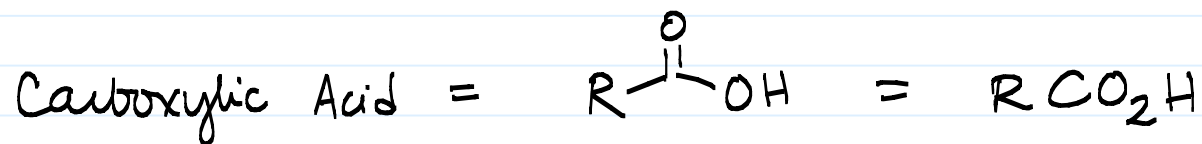


Carboxylic Acids (Chapter 17)

Note Title

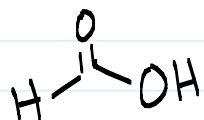
4/18/2014



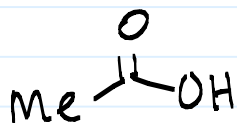
- Naming:
- 1) Drop "e" from alkane
 - 2) Add "oic acid"
 - 3) Acid takes priority
 - 4) For cyclic, "cycloalkane carboxylic acid"

Note: Common names are still used.
See Table 17.1

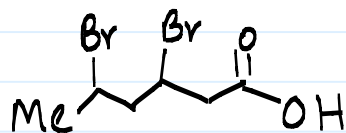
ex:



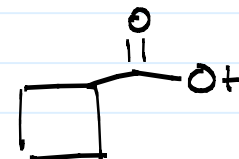
methanoic acid
"formic acid"



ethanoic acid
"acetic acid"
(vinegar)

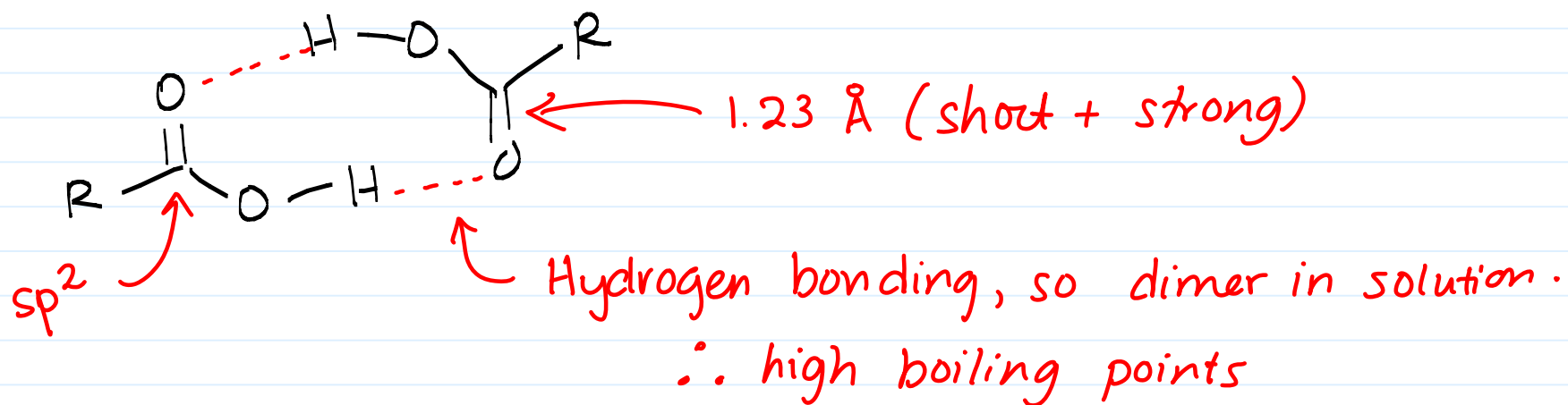


3,5-dibromohexanoic acid



cyclobutane
carboxylic acid

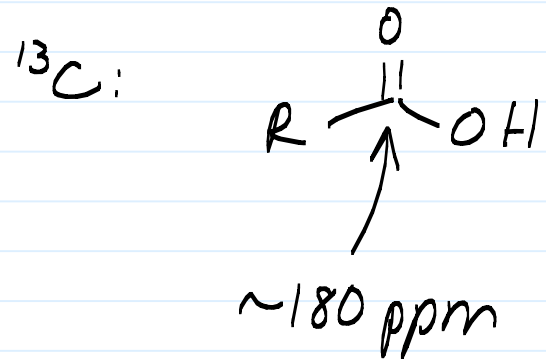
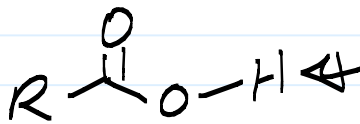
Structure



