

Edexcel International Chemistry

A-level

Practical 7

Oxidation of Propan-1-ol to Produce
Propanal and Propanoic Acid



The oxidation of propan-1-ol to **propanal** (aldehyde) requires **distillation** apparatus. To oxidise propan-1-ol completely to **propanoic acid** (carboxylic acid), **reflux** apparatus is required.

Method

1. Measure 20 cm³ of acidified potassium dichromate solution into a pear-shaped flask. Cool down the flask using an ice bath.
2. Add a few anti-bumping granules. These will prevent the formation of large gas bubbles that cause violent boiling.
3. Add 1 cm³ of ethanol dropwise to the pear-shaped flask using a pipette. Stir to ensure complete mixing.
4. Warm up the flask to room temperature.
5. Set up the reflux apparatus as shown below, placing the flask in a water bath.
6. Heat using the Bunsen burner for 5-10 minutes.
7. Allow some time for the apparatus to cool down. Afterwards, collect the product via distillation using the equipment shown in the diagram below.
 - In this set-up the propan-1-ol will be completely oxidised to propanoic acid.
 - Use the thermometer to prevent the temperature from rising too high.
8. To preparing an aldehyde, conduct the same reaction under distillation conditions without the reflux process.
 - In this set-up the propan-1-ol will be oxidised to propanal.

For both reactions, the colour change occurs from **orange** (Cr₂O₇²⁻) to **green** (Cr³⁺) as the potassium dichromate solution is reduced.

Diagram - Reflux

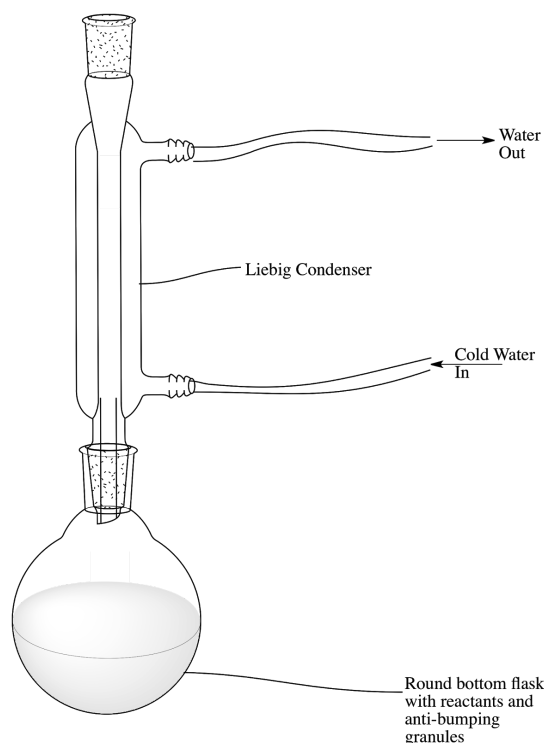


Diagram - Distillation

