

Exam 2 Friday

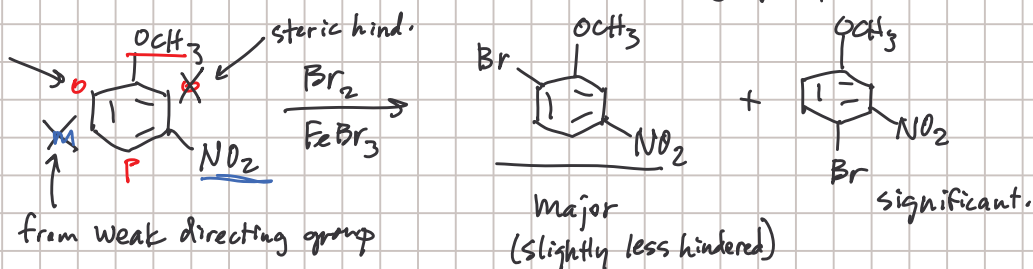
Webassign due tonight

Skip nucleophilic aromatic substitution

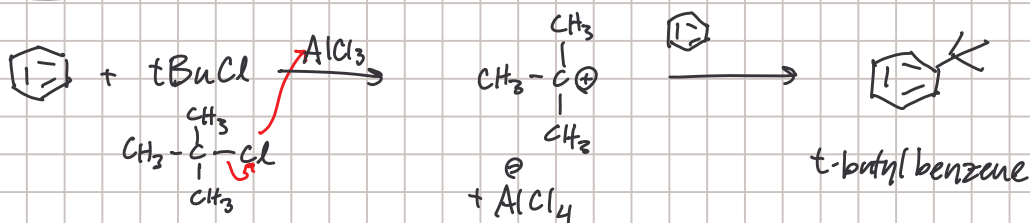
- Table of directing groups o,p vs. m
 on discussion answers activating vs. deactivating
 halogens: o,p, deactivating

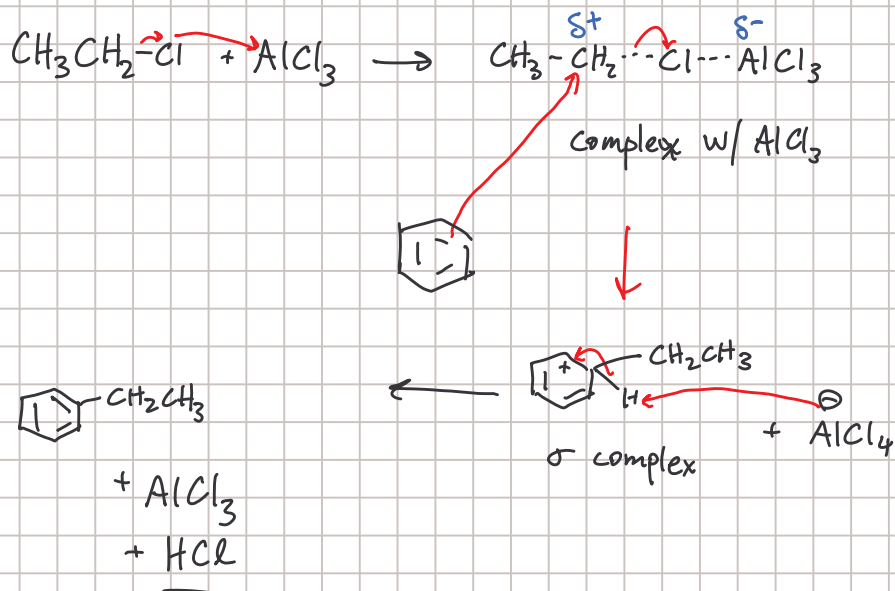
— Multiple directing groups

- 1) strong activating groups best directors ($-\text{NH}_2$, $-\text{OR}$, etc)
- 2) moderate o,p directors ($-\text{R}$, $-\text{X}$)
- 3) meta directors are weak directing groups

