Today

Reactions with Oxygen Nucleophiles
Section 16.9

Protecting Groups
16.10

Next Class

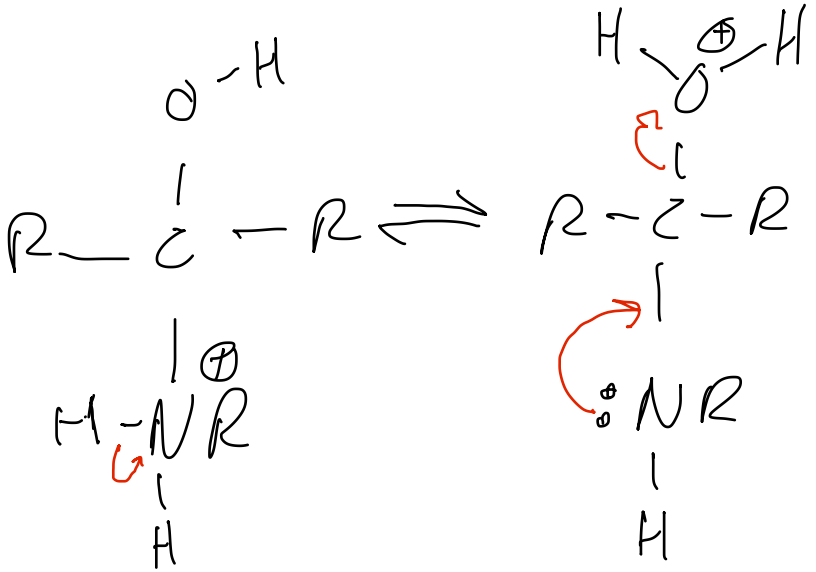
Other Reactions
16.11-16.17

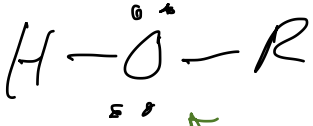
Rework test 2 by Wednesday

CH_3MgBr acts like $H_3C:^{\ominus}$ one and done

$Li^{\oplus}\ AlH_4^{\ominus}$ acts like $H:^{\ominus}$ one and done

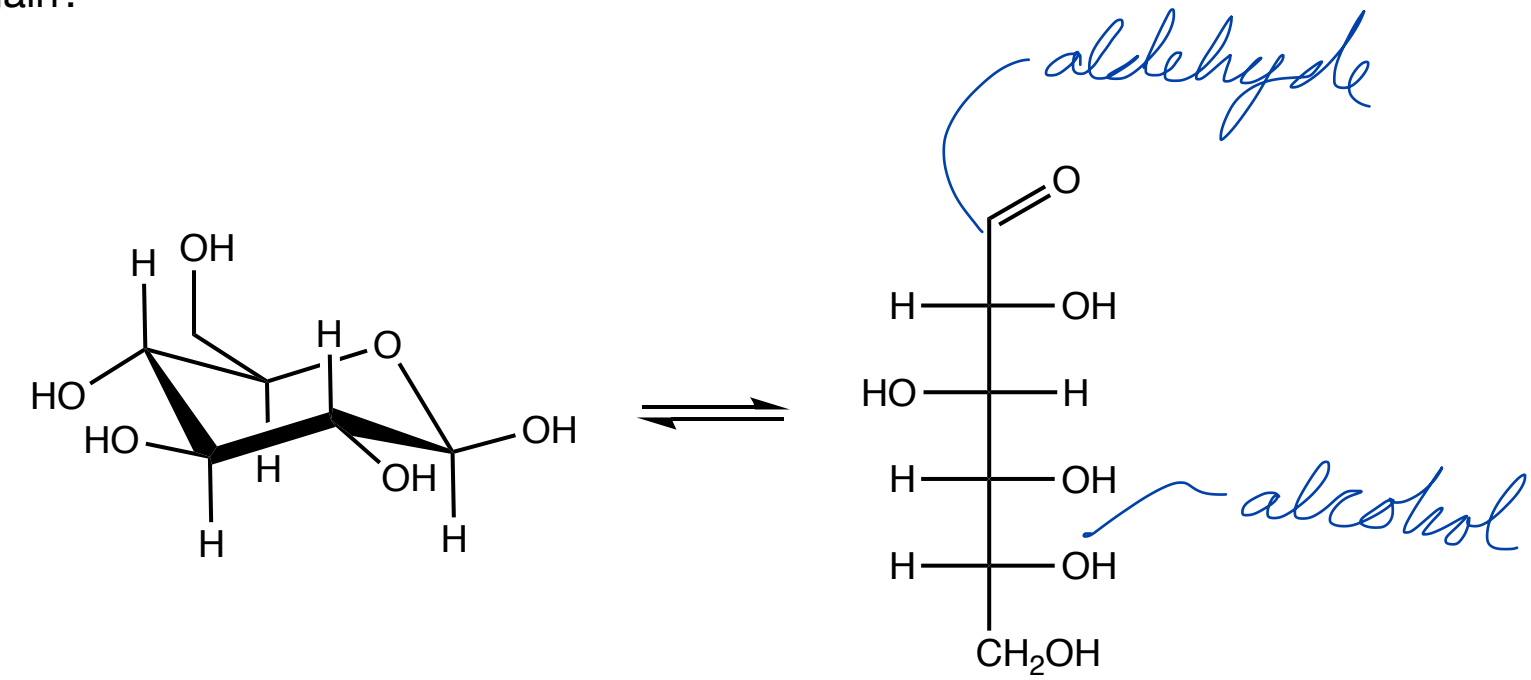
$H_2\ddot{N}R$ one and deprotonate and go again



