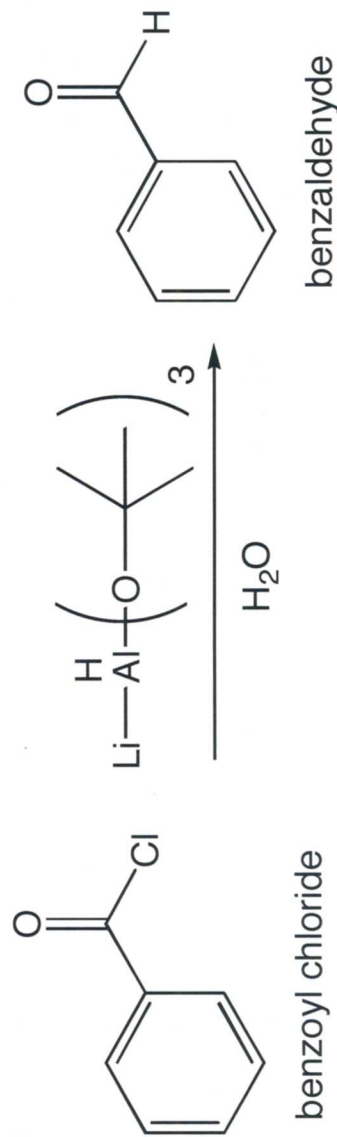
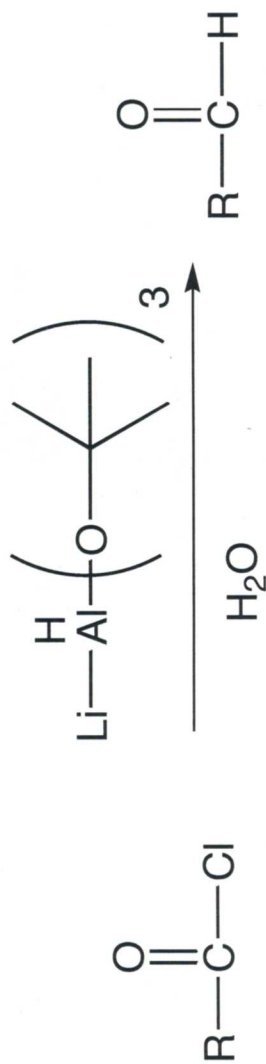


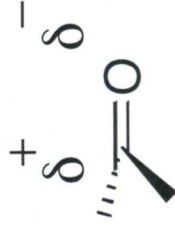
Preparation of Aldehydes: from acid halides

Other hydride reagents can be used but should not react with RCHO :



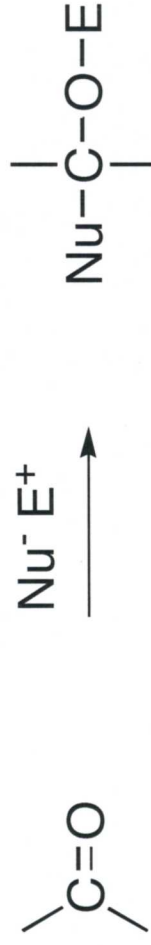
Reactions of Aldehydes and Ketones (see handout):

carbonyl group is highly polarized



nucleophilic attack at carbon of carbonyl group by a nucleophile (Nu:)

alkoxide then reacts with electrophile E^+ which is often a proton, H^+



Strong nucleophile attack is an **irreversible** reaction whereas **weak nucleophile** attack is **reversible**

