Chemical Reactions

Testing for anions

Chemical reactions

- Reactants  Products

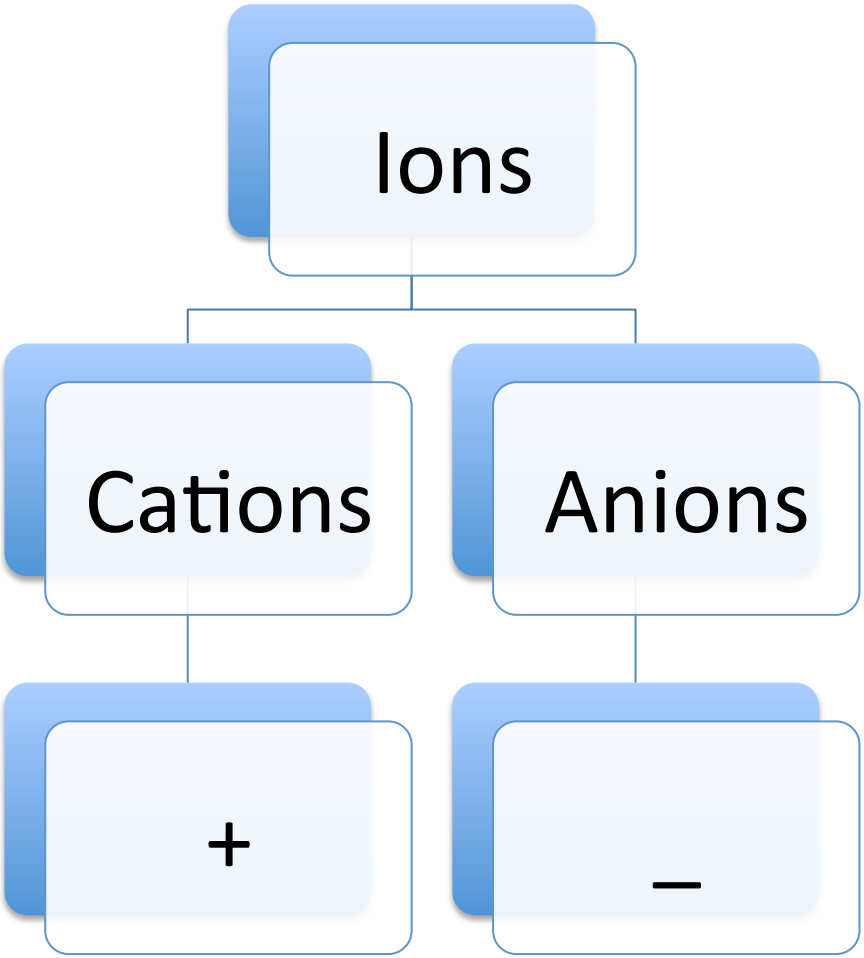
The law of conservation of mass states

- **Total mass of the products of a chemical reaction is the same as the as the total mass of the reactants**
- **Carbon + Oxygen → Carbon Dioxide**
- **12g + 32g → 44g**

Law of conservation of matter/ energy

In any chemical reaction , matter is neither created or destroyed but merely changes from one form to another.

Ions

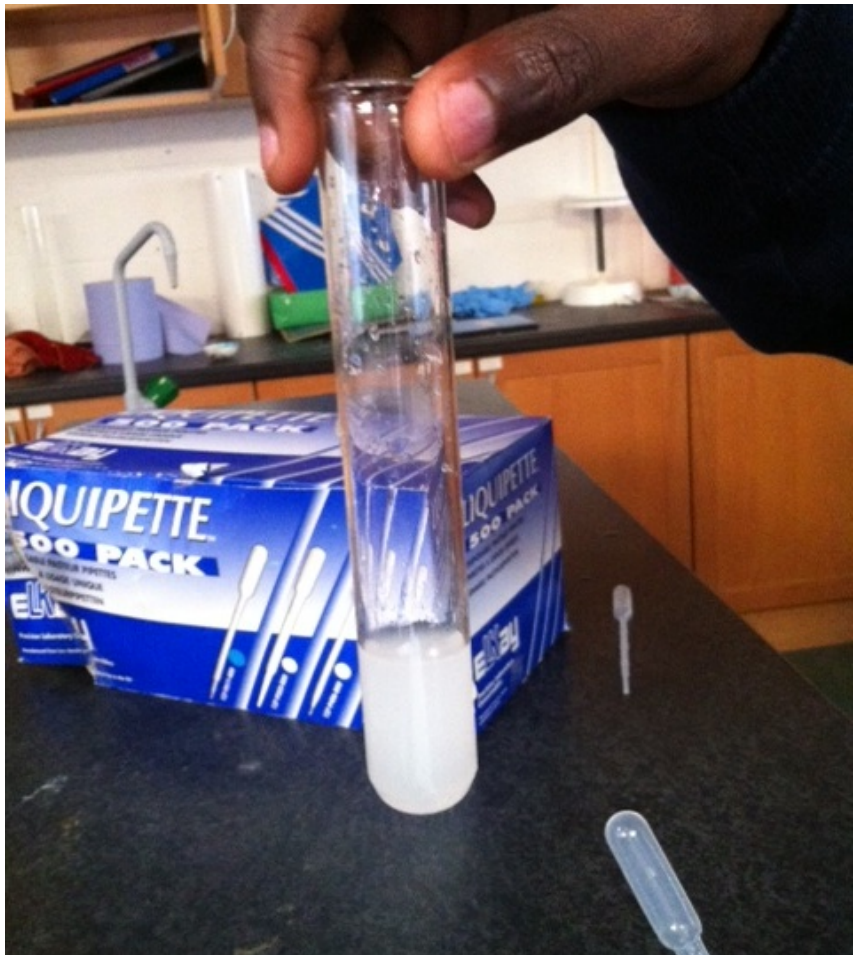


Important Anions to remember

Anion	Formula	Test
Chloride	Cl^-	
Nitrate	NO_3^-	
Hydrogen carbonate	HCO_3^-	
Sulphate	SO_4^{2-}	
Sulphite	SO_3^{2-}	
Carbonate	CO_3^{2-}	
Phosphate	PO_4^{3-}	

Chloride Test

- Solutions containing chloride ions react with silver nitrate solution, producing a white precipitate of silver chloride. For example:
- $NaCl + AgNO_3 \rightarrow NaNO_3 + AgCl\downarrow$
- This precipitate dissolves when dilute ammonia solution is added.



Sulphate and Sulphite anions

- Sulfite anions react with barium chloride solution
- producing a white precipitate.
- Sulfate anions also react with barium chloride solution, producing a white.
- How can you tell whether it's a sulphate or sulphite?
- Hydrochloric acid is added to the white precipitate.
- Sulphate ppt does not dissolve.

Carbonate and Hydrogen Carbonate anions

- Hydrogen carbonate anions react with hydrochloric acid, producing CO_2.
- Carbonate ions also react with hydrochloric acid giving off CO_2.
- $Na_2CO_3 + 2HCl \rightarrow 2NaCl + H_2O + CO_2\uparrow$

- How can you tell the difference between a carbonate and a hydrogen carbonate?

- No ppt is formed when hydrogen carbonate ions are mixed with a solution of magnesium sulfate.

Nitrate anions

- Nitrate ions react with a mixture of iron(II) sulfate solution and concentrated sulfuric acid. A **brown ring** develops slowly at the interface of two layers
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Phosphate anions

- Phosphate anions react on heating with an ammonium molybdate reagent, forming a yellow precipitate, which dissolves on addition of ammonia solution.
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