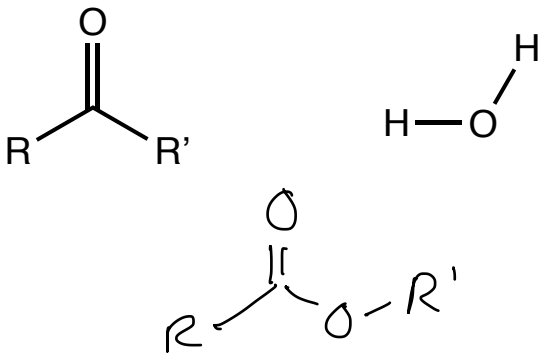


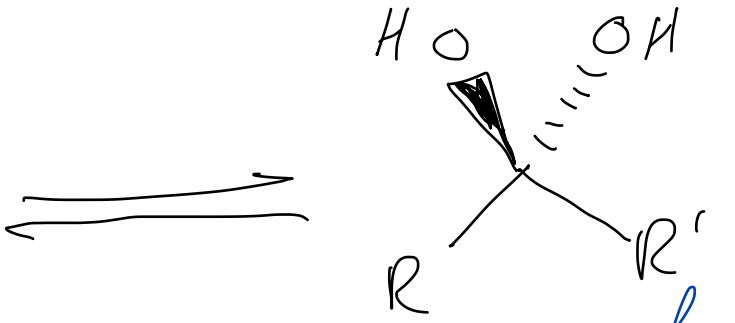
can also do one a deprotonate and go again

Reactions of Aldehydes and Ketones with Oxygen Nucleophiles: Section 16.8
Why do I care again?



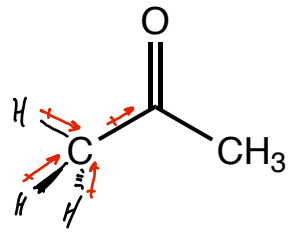
carbonyls in sugars can do the same reactions we are looking at.