Strong nucleophiles are H^- and R^-

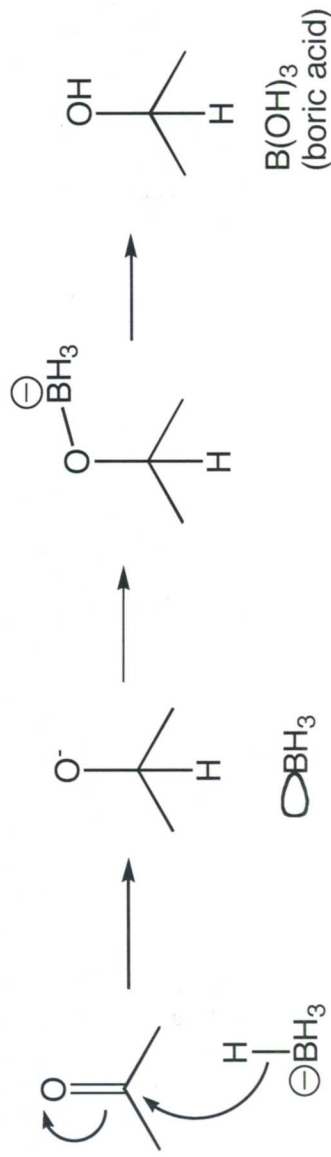
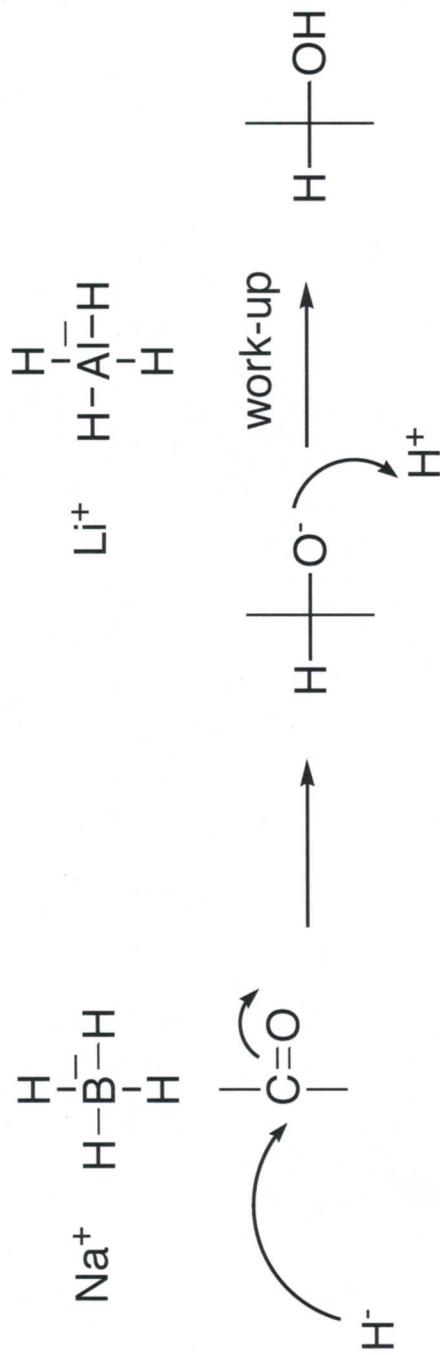
Weak nucleophiles are hydroxide ion (OH^-) or water (H_2O), alkoxide anion (O^--R) or alcohols ($\text{H}-\text{O}-\text{R}$), cyanide ion (CN^-) or hydrogen cyanide (HCN) amines ($\text{H}-\text{NRR}'$) where R and R' can be H or alkyl

Reactions of Aldehydes and Ketones (see handout):