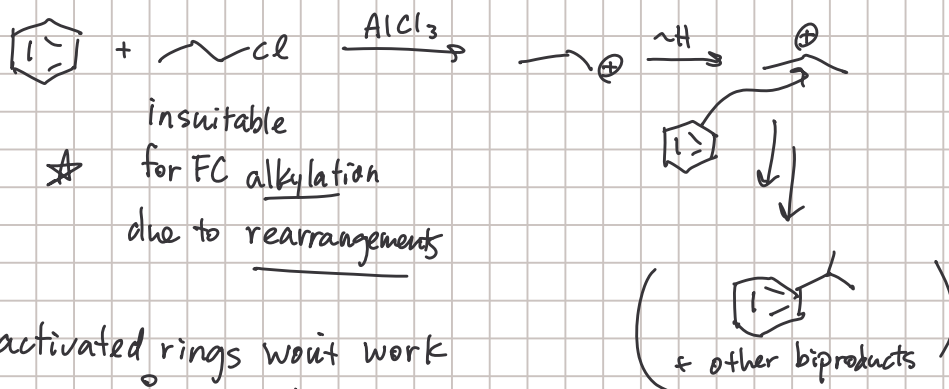


Friedel-Crafts Alkylation





works best w/ t-butyl, ethyl, methyl



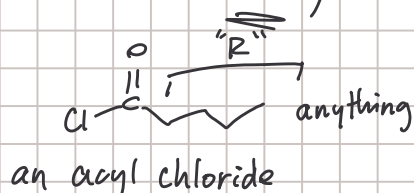
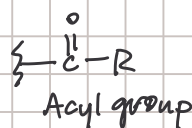
★ deactivated rings won't work
 ($-\text{NO}_2$, $-\text{C}(=\text{O})\text{-R}$, etc)
 halogens... maybe
 activated rings or benzene work great!

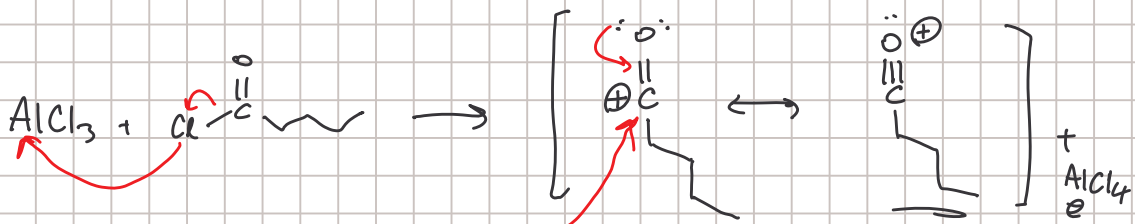
★ alkylated
 product is further activated than starting material!

polyalkylation is common

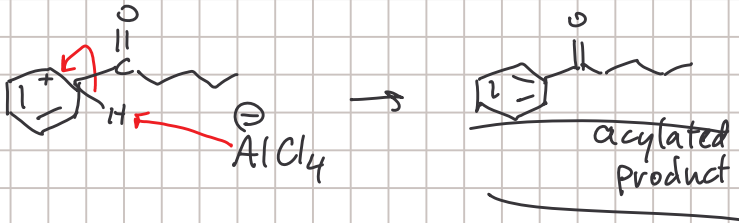
(can be minimized w/ huge excess of C_6H_6)

FC Acylation



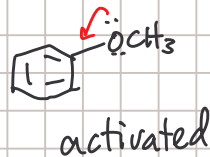
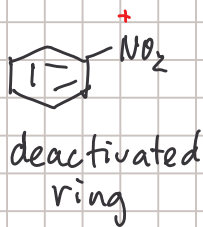


acylium ion
stabilized by resonance
no rearrangement

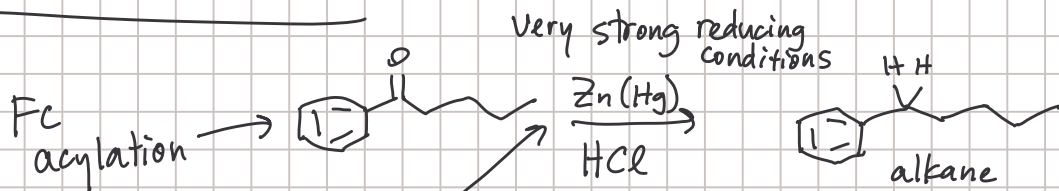


product is deactivated
toward further reaction
(polyacylation is not an issue)

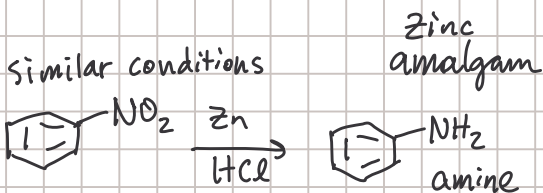
still does not work on strongly deactivated rings
($-\text{NO}_2$, $-\text{C}(=\text{O})\text{R}$, etc)



