Edexcel Chemistry IGCSE

Practical 1.7C: Investigate the solubility of a solid in water at a specific temperature (chemistry only)

Notes

Investigating Solubility

Aim

To investigate the solubility of a solid in water at various temperatures.

Equipment list

- 250 cm^3 beaker
- Thermometer
- Water bath
- Glass rod
- Digital mass balance

Chemicals required

- Deionised water
- A solid, powdered (e.g.sodium chloride)

Method

1. Pour 200 cm^3 of deionised water into a 250 cm^3 beaker.
2. Use a water bath to heat the beaker of water to the desired temperature. Keep the thermometer in the beaker to ensure the temperature stays constant throughout the experiment.
3. Add known masses of the solid bit by bit until it stops dissolving and remains as solid in the solution.
4. Record the mass of solid that was soluble.
5. Repeat steps 1-4 with the water at different temperatures.

Key points

- If the solid is very soluble, the solubility could be investigated by timing how long it takes a known mass of solid to dissolve at each temperature.
- A larger mass of solid should dissolve at higher temperatures because the water particles have more kinetic energy so they're able to overcome the intermolecular forces of attraction between the solid particles and cause the solid particles to break apart.
- To compare the solubility of different solids, keep the temperature of the water the same in each trial but use different solids.

Safety Precautions

- Take care when using the water bath as it can cause burns. Avoid touching hot parts of the water bath and handle the beaker with care when it is hot.
- Be careful with the glassware and clear up any broken glass immediately.
- The sodium chloride/ solid must not be ingested.

Analysis of results

The mass of sodium chloride that successfully dissolves in the water can be recorded in a table similar to the one below:

Temperature of the water (°C)	Mass of sodium chloride dissolved in the water (g)
… (room temperature)	
30	
40	
50	

As the temperature increases, the mass of sodium chloride that dissolves should increase. This is because the water particles have more kinetic energy so they're able to overcome the intermolecular forces of attraction between the solid particles and cause the solid particles to break apart.