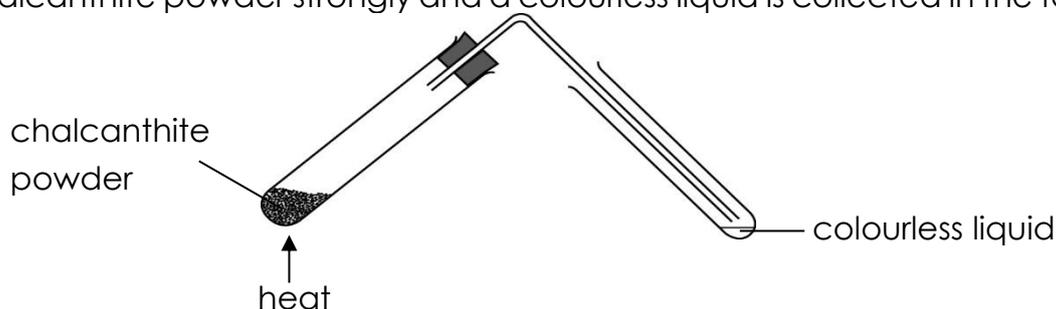


Quiz (The Rock)

1. Chalcantite is a blue mineral containing mainly copper(II) sulphate-5-water. In an experiment, a student uses the following set-up to heat a sample of chalcantite powder strongly and a colourless liquid is collected in the test tube.



- (a) State the potential risk of performing the experiment using the above set-up.
- (b) Suggest an expected observation when chalcantite is heated strongly.
- (c) Suggest a test to show that the colourless liquid collected is water.
- (d) Using the same amount of chalcantite powder, suggest how to increase the volume of liquid collected in the test tube.
- (e) Outline a test to show that chalcantite contains copper.
2. An aqueous solution is tested and the results are shown below.

Test	Observation
Flame test	Lilac flame is seen.
Adding dilute hydrochloric acid	Colourless gas bubbles evolve.
Adding acidified silver nitrate solution	Solution remains colourless

Deduce what is the aqueous solution.

Write chemical equation(s) involved.

Suggested Answer

1. (a) Water vapour produced may condense on the cooler upper part of the boiling tube. If it flows back to the hot bottom part, the tube may crack.
(b) The powder changes from blue to white.
(c) Add the liquid to anhydrous copper(II) sulphate.
Water turns the solid from white to blue.
OR Add the liquid to dry cobalt(II) chloride paper.
Water turns the paper from blue to pink.
(d) Immerse the test tube into an ice-water bath to enhance the cooling effect.
(e) Moisten a clean platinum wire with concentrated hydrochloric acid.
Dip the wire into the chalcantite sample and heat the end of the wire strongly in a non-luminous Bunsen flame.
A bluish green flame will be seen, showing that chalcantite contains copper.

2. From Flame test, lilac flame \Rightarrow presence of K^+

From the result of dilute hydrochloric acid, colourless gas bubbles evolve \Rightarrow presence of CO_3^{2-}

From the result of acidified silver nitrate solution, solution remains colourless \Rightarrow no Cl^- is present

Conclusion: potassium carbonate solution

