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Course Chem 345 Lecturer Gellman

Day Friday Date 2/26/16

Notes Taken by Ln Lin Page 1 of 5 (Total Pages)

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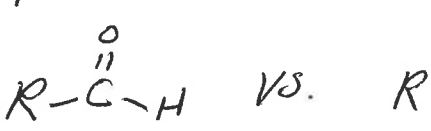
Review Session NEXT WEEK on Monday (5 pm), not Wednesday.

Office hours next 2 weeks. Mondays & Wednesdays.

Chapter 19 – Aldehydes & Ketones

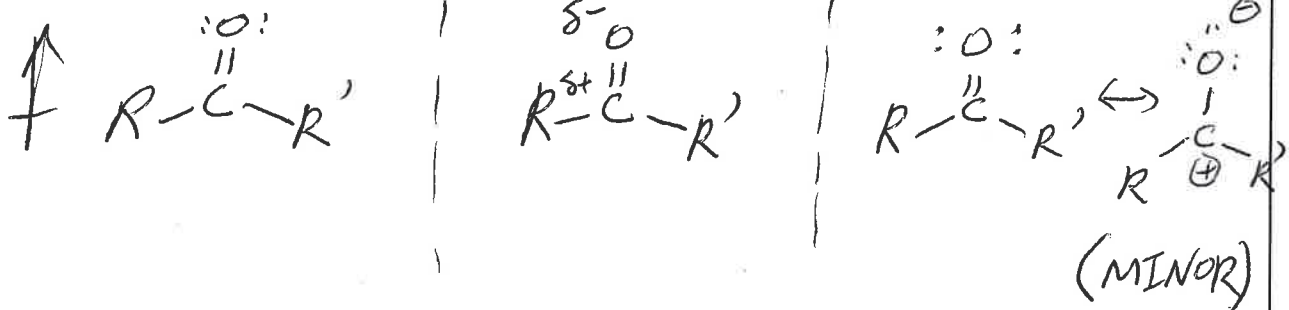
Rec. Problems: 1, 3-6, 12-20, 22-56, 58-65, 66 a&b. 69 & 71.



aldehyde Ketone → Both are C(+2) @ carbonyl C.

Carbon oxidation state (Contrast: ) C(+3)

physical properties – strong dipole across C=O. Images:



(MINOR)

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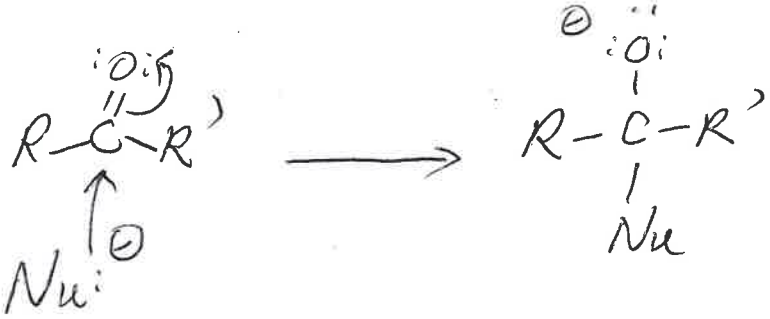
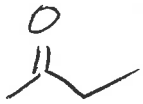
Key mechanistic theme.

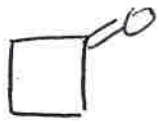


Examples –



1715 cm^{-1}

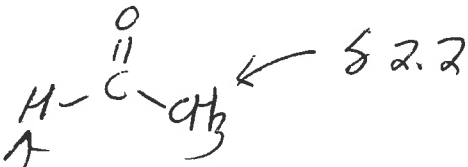
1670 cm^{-1} (conjugated)



1780 cm^{-1} (small ring)

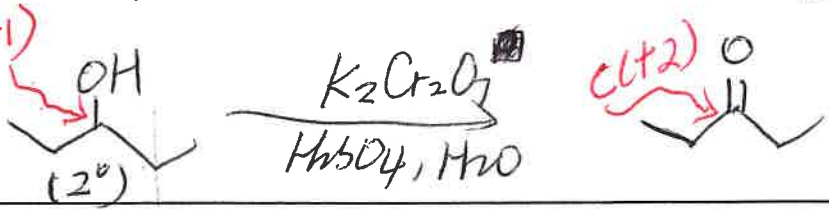
Aldehyde H – 9–10 ppm

Thus,



How form aldehyde/ketone C=O?