Strong nucleophile attack is an **irreversible** reaction

Strong nucleophiles are H^- and R^-

H^- donors include sodium borohydride, lithium aluminum hydride



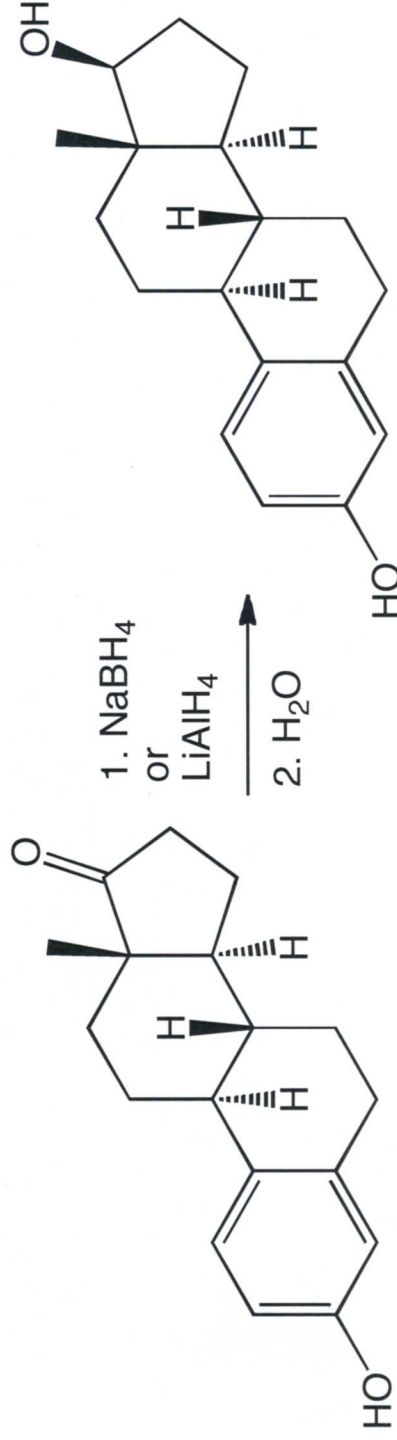
159

Reactions of Aldehydes and Ketones (see handout):

Strong nucleophile attack is an **irreversible** reaction

Strong nucleophiles are H^- and R^-

H^- donors include sodium borohydride, lithium aluminum hydride



estrone

estradiol

Reactions of Aldehydes and Ketones (see handout):

Strong nucleophile attack is an **irreversible** reaction

Strong nucleophiles are H^- and R^-

R^- donors include RM where $\text{M} = \text{Li}, \text{Na}, \text{K}, \text{MgX}$

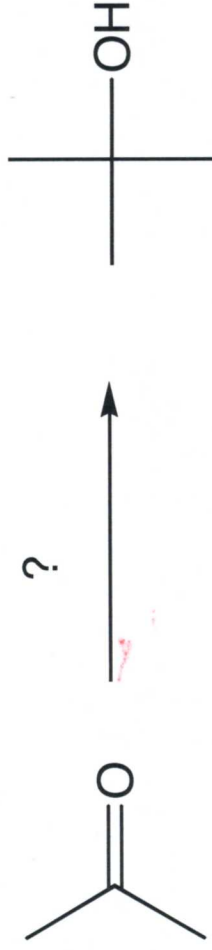


polarity of RX changes when it reacts with metal

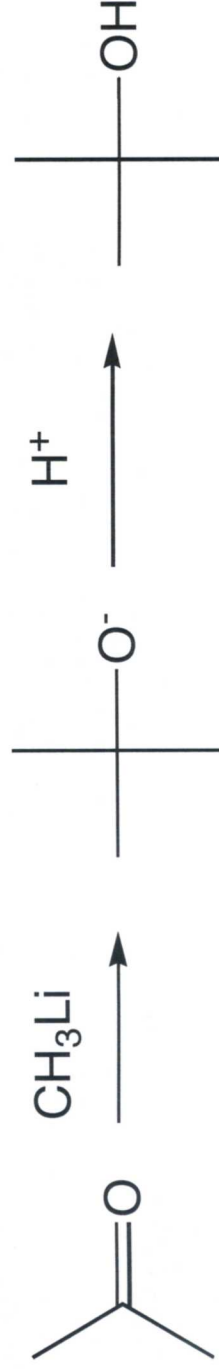
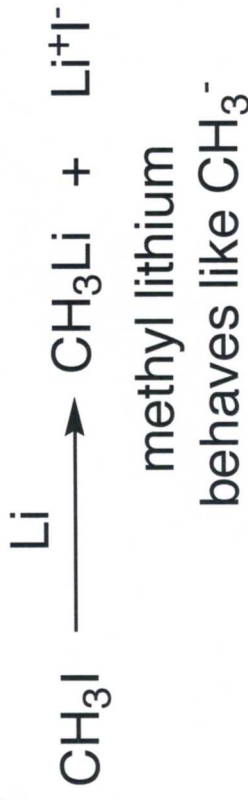


Reactions of Aldehydes and Ketones (see handout):

How to accomplish?

