# CHEM 8B, Lecture 1

- Mini 8A Refresher
- Chapter 16.1-16.3 : Electrophilic Aromatic Substitution (EArS)

## FG's


arene ketone aldehyde ester alcohol

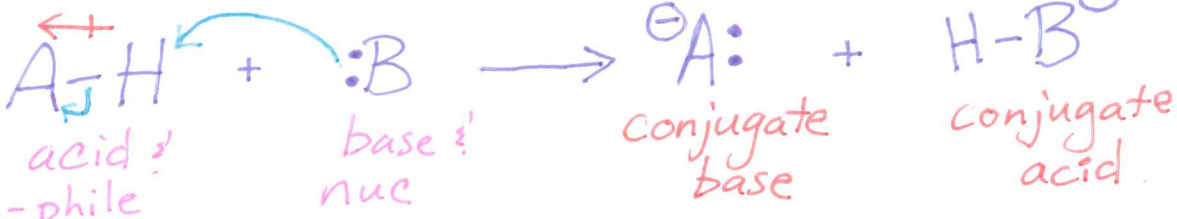
and more!

## Arrow-Pushing

always from e-rich to e-poor


## ACID-BASE CHEMISTRY

acids accept electrons



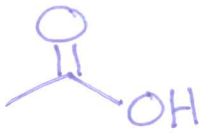

acid / e-phile

base / nuc

conjugate base

conjugate acid

pKa's




pKa = 5

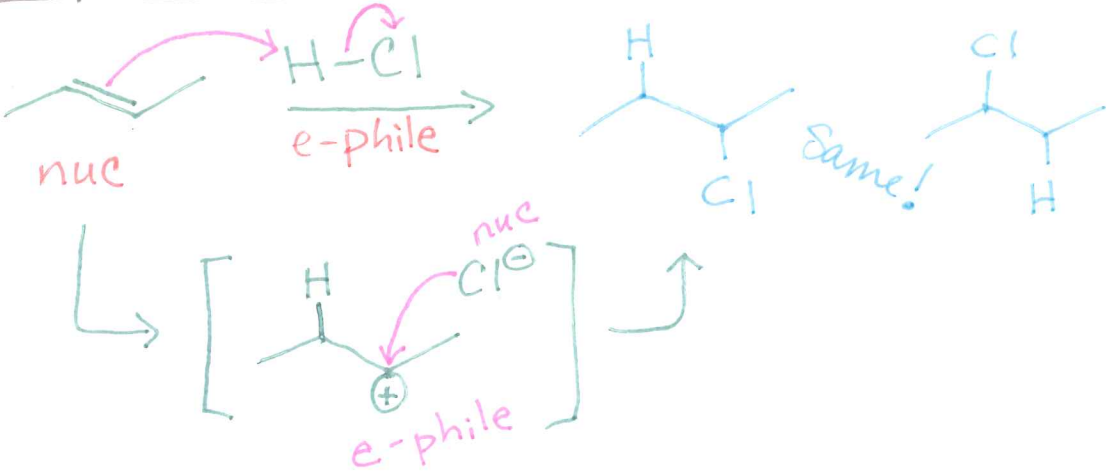
any carb. acid has pKa ~ 5 and is more acidic than any alcohol