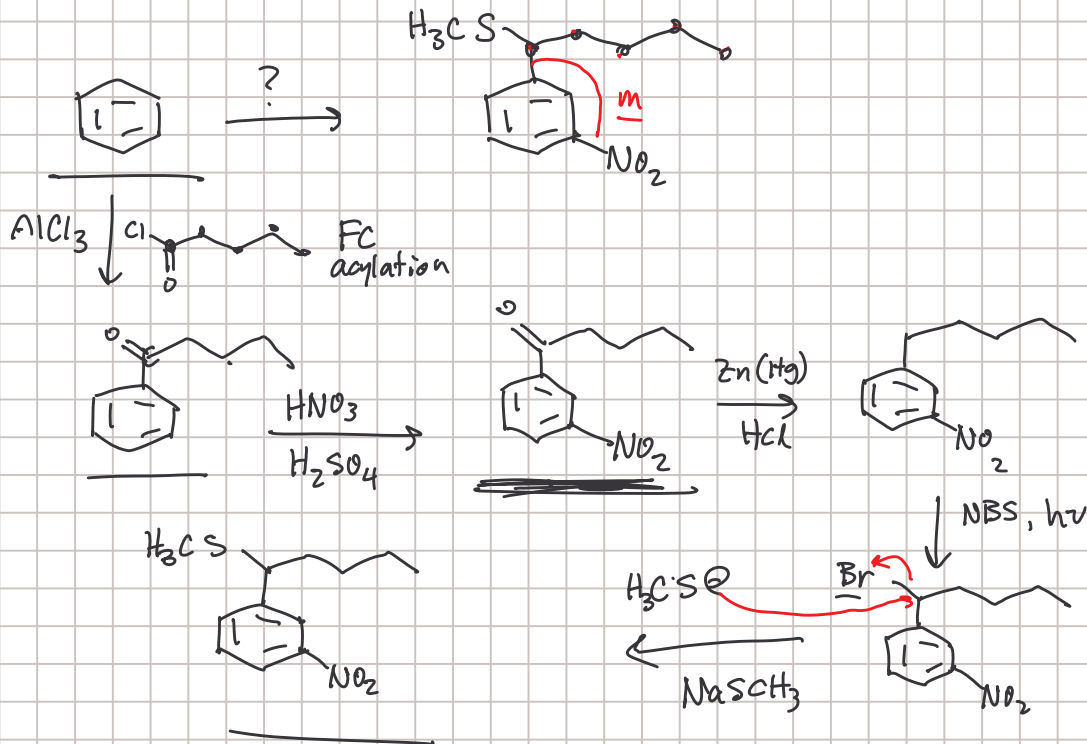
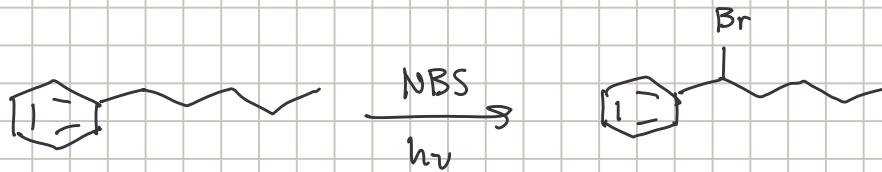
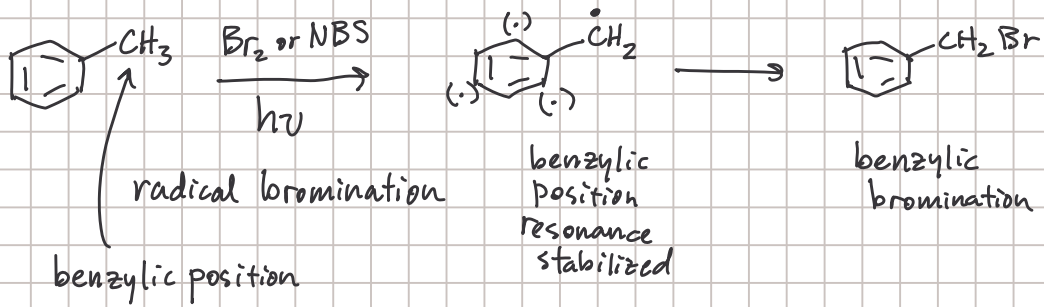
Clemmensen reduction



Very strong reducing conditions



(gives you ANY alkylated benzene)



- All electrophilic aromatic subs.
- 2 Reductions ($\text{NO}_2 \rightarrow \text{NH}_2$, $\text{C=O} \rightarrow \text{CH}_2$)
- benzylic bromination

- Grignard
- oxidation/reduction $\text{C=O} \leftrightarrow \text{C-OH}$
- S_N2