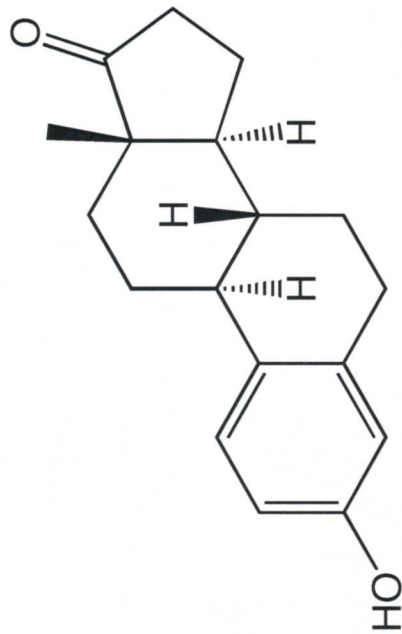


Needed: $\text{H}^{\oplus}$ $\text{CH}_3^{\ominus}$

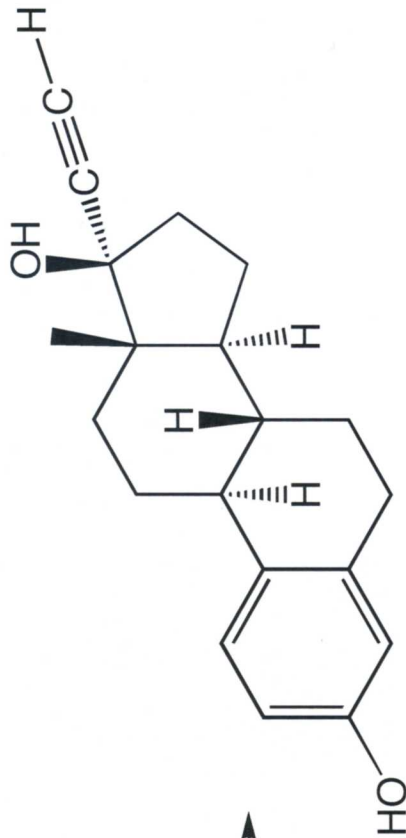
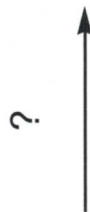


Reactions of Aldehydes and Ketones (see handout):

How to accomplish?

