

Chemistry Topic 8: Chemical analysis

| 1. Keywords | |
|----------------|---|
| Pure substance | A single element or compound not mixed with any other substance. They have a specific melting and boiling point |
| Melting point | The temperature at which a solid turns to a liquid |
| Boiling point | The temperature at which a liquid turns to a gas |
| Formulation | A mixture that has been designed as a useful product eg fuels, cleaning agents, medicines and fuels |
| Chromatography | Use to separate mixtures and identify substances |
| Rf | $\frac{\text{distance moved by substance}}{\text{distance moved by solvent}}$ |

| 2. Identification of common gases | | |
|-----------------------------------|-------------------|-----------------------|
| Gas | Test | Observation |
| Hydrogen | Burning splint | Squeaky pop |
| Oxygen | Glowing splint | Relights |
| Carbon dioxide | Limewater | Goes cloudy |
| Chlorine | Damp Litmus paper | Bleached (goes white) |

| 3. Flame tests (TRIPLE ONLY) | |
|--|------------|
| Metal ion | Colour |
| Lithium (Li ⁺) | Crimson |
| Sodium (Na ⁺) | Yellow |
| Potassium (K ⁺) | Lilac |
| Calcium (Ca ²⁺) | Orange-red |
| Copper (Cu ²⁺) | Green |
| Flame emission spectroscopy: A sample is put in a flame and the light given out passed through a spectroscope that can identify the ions in the sample | |

| 4. Metal hydroxides (TRIPLE ONLY) | |
|-----------------------------------|---|
| Metal ion | Observation with addition of sodium hydroxide |
| Aluminium (Al ³⁺) | White precipitate which dissolves in excess |
| Calcium (Ca ²⁺) | White precipitate |
| Copper (Cu ²⁺) | Blue precipitate |
| Iron II (Fe ²⁺) | Green precipitate |
| Iron III (Fe ³⁺) | Brown precipitate |

| 5. Testing for negative ions (TRIPLE ONLY) | | |
|--|---------------------|---|
| Negative ion | Reagent | Observation |
| Carbonate | Add carboxylic acid | Fizzes releasing Carbon dioxide |
| Halide | Add silver nitrate | Cl ⁻ = white precipitate Br ⁻ = cream precipitate I ⁻ = yellow precipitate |
| Sulfate | Add Barium Chloride | White precipitate |