**Aldehydes.**

General Structure:

Generic organic product formed on oxidation:

Generic organic product formed on reduction:

Observation with Tollens reagent:

Observation with 2,4-DNP

Ketones:

General Structure:

Generic organic product formed on oxidation

Generic organic product formed on reduction

Observation with Tollens reagent:

Observation with 2,4-DNP

Explain the meaning of the following terms and terminology.

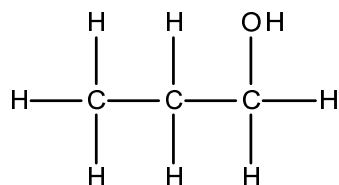
1. [O].....
.....
2. [H].....
.....
3. Nucleophilic addition.....
.....
4. H⁺.....
.....
5. Cr₂O₇²⁻
.....
6. Tollens reagent.....
.....

7. Reflux.....
.....
8. Reduction.....
.....
9. Oxidation.....
.....
10. Distillation.....
.....
11. 2,4-DNP (Brady's Reagent).....
.....
12. Nucleophile.....
.....

4.1.2a – Describe the Oxidation of Alcohols. (Page 22-23)

(ia) Oxidation of Primary Alcohols under **Distillation**. (Use Propan-1-ol as an example)

Displayed formula equation:



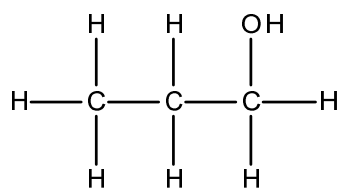
Structural formula equation:

Reagents:.....

Conditions:.....

(ib) Oxidation of Primary Alcohols under **Reflux**. (Use Propan-1-ol as an example)

Displayed formula equation:



Structural formula equation:

Reagents:.....

Conditions:.....

(ii) Oxidation of secondary Alcohols. (Use propan-2-ol as an example).

Displayed formula equation:

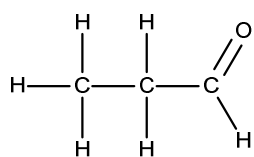
Structural formula equation:

Reagents:.....

Conditions:.....

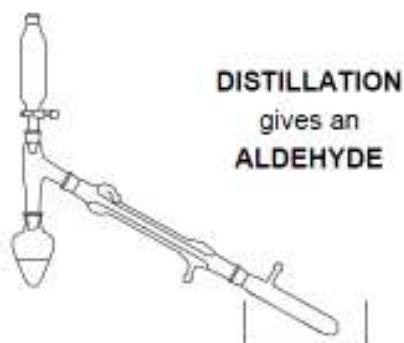
4.1.2 b – Describe the Oxidation of Aldehydes.

Displayed formula equation:



Reagents:.....

Conditions:.....

Video of reflux: <http://goo.gl/O8auU>Video of distillation: <http://goo.gl/NYEIA>**4.1.2 c – Describe the Reduction of Carbonyl Compounds to form Alcohols.** (Page 24-24)

1. What is the name of the reducing agent used to reduce carbonyl compounds?

.....

2. What is the formula of the reducing agent used to reduce carbonyl compounds?

.....

3. What solvent is used to dissolve the reducing agent in?

.....

(i) Reduction of Aldehydes



(ii) Reduction of Ketones

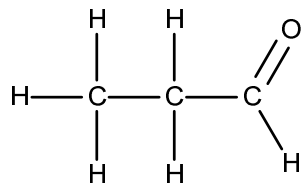


4.1.2 d – Mechanism for Nucleophilic Addition of Carbonyl Compounds



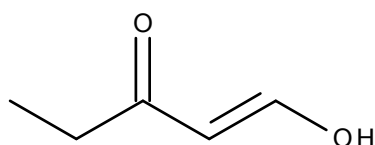
Draw the mechanism for nucleophilic addition by NaBH_4 to both the following compounds. Show all relevant dipoles and curly arrows.

(i)



is a **hydride** ion. Within NaBH_4 the BH_4^- ion acts as a source of hydride ions and is a **nucleophile**.

(ii)

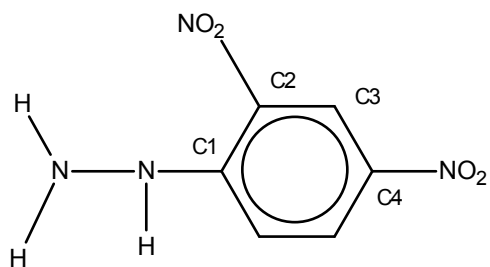


It is essential that you fully understand where the dipoles are positioned and what each curly arrow means during the mechanism steps.

4.1.2 d – Describe the use of 2,4, DNP (page 26-27):



(i) detect the presence of a carbonyl compound



2,4-Dinitrophenylhydrazine

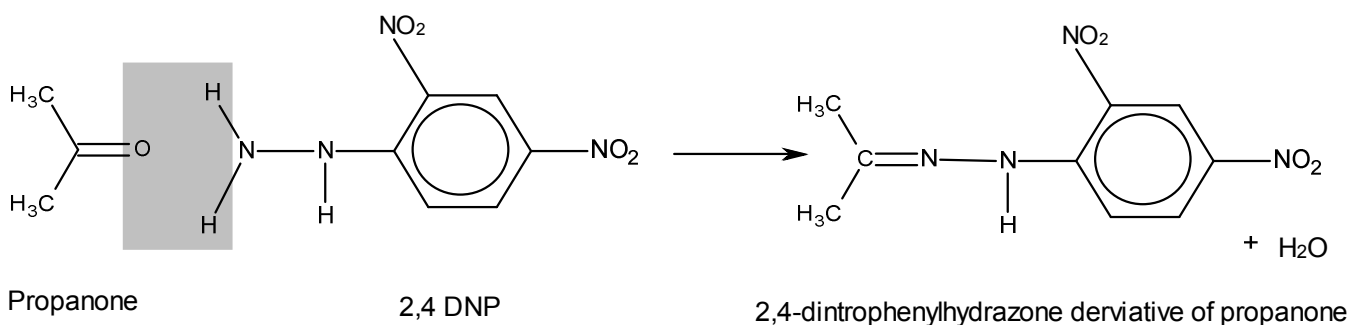
2,4-DNP (2,4-Dinitrophenylhydrazine) in methanol and sulfuric acid is known as Brady's reagent. 2,4-DNP is used to determine if there is a carbonyl group (aldehyde or ketone) in a compound. When 2,4-DNP is added to a solution containing a carbonyl compound, a yellow/orange precipitate is produced.

Chemguide Notes: <http://goo.gl/yeBxV>

The yellow/orange precipitate is due to the production of 2,4-dinitrophenylhydrazone, and confirms the presence of a carbonyl compound.

Testing for carbonyl compounds video: <http://goo.gl/4DWv4>

2,4, DNP only gives a positive test (yellow/orange precipitate) with a carbonyl compound.



You will not be asked to write this equation or draw 2,4-DNP in the exam, you just need to know the observations and the use for 2,4-DNP as a chemical test for carbonyl compounds.



(ii) describe how 2,4 –DNP is used to identify a carbonyl compound

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1. Knock Hardy Notes:

Notes: <http://goo.gl/qMHYWW>



2. OCR A2 Chemistry Textbook pages: 20-26

3. Mr. McCormack's PowerPoint and carbonyl compounds resources on the Plymstock School Learning and Teaching shared area.

4. Silver Mirror Demonstration.

<http://www.youtube.com/watch?v=y-4qqcCxD6g&feature=related>

Knock hardy PowerPoint: <http://goo.gl/zxOIV>