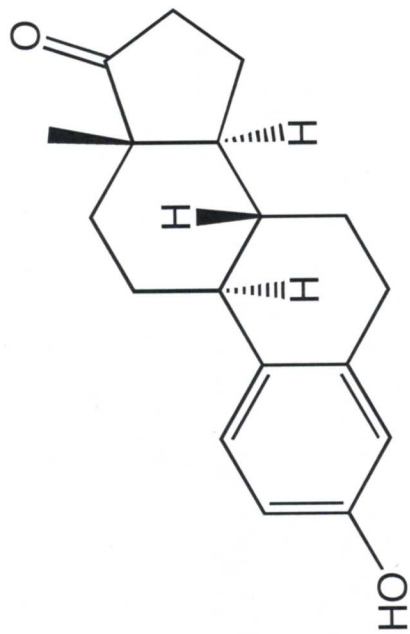


estrone

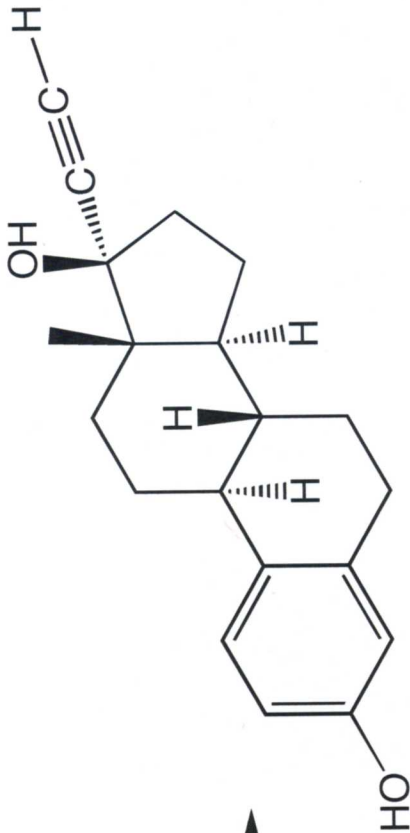


Ethynyl estradiol - birth control pill

Reactions of Aldehydes and Ketones (see handout):

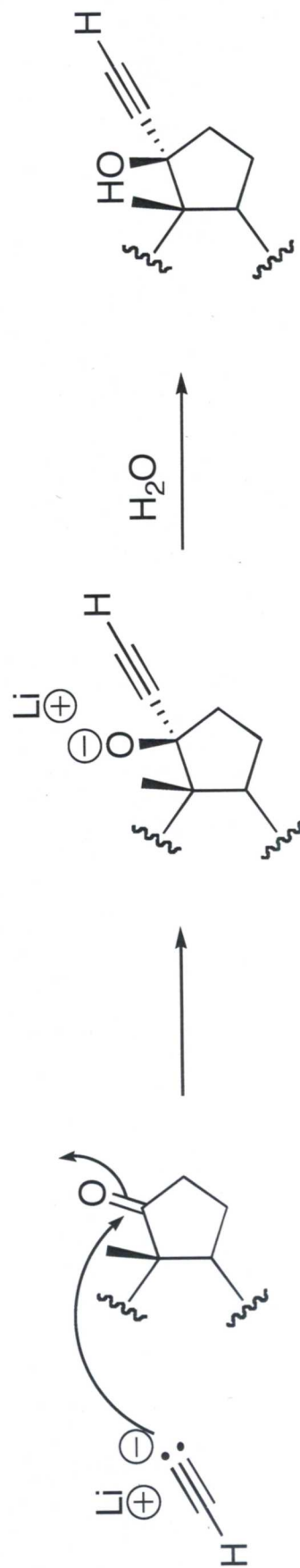
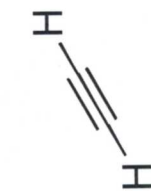


?



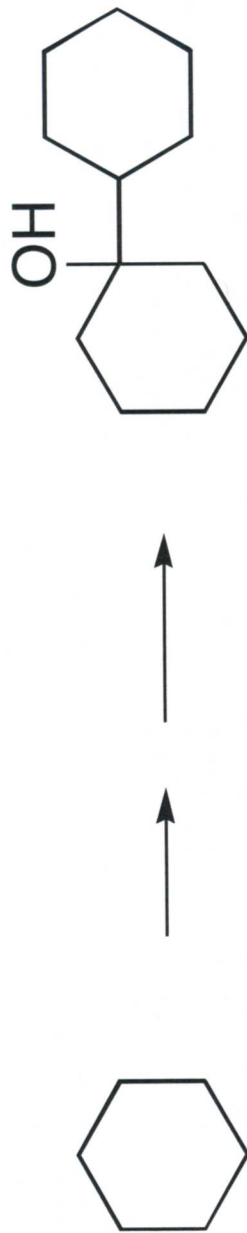
estrone

Ethinyl estradiol - birth control pill



Reactions of Aldehydes and Ketones (see handout):

