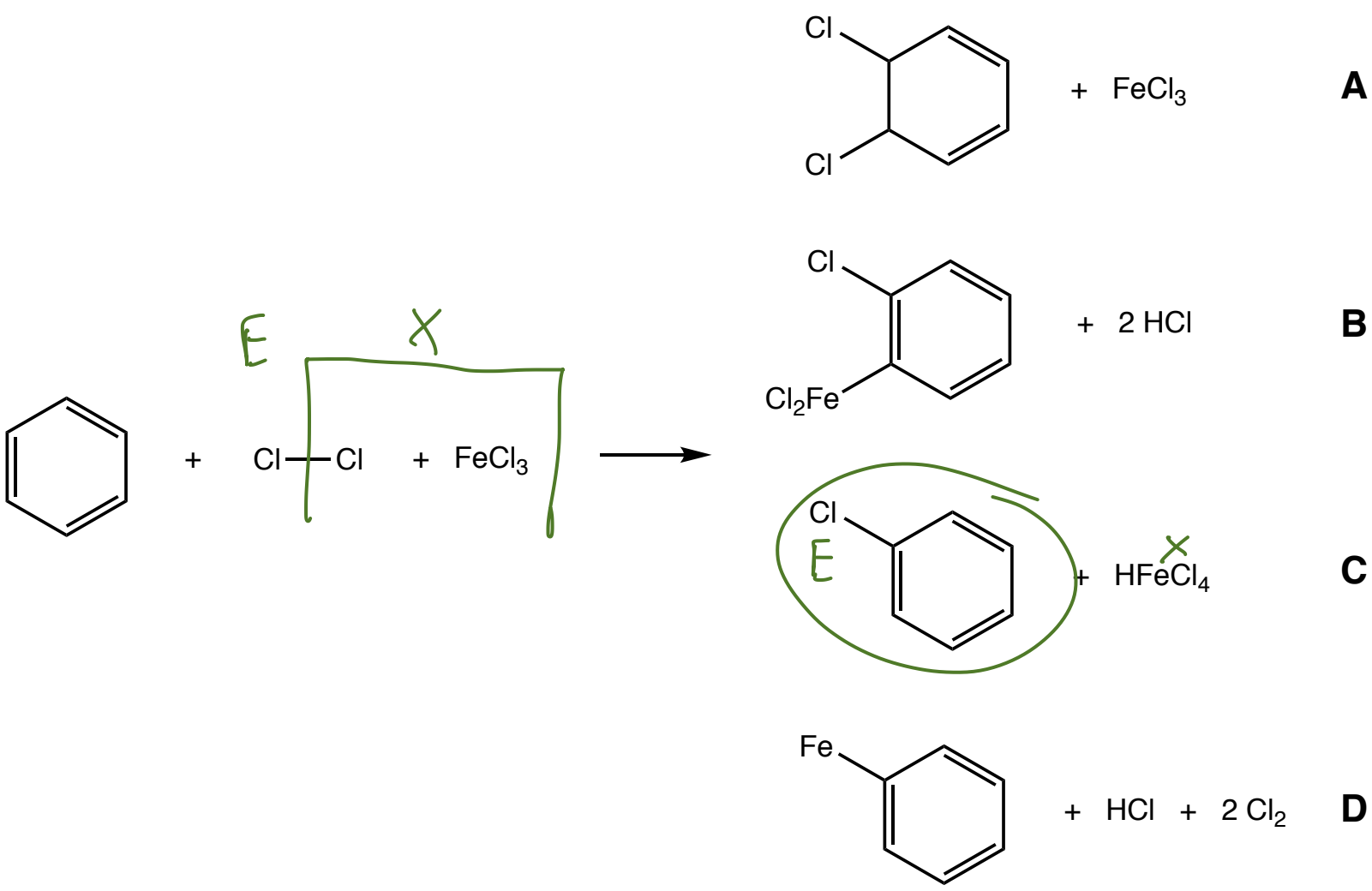




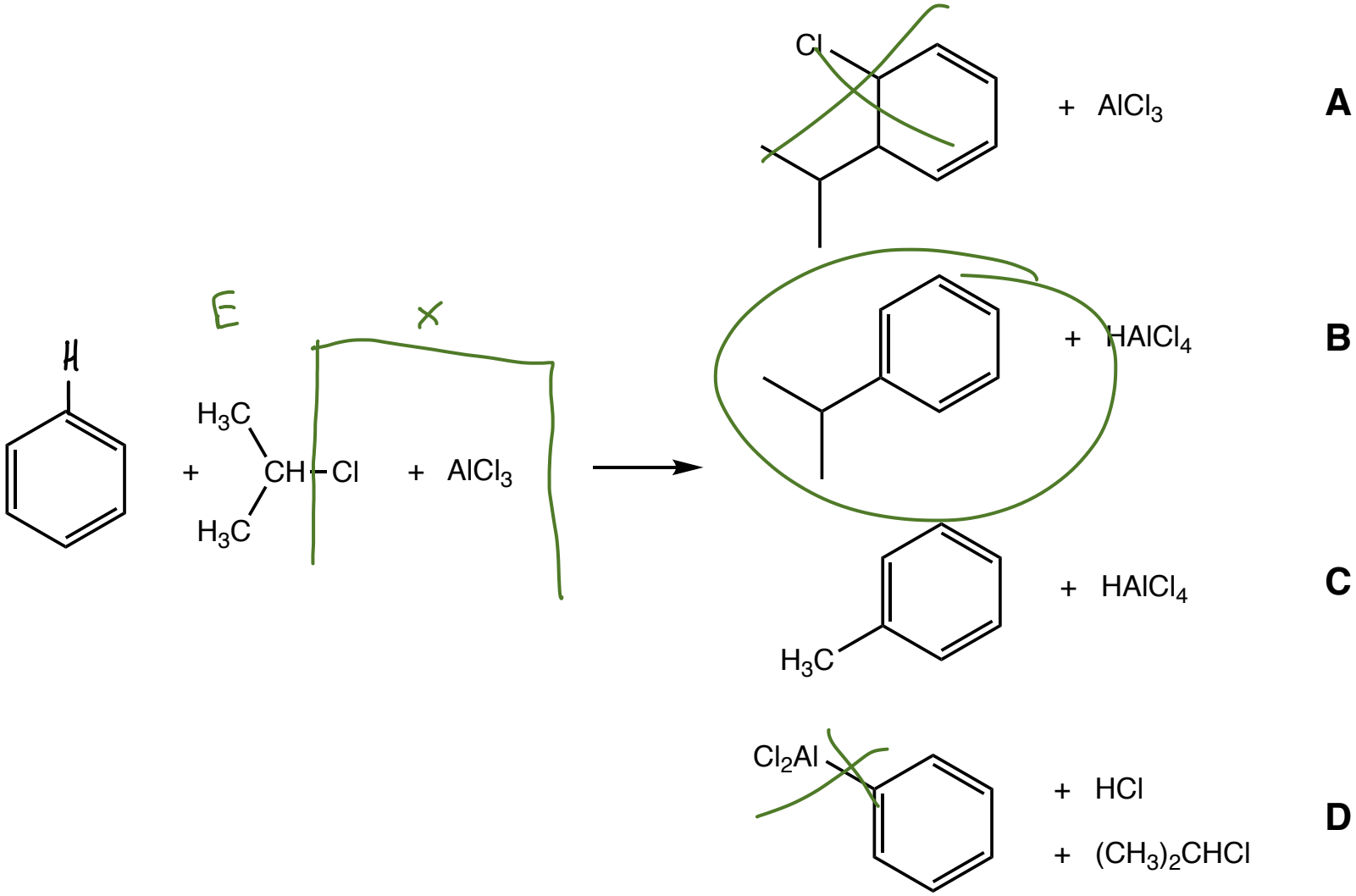
this or longer