

Write balanced equations for the following reactions and apply state symbols to all reactants and products, assuming room temperature and pressure unless stated otherwise. If you are not familiar with the aqueous solubilities of some of these substances, you may have to look them up.

- (a)** $\text{KNO}_3 \rightarrow \text{KNO}_2 + \text{O}_2$ (when heated, 500°C)
- (b)** $\text{CaCO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{CaSO}_4 + \text{CO}_2 + \text{H}_2\text{O}$
- (c)** $\text{Li} + \text{H}_2\text{O} \rightarrow \text{LiOH} + \text{H}_2$
- (d)** $\text{Pb}(\text{NO}_3)_2 + \text{NaCl} \rightarrow \text{PbCl}_2 + \text{NaNO}_3$ (all reactants are in aqueous solution)
- (e)** $\text{C}_3\text{H}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$ (combustion reaction)

A mixture of two gases, X and Y, which both have strong but distinct smells, is released. From across the room the smell of X is detected more quickly than the smell of Y. What can you deduce about X and Y?

Ice floats on water. Comment on why this is not what you would expect from the kinetic theory of matter.

Explain why a burn to the skin caused by steam is more serious than a burn caused by the same amount of boiling water at the same temperature.

Which of the following occurs at the melting point when solid sulfur is converted to its liquid form?

- I movement of the particles increases
- II distance between the particles increases

- A** I only
- B** II only
- C** Both I and II
- D** Neither I nor II

You are given a liquid substance at 80°C and told that it has a melting point of 35°C . You are asked to take its temperature at regular time intervals while it cools to room temperature (25°C). Sketch the cooling curve that you would expect to obtain.