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. Use the words below to label the diagram.

**ice hot water air freshener clamp

small dish beaker**

Complete the sentences.

1. The demonstration is carried out in the fume cupboard because some air fresheners produce \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ substances when they are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ quickly, which are not good to breathe in.
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ was used to slowly heat the air freshener.
3. Ice was added to the top beaker to make a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ surface for the gaseous air freshener particles to hit.
4. Predict what you will observe during the demonstration.

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Observations

Record your observations from the demonstration here.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Conclusion

Choose the correct word to complete the sentences.

**cooled lost gas solid liquid heated energy

evaporation sublimation condensation deposition**

When the air freshener was \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ it changed from a solid to a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because the particles took in lots of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. We call this process \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

When the gas particles hit the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ surface they turned back to a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because they had \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a lot of energy. We call this process \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Changes of state questions

1. Choose the correct word to explain the following changes of state:

**evaporation melting sublimation**

**condensation deposition freezing**

1. Solid $\rightarrow $ liquid (eg ice to water) is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Liquid $\rightarrow $ solid (eg water to ice) is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Liquid $\rightarrow $ gas (eg water to steam) is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. Gas $\rightarrow $ liquid (eg steam to water) is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. Solid $\rightarrow $ gas (eg dry ice to carbon dioxide gas) is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. Gas $\rightarrow $ solid (eg carbon dioxide gas to dry ice) is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. During the air freshener demonstration, two changes of state took place.

Draw a circle around the words that best describe those changes of state.

**evaporation** **melting** **sublimation**

**condensation** **deposition** **freezing**