Spectroscopy:

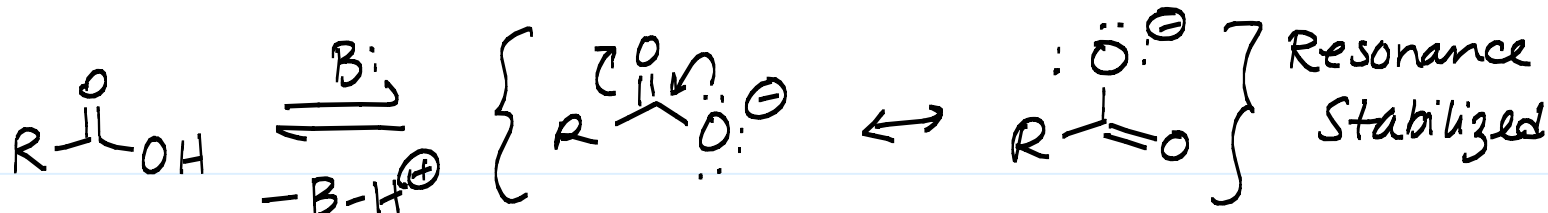
IR: C=O strong $\sim 1700 \text{ cm}^{-1}$
O-H broad $\sim 3100 \text{ cm}^{-1}$

NMR: ^1H : broad peak 10-13 ppm



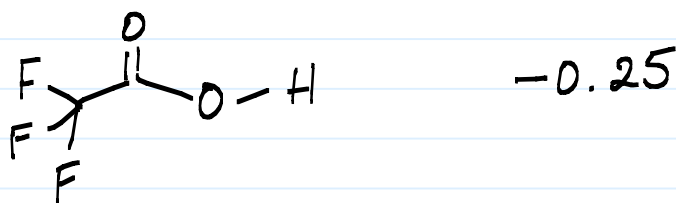
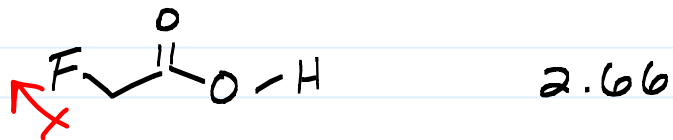
(upfield compared to aldehydes + ketones)

Acidity

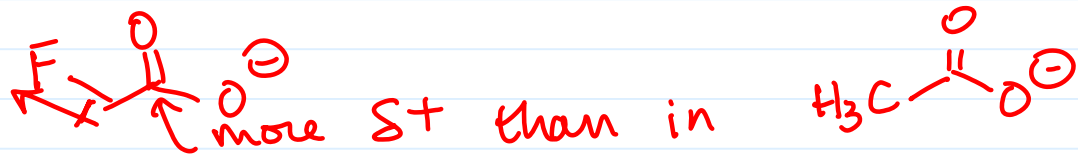


$pK_a \sim -0.3 - 6.0$

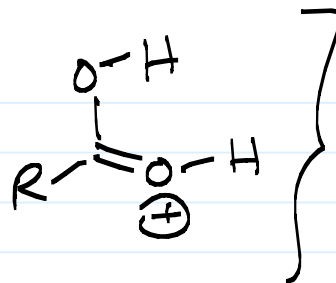
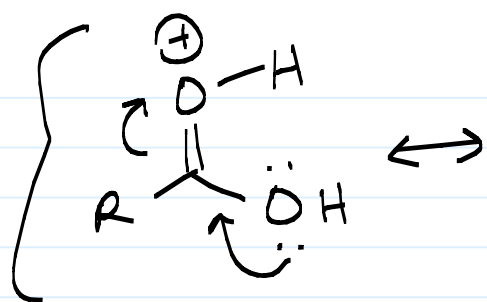
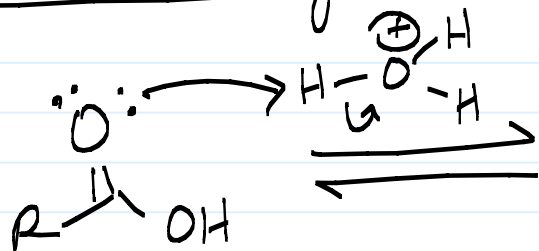
Inductive Effects: $Me-C(=O)OH$ pK_a 4.75