$H_2O$ pKa = 16

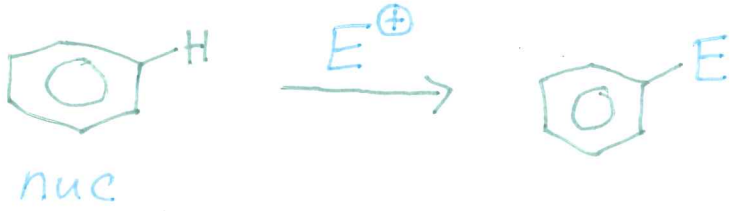
H-OH

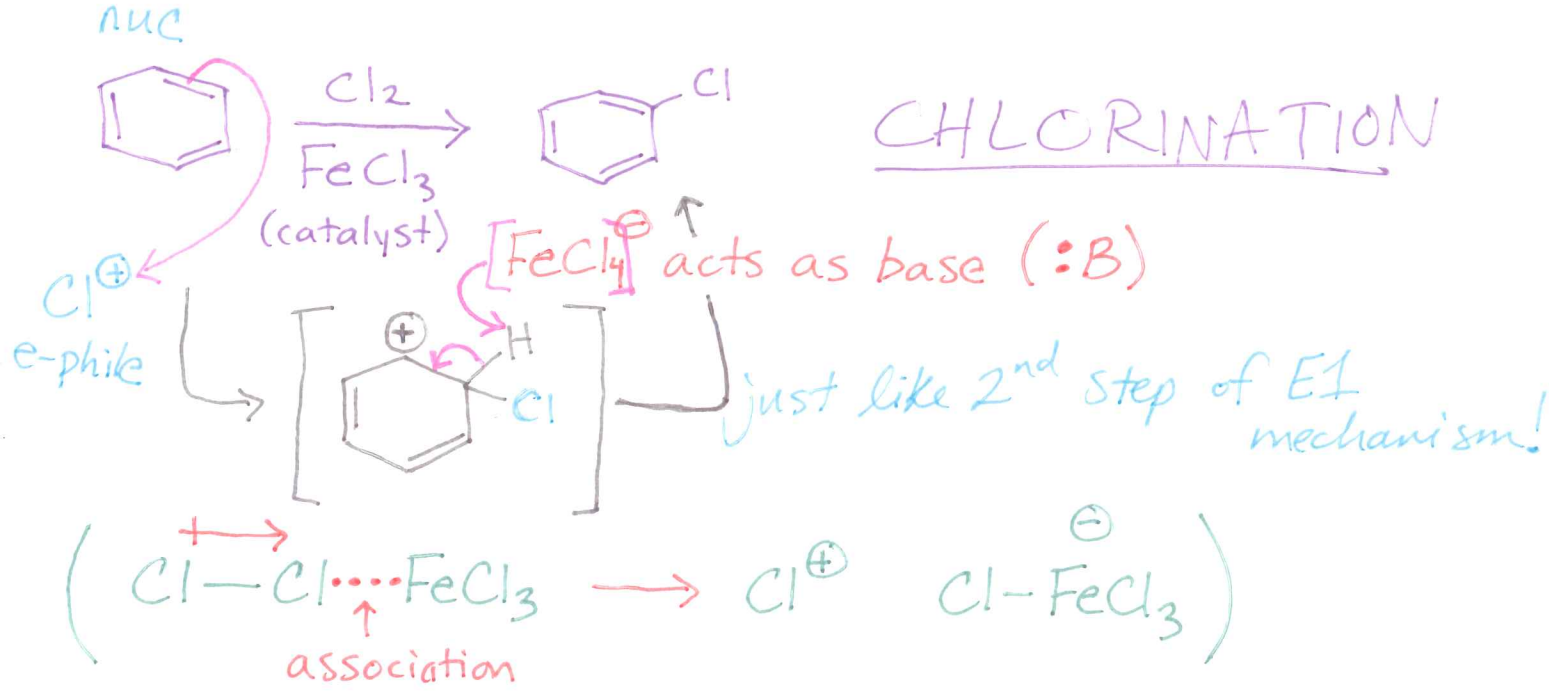
H-OR alcohol

# Electrophilic Addn to Alkenes (Ch 8)



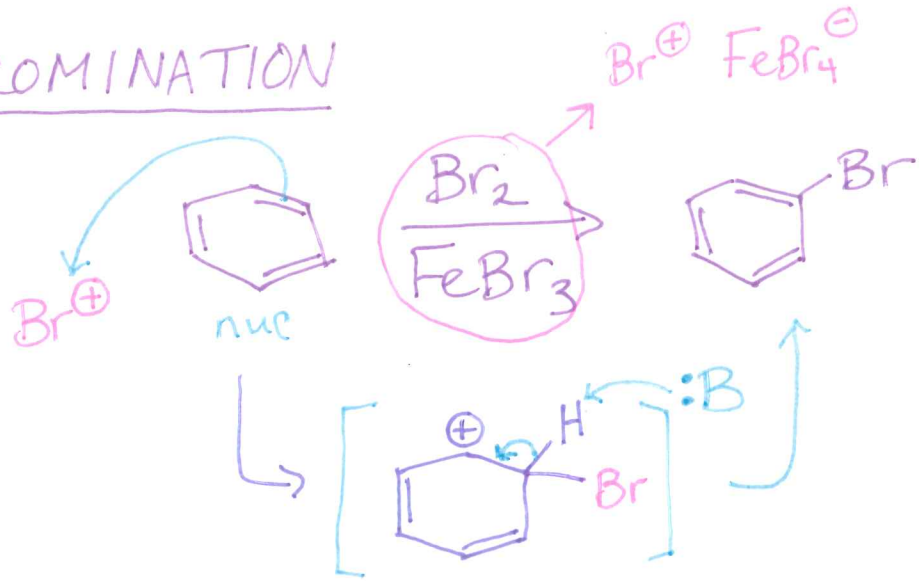

