## Microscale Preparation and Testing of Propene

## Aim

To prepare propene by dehydrating propan-2-ol using aluminum oxide as catalyst

## Curriculum Link

Topic V Fossil fuels and carbon compounds

## Apparatus and Equipment

|  |  |
| --- | --- |
| * + Glass dropper
 | x 1 |
| * + Spirit burner
 | x 1 |
| * + Delivery tube
 | x 1 |
| * + Water trough
 | x 1 |
| * + Rubber tubing
 | x 1 |
| * + Test tube with rubber stopper
 | x 3 |
| * + Wooden splint
 | x 1 |
| * + Forceps
 | x 1 |
| * + Retort stand and clamp
 | x 1 |

## Chemicals

|  |  |
| --- | --- |
| * + propan-2-ol
 | 0.5 cm3 |
| * + Mineral wool
 | Small amount |
| * + Aluminium oxide powder
 | 1-2 g |
| * + 0.002 M acidified KMnO4(aq)
 | 5 cm3 |
| * + 0.002 M aqueous bromine solution
 | 5 cm3 |
|
|

## Safety precautions

* Wear safety goggles and disposable protective gloves.
* The solutions used are basic and harmful to skin and eyes. In case of spills, rinse the affected area with plenty of water for about 5 minutes.
* Do not dispose of chemicals by pouring down the drain, use the waste container provided.

## Procedure

1. Seal the tip of a glass dropper using a strong Bunsen flame. Allow the dropper to cool.
2. Add some mineral wool to the sealed dropper, and then about 0.5 cm3 propan-2-ol liquid.
3. Add about 1-2 g of aluminium oxide powder into the sealed dropper.
4. Fill 3/4 of a water trough with water and then submerge 3 test tubes and 3 stoppers in it.
5. Set up the experiment as shown in Figure 1. Use a spirit burner to heat the catalyst (aluminium oxide). Discard the first few cm3 of the gas produced.



Figure 1

1. Collect about 20 cm3 of the gas using a test tube and then seal the tube with a rubber stopper in water.
2. Repeat step (6) twice using another two test tubes and stoppers.
3. Test the gas in the test tubes with
	1. acidified KMnO4(aq),
	2. aqueous bromine solution, and
	3. a burning splint.
4. Record and explain all the observations with the aid of chemical equations (with state symbols).

|  |
| --- |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

**Reference:**

<https://www.youtube.com/watch?v=V66u-TPgKJ8> (Accessed on 9 February 2022)

**Acknowledgement:**

1. Department of Chemistry, The Chinese University of Hong Kong
2. Department of Chemistry, SKH Tsang Shiu Tim Secondary School