Recall: From Chem 343, alcohol oxidat", w/ Cr(VI)



Spectroscopy

① IR – Strong C=O signals

1700's cm^{-1}

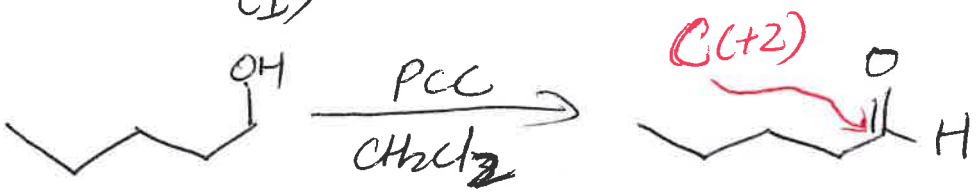
^1H NMR

H on C next to carbonyl, 2.0–2.5 ppm.

^{13}C NMR – carbonyl C far downfield

δ 190 – 220

BUT



Review:

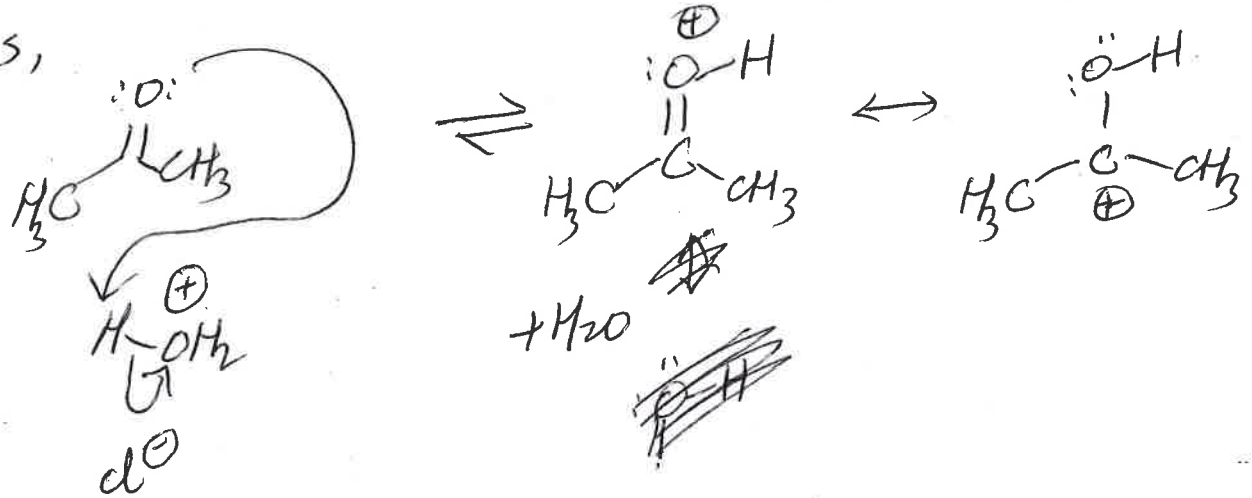
- MnO_2 (allylic / benzylic alcohol)
- Friedel-Crafts Acylat^n (EAS) (List P. 959)

Reactions of Aldehydes & Ketones

Carbonyl C as electrophiles ...

Acid-Base reactivity — Aldehyde/Keton C=O is a weak base.