# CHAPTER 16 Electrophilic Aromatic Substitution (EArS)



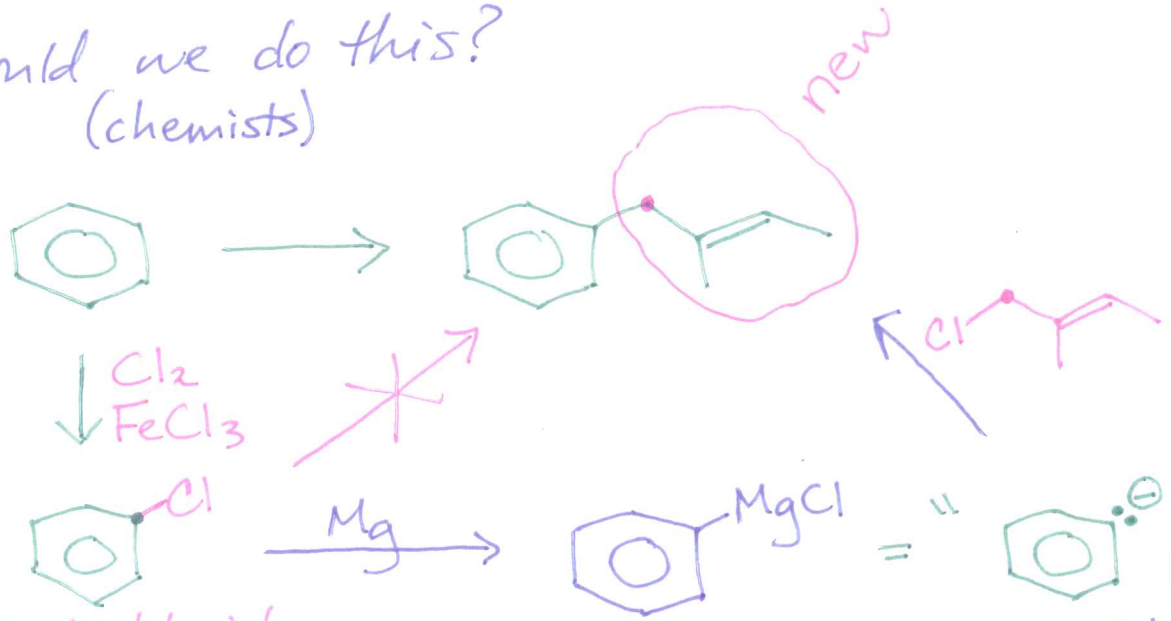




## CHLORINATION

# BROMINATION




Why would we do this?
(chemists)