will rearrange


?
AlCl3
reduce with H2
over Pd catalyst
+ HAlCl4

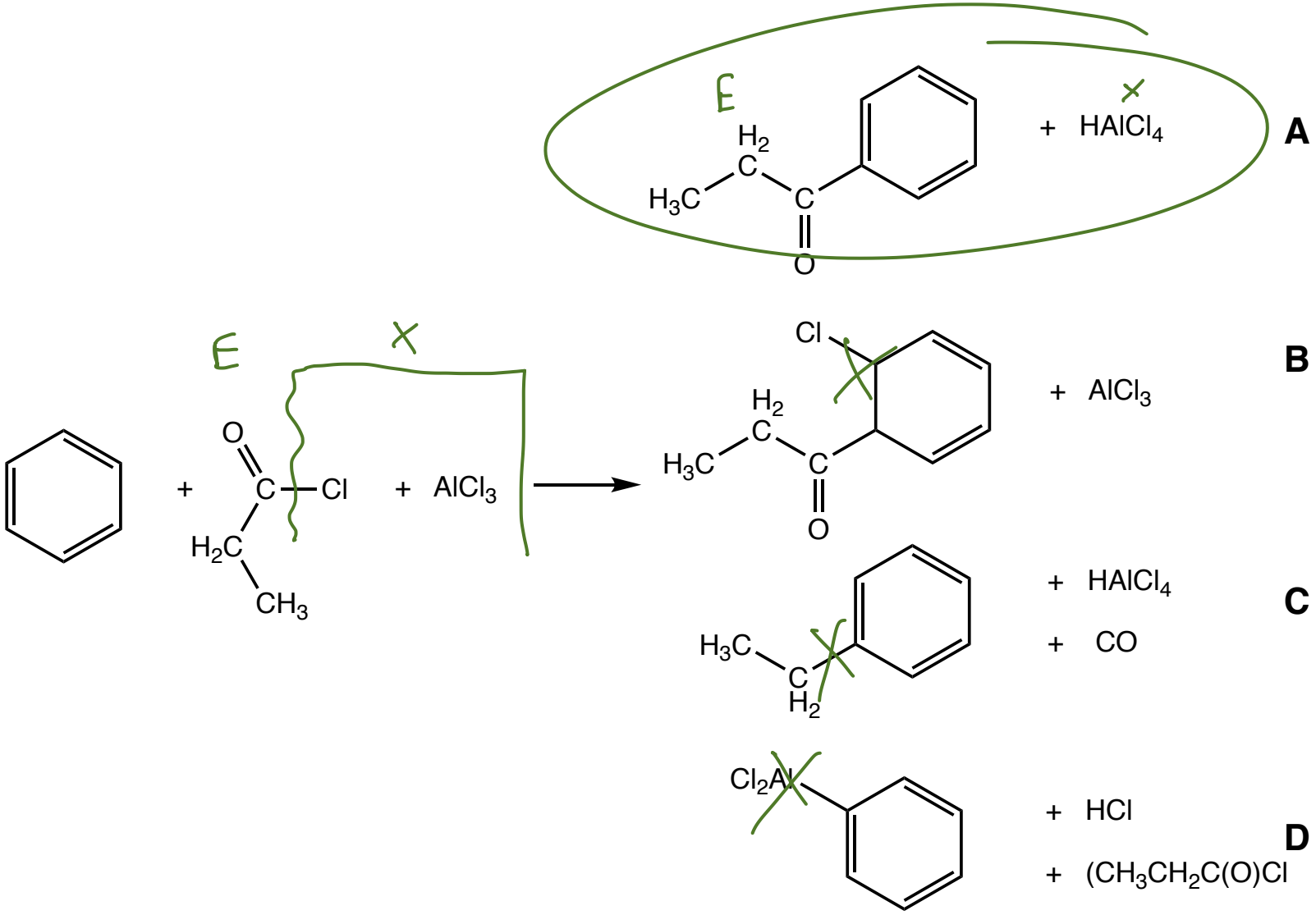
Review


Cl
Cl
+ FeCl3
A
Cl
Cl2Fe
+ 2 HCl
B
Cl
E
+ HFeCl4
C
Fe
+ HCl + 2 Cl2
D
+
Cl—Cl
+ FeCl3

