

SL & HL Questions on the Particulate nature of matter and chemical change

1. State the equation (including state symbols) for the following reactions:

- The addition of dilute hydrochloric acid to solid calcium carbonate to give aqueous calcium chloride, carbon dioxide and water.
- The reaction between ammonia gas and oxygen gas to give nitrogen(II) oxide gas and water.

2. State the **ionic** equation for the following reactions.

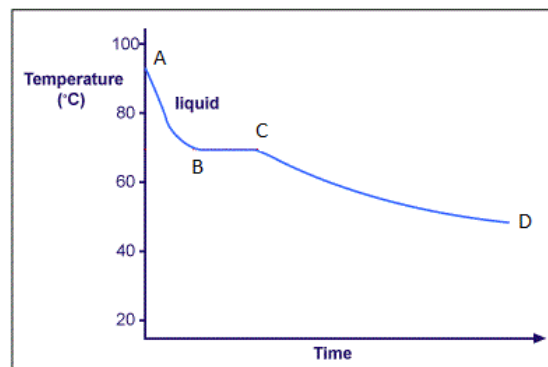
- $\text{BaCl}_2(\text{aq}) + 2\text{AgNO}_3(\text{aq}) \rightarrow \text{Ba}(\text{NO}_3)_2(\text{aq}) + 2\text{AgCl}(\text{s})$
- $\text{Na}_2\text{CO}_3(\text{aq}) + 2\text{HCl}(\text{aq}) \rightarrow 2\text{NaCl}(\text{aq}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$

3. Outline how the following mixtures could be separated into their individual components.

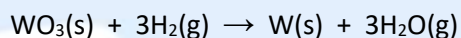
- A saturated solution of sodium chloride
- A mixture of hexane and octane
- An ink that contains two coloured dyes.

4. The diagram on the right shows a cooling curve for stearic acid.

- Determine the melting point of stearic acid.
- Explain why the temperature remains constant between B and C.



5. The metal tungsten, W, can be prepared by reducing powdered tungsten(VI) oxide using hydrogen gas at 850 °C. The equation for the reaction is:



Calculate the atom economy for this reaction.