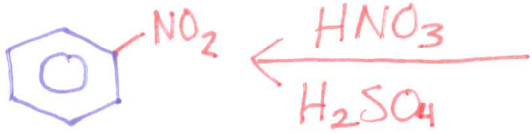



aryl chloride
DO NOT PARTICIPATE
DIRECTLY IN SUB. RXNS

Phenyl magnesium chloride
(GRIGNARD REAGENT)

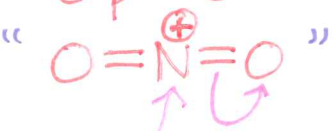
# EArS

## Nitration




new C-N bond

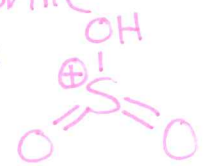
e-phile

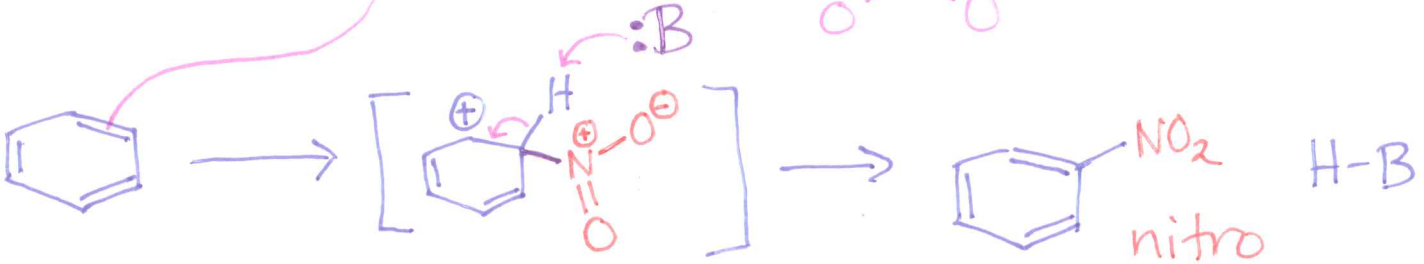


## Sulfonation


sulfonic acid

e-phile



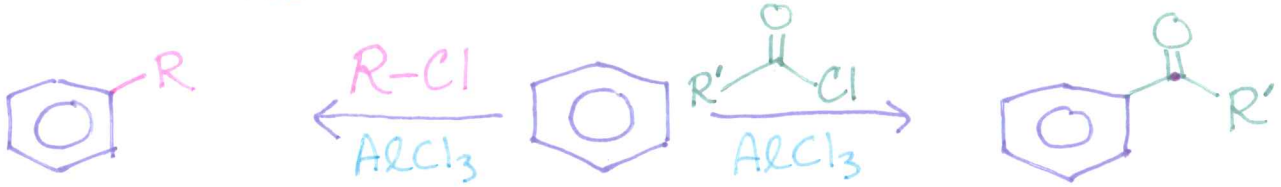



"nitro group"