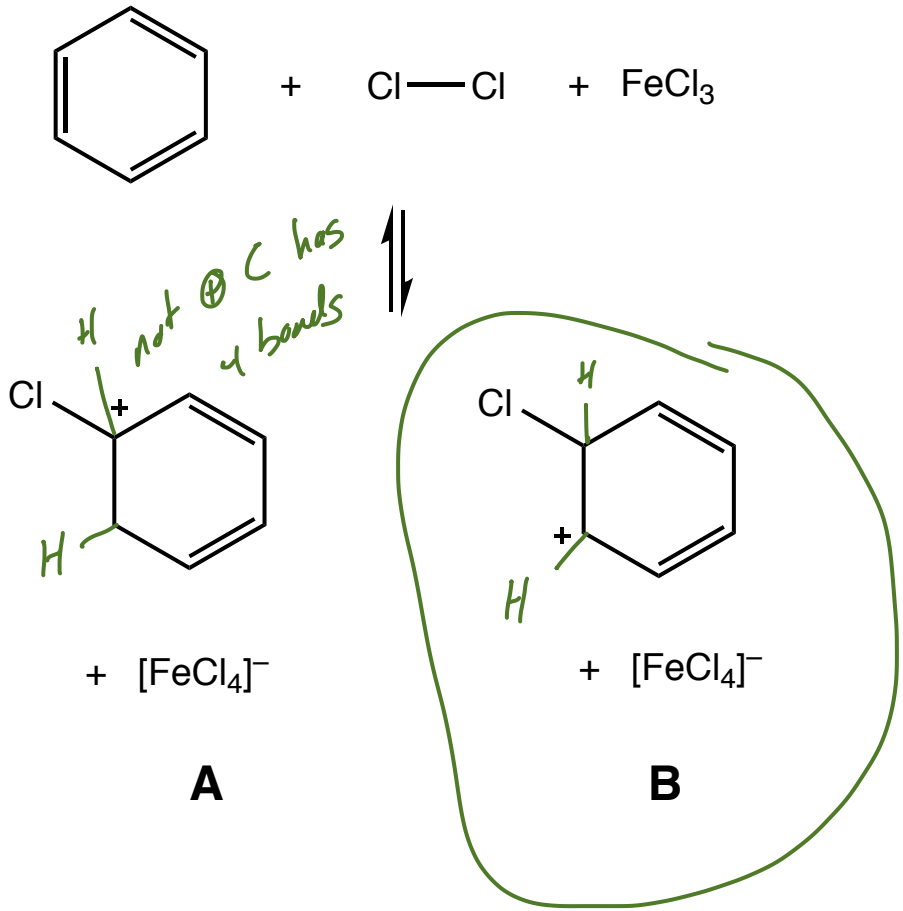
Review


H
E
X
H_3C
CH
Cl
H_3C
+ $AlCl_3$
Cl
+ $AlCl_3$
A
+ $HAlCl_4$
B
+ $HAlCl_4$
C
H_3C
Cl_2Al
+ HCl
+ $(CH_3)_2CHCl$
D