Dipole withdraws e^- density, so stabilizes carboxylate anion



Lewis Basicity

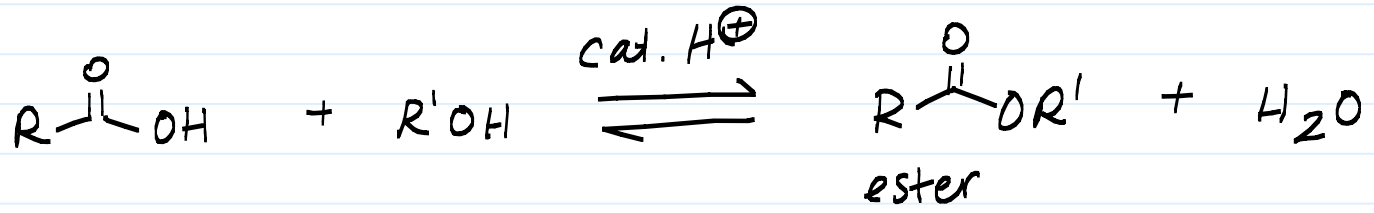


Resonance
Stabilization

Rxns

A) Formation of Esters

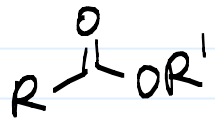
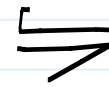
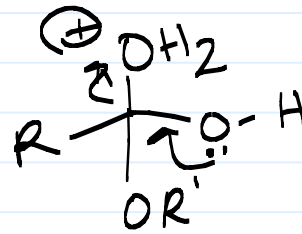
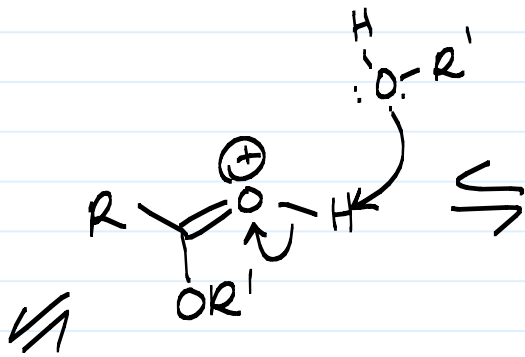
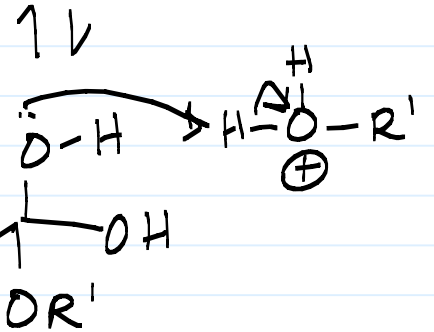
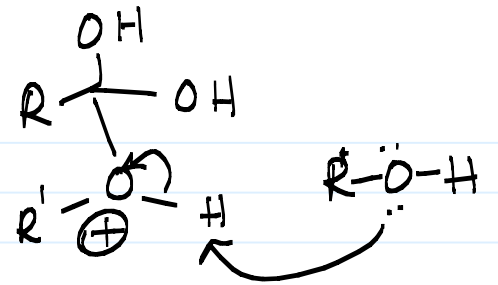
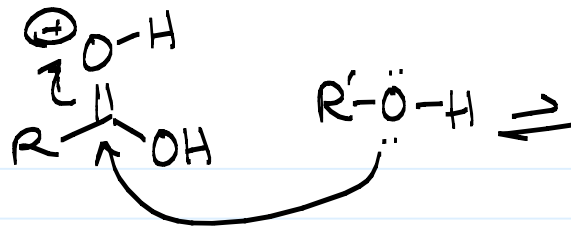
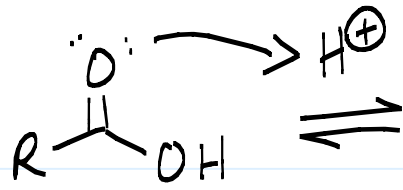
i) Fisher Esterification