gem diol

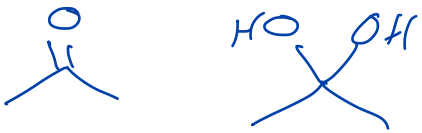
short for geminal

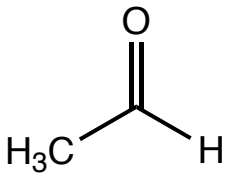


most crowded

least e⁻ deficient C

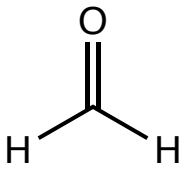
99.8% .2%





42%

58% gem diol

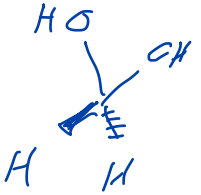


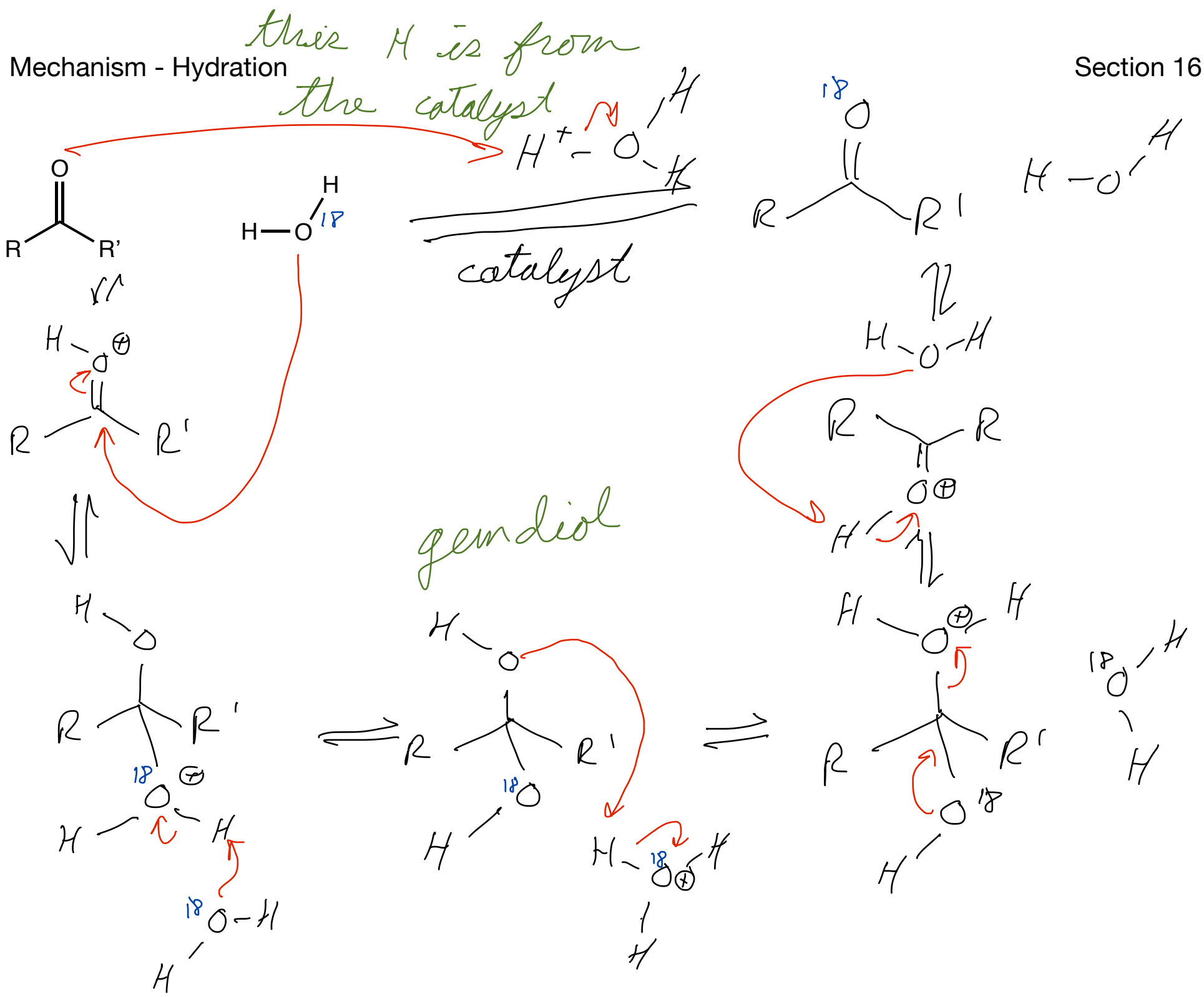
least crowded

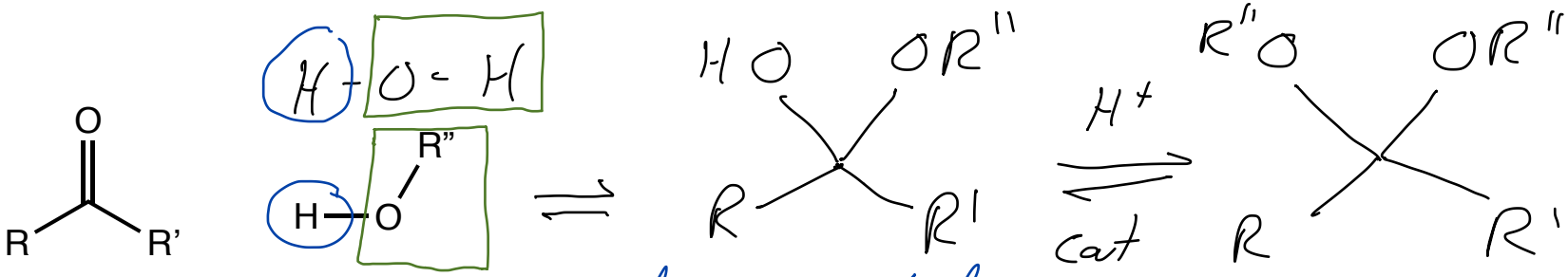
most e⁻ deficient C

0.1% $H_2C{=}O$

