The sublimation of air freshener

Learning objectives

1 Describe sublimation and deposition.

2 Understand the difference between sublimation and deposition.

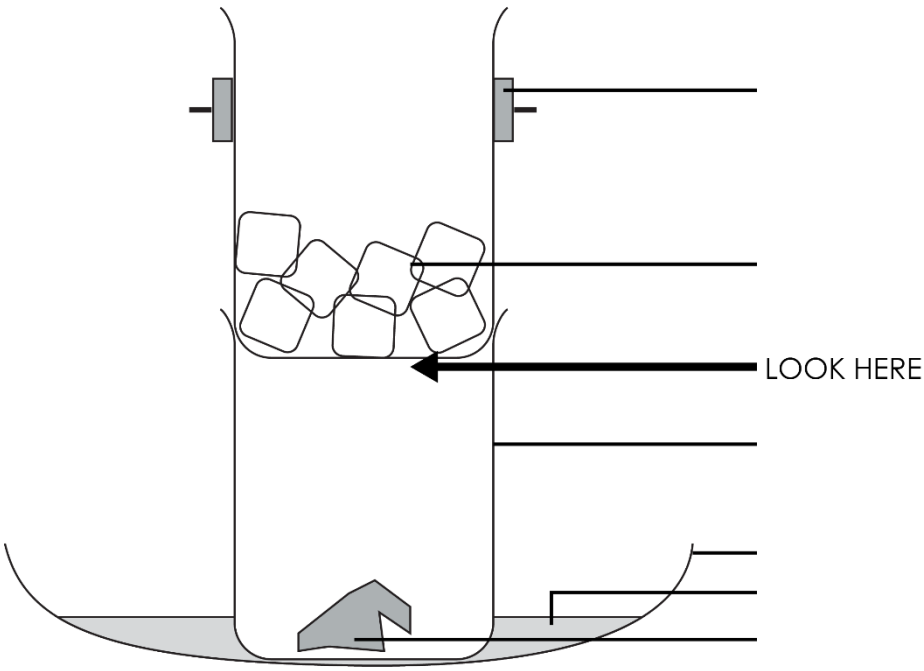
3 Use the particle model to explain sublimation and deposition.

Introduction

Air fresheners are used to make a room smell pleasant and come in different forms including solids, liquids and aerosol sprays. In this demonstration, you will observe the changes of state that occur when a solid air freshener is heated and then cooled.

The demonstration

At the start of the demonstration your teacher will have set up the equipment in a fume cupboard as shown in the diagram below. Answer questions 1–5 while you are waiting for an observable change.



Questions

1. Label the diagram.
2. Suggest a reason why the demonstration is carried out in a fume cupboard.

3. Describe how the air freshener is heated.

4. Suggest a reason why ice was added to the top beaker.

5. Predict what you will observe during the demonstration.

Observations

Record your observations from the demonstration.

Conclusion

Using your own words, explain your observations.

Changes of state questions

6. Write the words that explain the following changes of state:

(a) Solid → liquid (eg ice to water) is known as _____.

(b) Liquid → solid (eg water to ice) is known as _____.

(c) Liquid → gas (eg water to steam) is known as _____.

(d) Gas → liquid (eg steam to water) is known as _____.

(e) Solid → gas (eg carbon dioxide solid or dry ice to carbon dioxide gas) is known as _____.

(f) Gas → solid (eg carbon dioxide gas to dry ice) is known as _____.

7. During the air freshener demonstration, two changes of state took place. Using your answers from Q6, name the two state changes that you observed.

1. _____
2. _____

Challenge question

Dry ice, or solid carbon dioxide, sublimes at –78.5°C

(a) Describe what you would observe when a piece of dry ice is left on a table at room temperature, 22°C.

_____

_____

_____

On a sunny day, the snow lying on the ground appeared to 'shrink', but there was no sign of running water.

(b) Use your knowledge of particle theory to explain why.

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