

OCR (A) Chemistry A-level

PAG 4: Qualitative Analysis of Ions

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4.1 Identifying Unknowns

Method

Part 1: Identifying the negative ions (anions) present in (unknown) mixture A

1. Add 25 cm³ of distilled water into a 100 cm³ beaker.
2. Add mixture A into the water and stir with a glass rod, until most of the solid has dissolved.
3. Filter the mixture into a conical flask.
4. Add about 2 cm³ of the filtrate to a test tube.
5. Add 5 drops of HNO₃ followed by 10 drops of AgNO₃ to the test tube. Record any observations.
6. To the same test tube, add NH₃ dropwise until there is no further colour change. Record any observations.
7. Add 1 spatula of the residue from step 3 to a test tube. Add about 2 cm³ of HNO₃ to this test tube. Continue adding HNO₃ dropwise until there is no further reaction. Record any observations.
8. Use your observations to suggest formulae of the two anions in mixture A and write equations for the observed reactions.

Part 2: Identifying the Group 2 positive ion (cation) present in mixture A

1. Add about 2 cm³ of the filtrate from part 1, step 3 to a test tube. Add about 2 cm³ of sulfuric acid to this test tube and record any observations.
2. In a new test tube, add 2 cm³ of the filtrate from part 1, step 3 followed by about 2 cm³ of K₂CrO₄. Record any observation.
3. Deduce the formula of the Group 2 positive ions in mixture A using your observations and the table below.

Information about solubility in water:

Group 2 metal	Solubility of sulfate	Solubility of chromate
magnesium	soluble	soluble
strontium	insoluble	soluble
barium	insoluble	insoluble

Safety

- Mixture A – unknown so treat as toxic via all exposure routes.
- Nitric acid – causes severe skin burns and eye damage.
- Silver nitrate – causes severe skin burns and eye damage.
- Ammonia – causes severe skin burns and eye damage; toxic if inhaled.
- Sulfuric acid – causes severe skin burns and eye damage.
- Potassium chromate – causes skin irritation and serious eye irritation; may cause an allergic skin reaction; causes respiratory irritation; may cause cancer and genetic defects.