99.9%




this H is from the catalyst
catalyst
gemdiol



hemiacetal

an ether (C-O-C) and an alcohol (C-O-H) connected to the same C

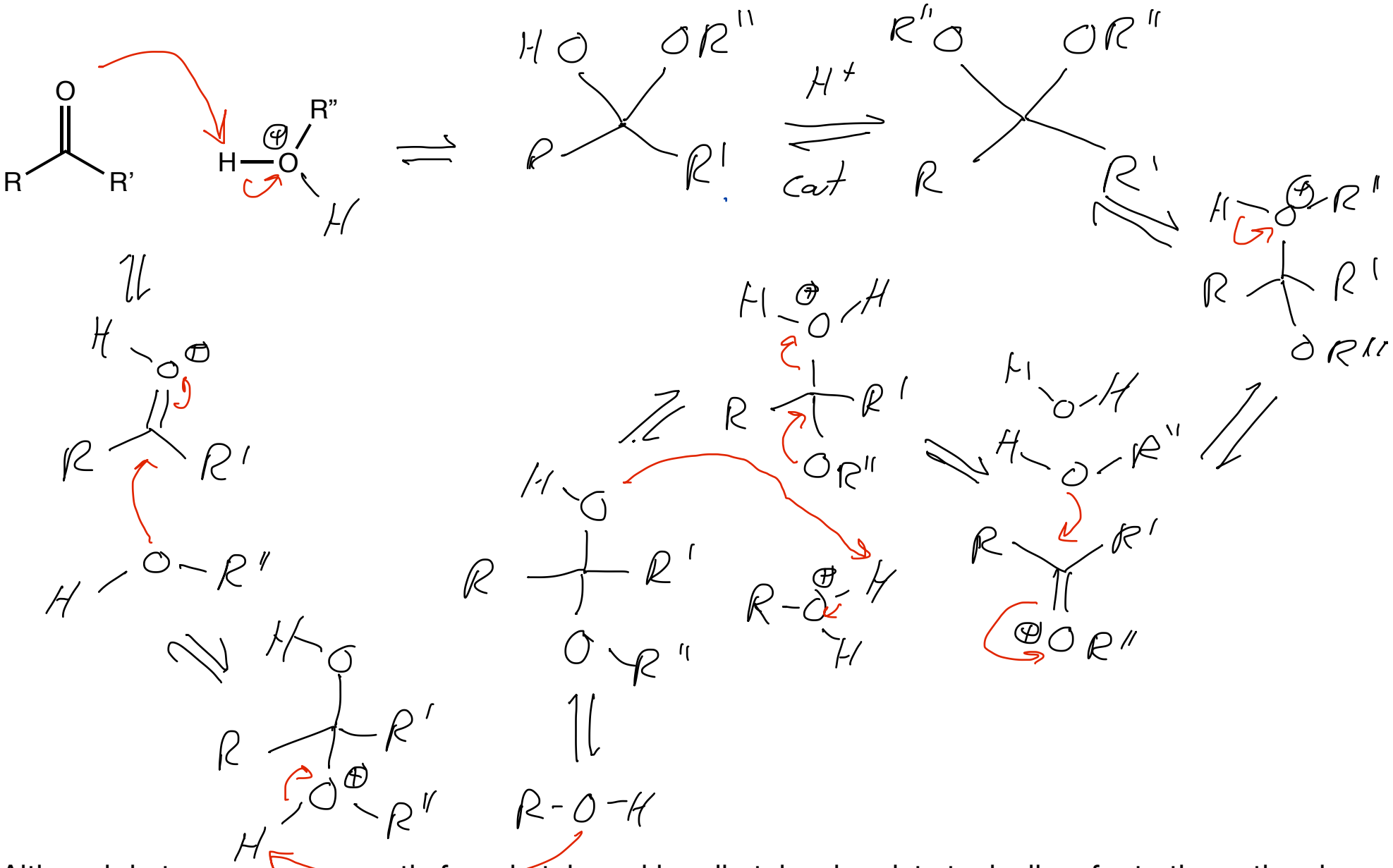
acetal

two ethers (C-O-C) on the same C atom

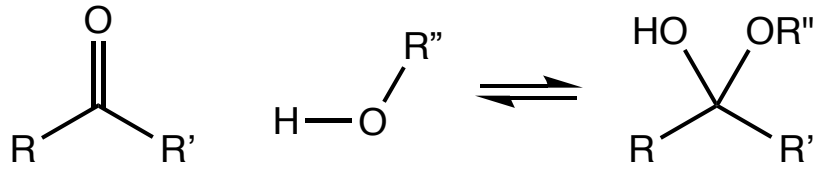
Although ketone, more correctly form ketals and hemiketals, chemists typically refer to the entire class of molecules as acetals and hemiacetals.