nitro benzene

# EArS : Friedel-Crafts Alkylation & Acylation

*new C-C bonds*

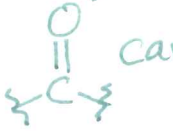



alkylation

$R^{\oplus}$ e-phile

$AlCl_4^{\ominus}$ base

acylation



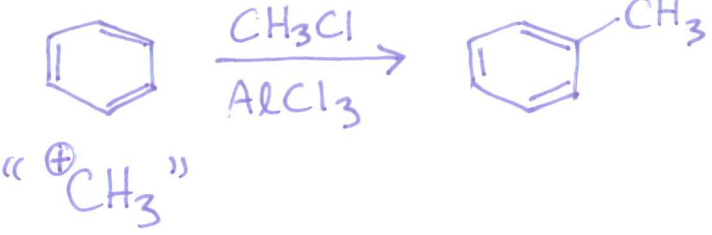


e-phile

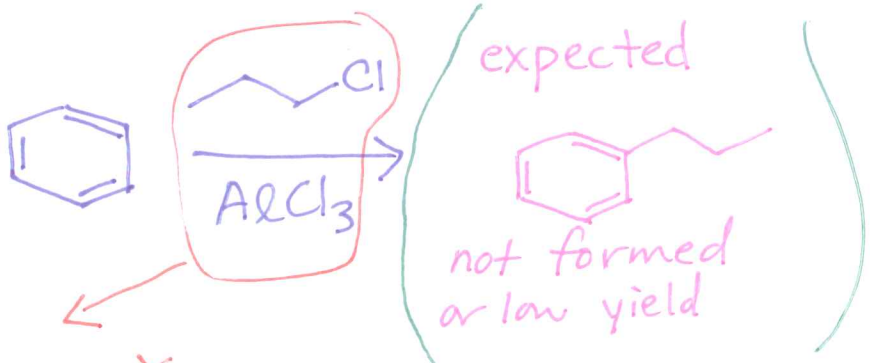
$AlCl_4^{\ominus}$ base

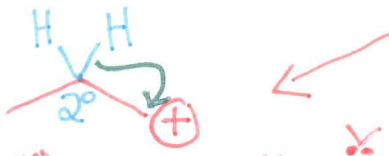
# FC Alkylation

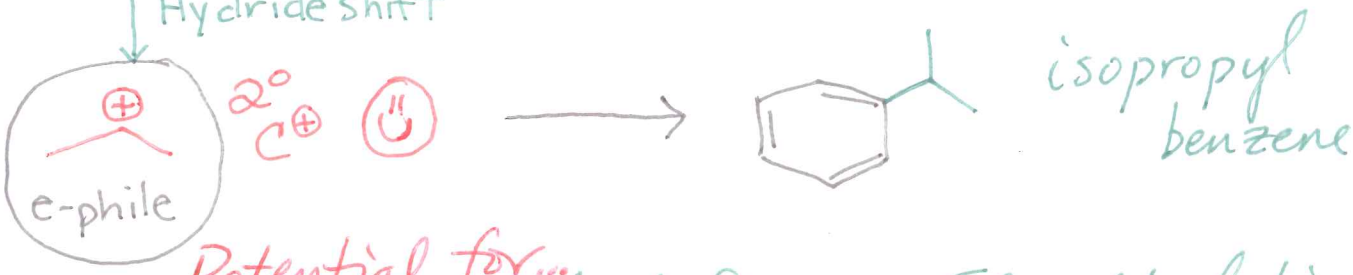
(1)




(2)

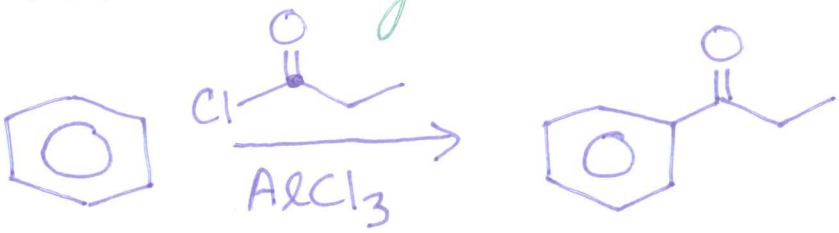


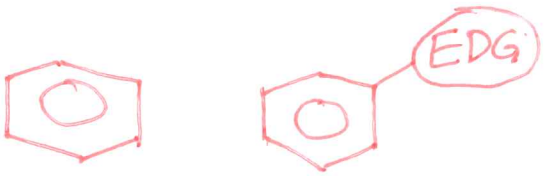




Potential for...

...Hydride or alkyl shifts in FC alkylation only, not FC acylation




All FC rxns require benzene to be "activated"




"deactivated" rings won't react