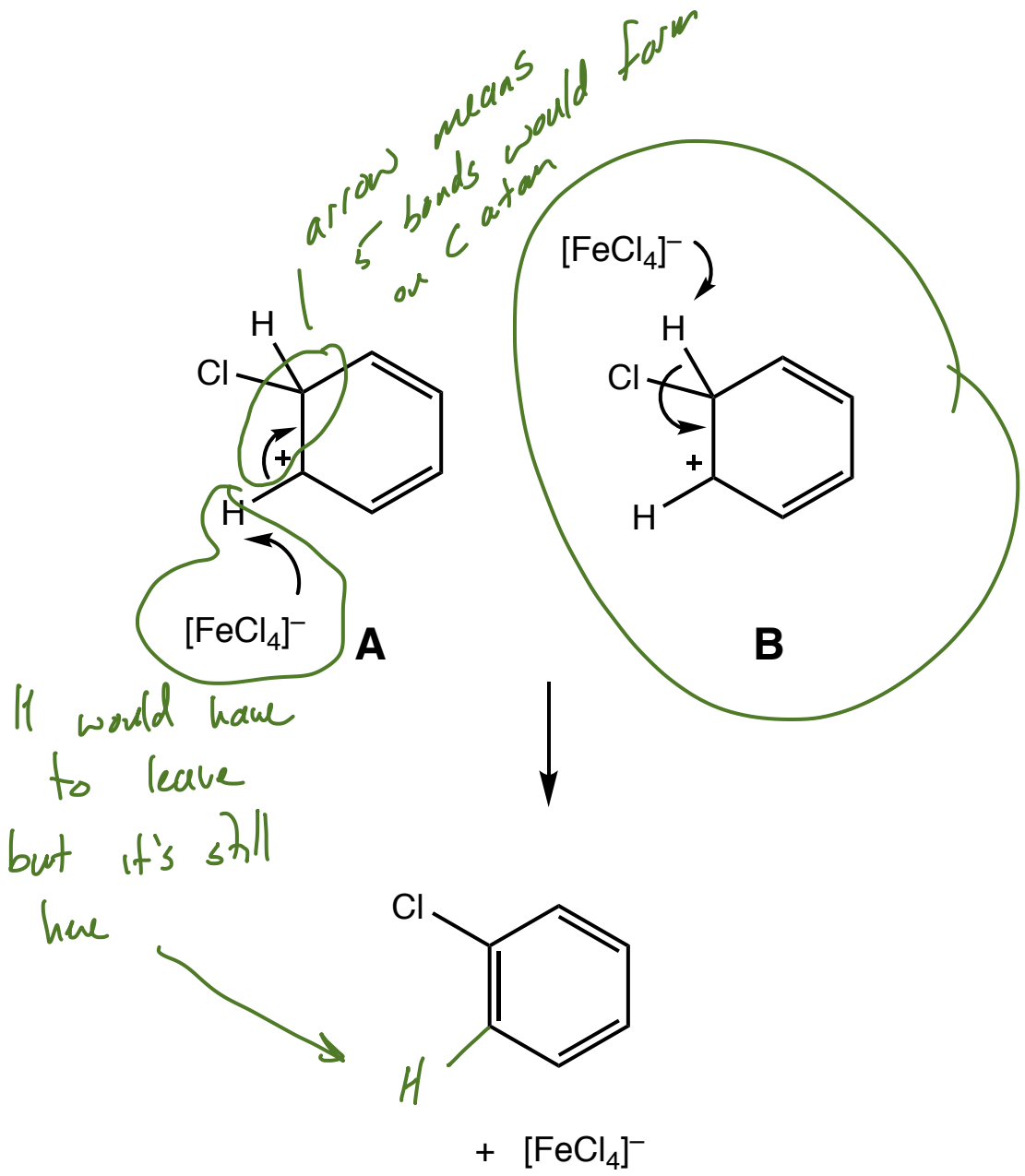
Review



Review



Review


arrow means 5 bonds would form or C atom
H
Cl
+
H
[FeCl4]−
A
[FeCl4]−
H
Cl
+
H
B
It would have to leave but it's still here
Cl
H
+ [FeCl4]−