Reactions of Aldehydes and Ketones with Oxygen Nucleophiles - Acetals and Hemiacetals

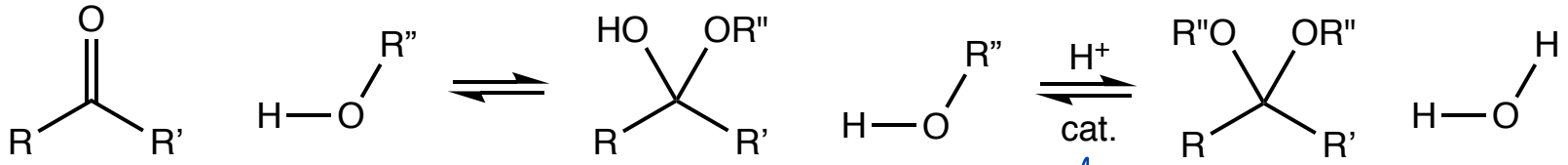
Section 16.9



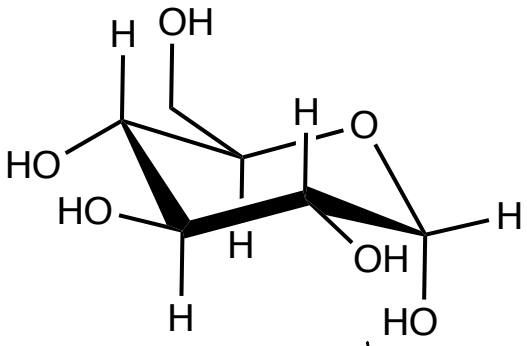
Although ketone, more correctly form ketals and hemiketals, chemists typically refer to the entire class of molecules as acetals and hemiacetals.

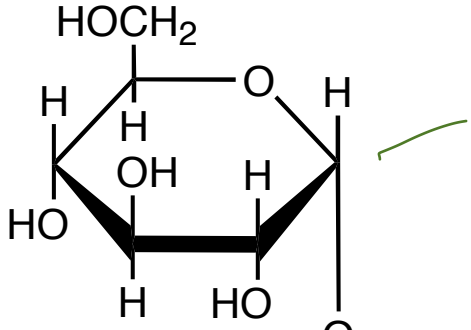


no H^+ catalyst is needed rxn runs in both direction

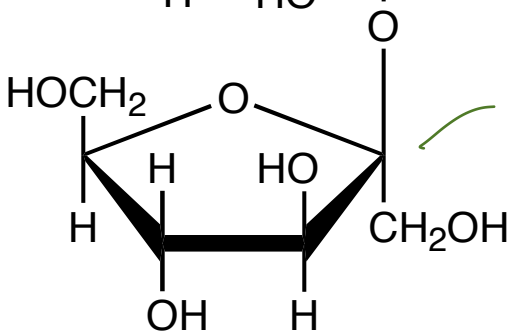


in the absence of H^+, the acetal is stable





acetal



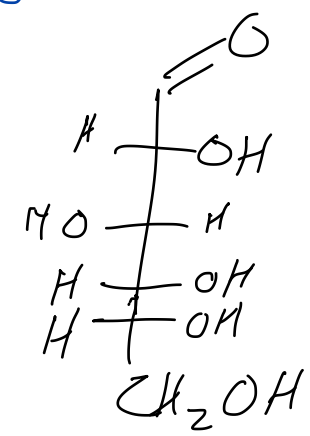
acetal

C_1 has a C-O-C linkage and a C-O-H linkage

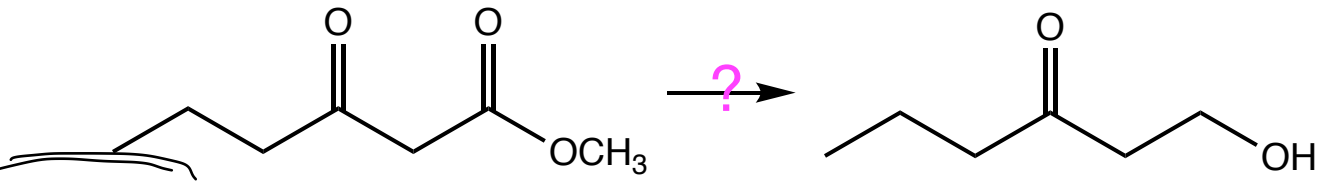
hemiacetal

sucrose

better for storage



better for active use



How do we reduce the ester without reducing the ketone.

$NaBH_4$ reduces ketones but not esters

$LiAlH_4$ reduces everything to OH