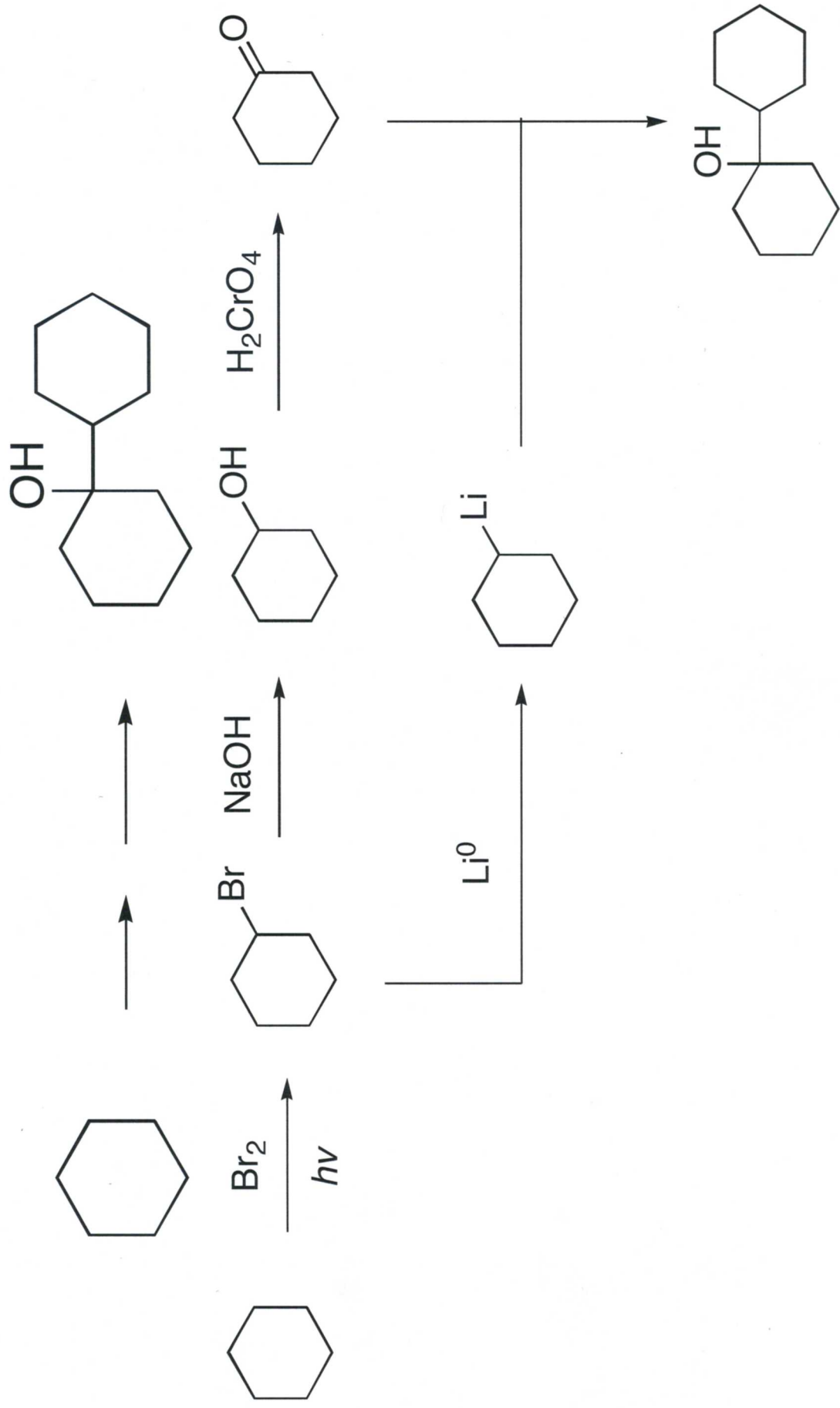
Fill the reagents to accomplish transformation (only inorganic reagents)



165

Reactions of Aldehydes and Ketones (see handout):

Fill the reagents to accomplish transformation (only inorganic reagents)



168

Provide reagents to accomplish transformation (organic or inorganic)