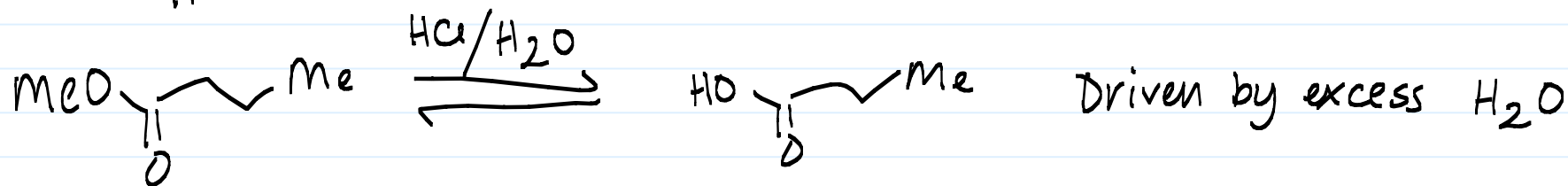
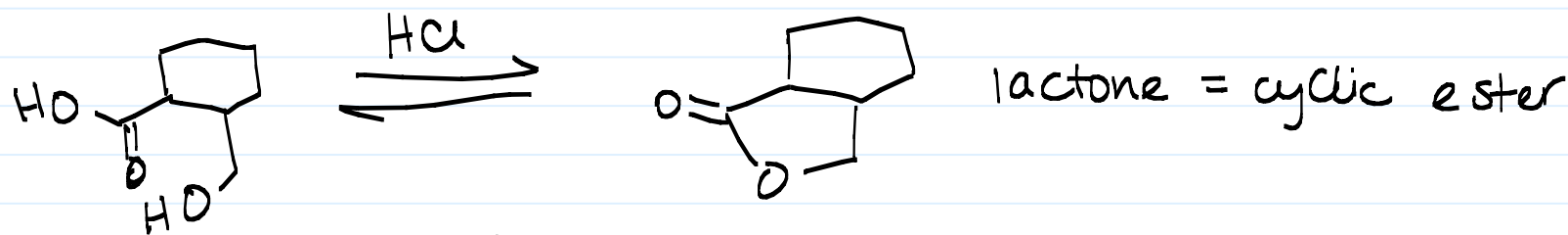
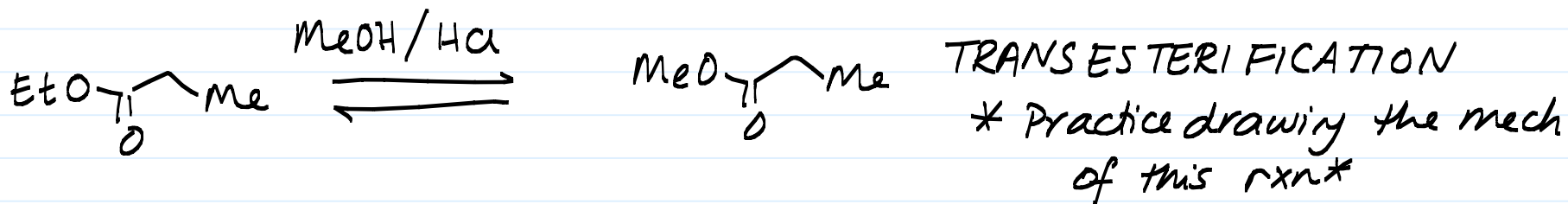
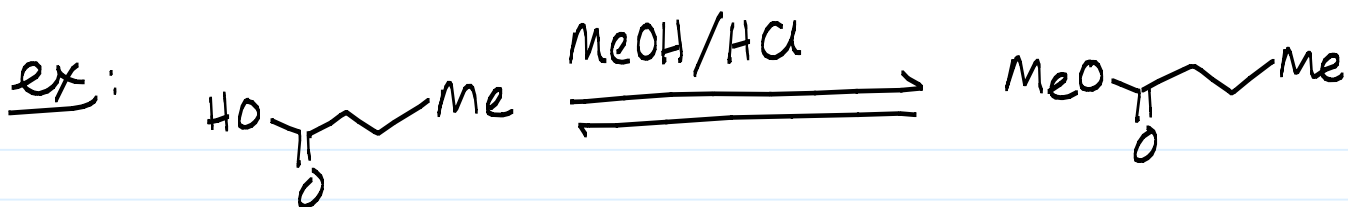