Thus,



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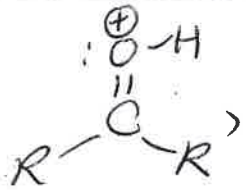
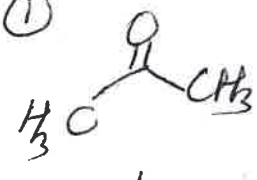
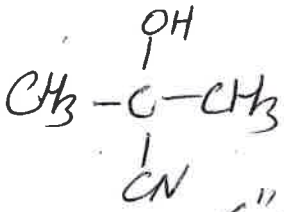


vs. $H-\overset{\oplus}{O}H_2$

pKa ~ -7 pKa ~ -2

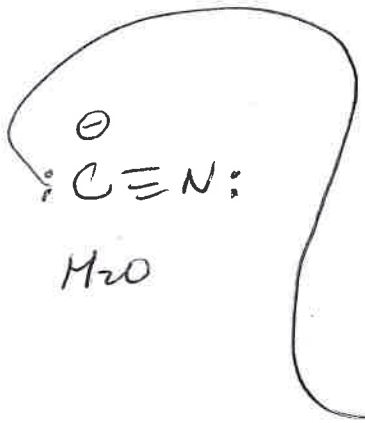
Reversible additions to A/K Carbonyls

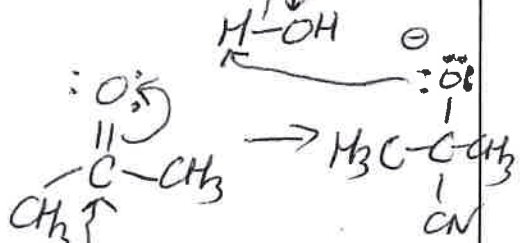
① 

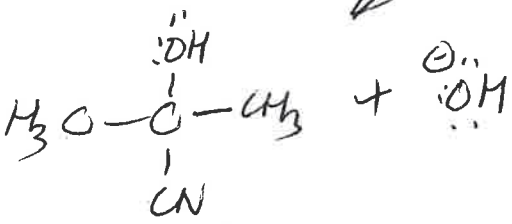


("cyanohydrin")

Mech:







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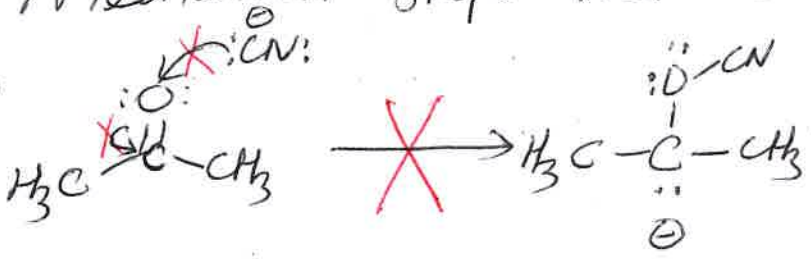
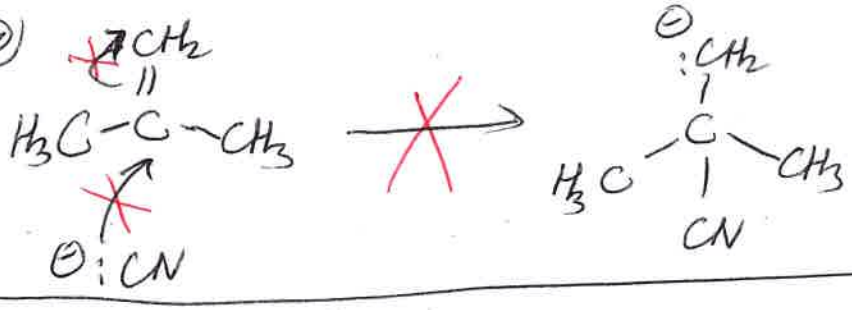
Mechanistic steps that DO NOT OCCUR (perspective):

① 

② 

② Hydrate formation

Ex: