

Chapter 18: Aldehydes and Ketones II Worksheet

REACTIONS:

1. formaldehyde + (conc.) NaOH \rightarrow $\text{H}-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}^{\ominus} + \text{CH}_3\text{OH}$
2. acetone + NaCN, H^+ \rightarrow $\text{CH}_3-\overset{\text{OH}}{\underset{\text{CN}}{\text{C}}}-\text{CH}_3$
3. methanal + (xs) ethanol, dry HCl \rightarrow $\text{CH}_3\text{CH}_2-\text{OCH}_2-\text{OCH}_2\text{CH}_3$
4. acetaldehyde + $\text{NH}_2\text{NHCONH}_2$ (semicarbazide) \rightarrow $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{H} + \text{NH}_2\text{NHCONH}_2 \rightarrow \text{CH}_3-\overset{\text{H}}{\text{C}}=\text{N}-\text{NH}-\overset{\text{O}}{\parallel}{\text{C}}-\text{NH}_2$
5. ethanal + alcoholic silver nitrate (Tollen's reagent) \rightarrow $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}^{\ominus} + \text{Ag (ppt)}$
Silver Mirror
6. acetophenone + H_2 , Ni \rightarrow $\text{CH}_3-\overset{\text{OH}}{\text{CH}}-\text{C}_6\text{H}_5$

SYNTHESIS OF ALCOHOLS USING GRIGNARD REAGENTS AND CARBONYL COMPOUNDS:

Draw the structures of the Grignard reagent and the carbonyl compound that can be combined to give the following alcohols.

1. 2-hexanol \leftarrow $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{H} + \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{MgBr}$
2. 3-phenyl-1-propanol \leftarrow $\text{H}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H} + \text{C}_6\text{H}_5-\text{CH}_2\text{CH}_2\text{MgBr}$
3. 2-methyl-2-butanol \leftarrow $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3 + \text{CH}_3\text{CH}_2\text{MgBr}$

Outline a possible laboratory synthesis of each of the following compounds starting with alcohols of four-carbons or less, benzene, cyclohexanol and any needed inorganic reagents.