Need acid catalyst

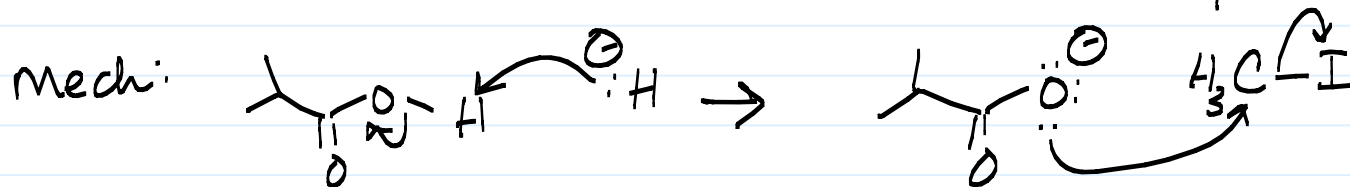
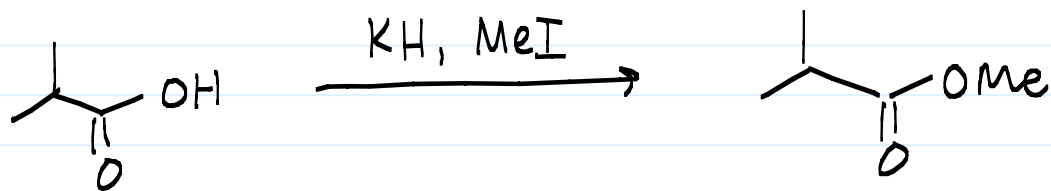
Rxn is reversible,
so driven by
excess alcohol
(forward)
or excess H₂O
(backwards)

Mech :

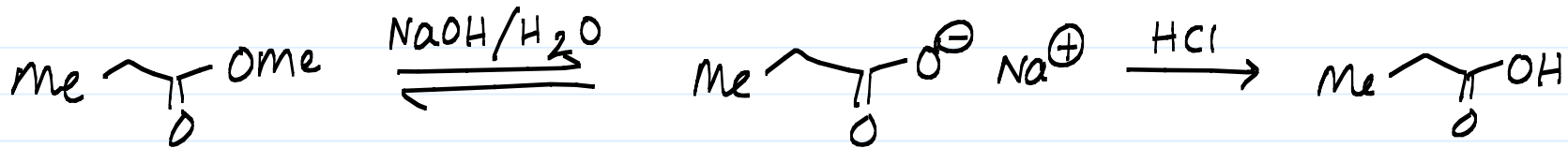




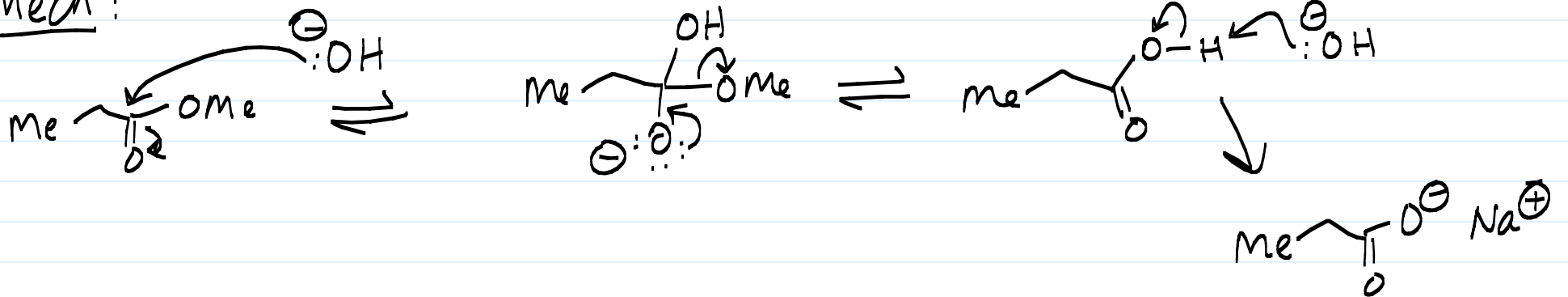
ii) S_N2 : Alkylation



Saponification: Ester $\xrightarrow{\text{NaOH}}$ Acid



Mech:



Note: Acid $\xrightarrow{\text{NaOR}}$ Ester

Why??

