

## Support Information

1, The following elements are **diatomic**:  $H_2$ ,  $O_2$ ,  $N_2$ ,  $F_2$ ,  $Cl_2$ ,  $Br_2$ ,  $I_2$ , and  $At_2$ .

2, Rules for naming compounds:

- If there are two elements in a compound the non-metal will end in **-ide**.  
e.g.  $CaCl_2$  - calcium chloride,  $K_2O$  - potassium oxide,  $Rb_3P$  - rubidium phosphide
- If the compound contains a metal, non-metal and oxygen the non-metal will end in **-ate**.
- If the metal has variable ions, the valency of the ion present must be shown in brackets e.g.  $Fe_2O_3$  iron (III) oxide and  $FeO$  iron (II) oxide

3, Examples of **acids** (all are **soluble**):

### Strong Acids

Hydrochloric acid ( $HCl$ )

Sulfuric acid ( $H_2SO_4$ )

Nitric acid ( $HNO_3$ )

Phosphoric acid ( $H_3PO_4$ )

### Weak Acids

Ethanoic Acid ( $CH_3COOH$ )

Propanoic Acid ( $CH_3CH_2COOH$ )

Carbonic Acid ( $H_2CO_3$ )

4, Examples of **soluble bases (alkalis)**:

### Strong Bases

Sodium hydroxide ( $NaOH$ )

Potassium hydroxide ( $KOH$ )

### Weak Bases

Ammonia ( $NH_3$ )

Potassium hydrogen carbonate

Note: Any base containing an alkali metal (Group 1) will be soluble.

5, Examples of types of **insoluble bases**:

Metal oxides e.g. copper oxide ( $CuO$ )

Metal carbonates e.g. calcium carbonate ( $CaCO_3$ )

Metal hydroxides e.g. magnesium hydroxide ( $Mg(OH)_2$ )

6, Examples of types of **salts** (formed when an acid reacts with a metal or a base)

Hydrochloric acid forms - **chlorides**

Sulfuric acid forms - **sulfates**

Nitric acid forms - **nitrates**

Phosphoric acid forms - **phosphates**

ethanoic acid forms - **ethanoates**

propanoic acid forms - **propanoates**

**Exception:** carbonic acid formed when carbon dioxide reacts with water - forms carbonates and hydrogen carbonates when reacting with a base

## 7, Salt solubility rules in water

**Note: All Group 1 salts and all nitrates are soluble in water**

Soluble	Insoluble (form precipitate)
All common sodium, potassium and ammonium salts	
All nitrates	
Most common chlorides	Silver chloride, lead chloride
Most common sulfates	Lead sulfate, barium sulfate, calcium sulfate
Sodium carbonate, potassium carbonate, ammonium carbonate	Most common carbonates
Sodium hydroxide, potassium hydroxide, ammonium hydroxide	Most common hydroxides

## 7, Common General Reactions:

### Reactions of Bases

- **Acid + base → salt + water**

- a, **Acid + metal hydroxide**

- Hydrochloric acid + magnesium hydroxide → magnesium chloride + water

- b, **Acid + metal oxide**

- Sulfuric acid + sodium oxide → sodium sulfate + water

- Exceptions:

- c, **Acid + metal carbonate**

- Nitric acid + calcium carbonate → calcium nitrate + water + **carbon dioxide**

- d, **Acid + ammonia**

- Hydrochloric acid + ammonia → ammonium chloride

## Reactions of Metals

- **Metal + Acid → metal salt + hydrogen gas**  
Hydrochloric acid + magnesium → magnesium chloride + hydrogen gas
- **Metal + oxygen → metal oxide**  
Strontium + oxygen → strontium oxide
- **Metal + sulfur → metal sulfide**  
Iron + sulfur → iron sulfide
- **Metal + water → metal hydroxide + hydrogen gas**  
Caesium + water → caesium hydroxide + hydrogen gas

## Combustion of fuels

- **Complete combustion**  
Methane + oxygen → carbon dioxide + water
- **Incomplete combustion**  
Methane + oxygen → carbon monoxide + water  
Or  
Methane + oxygen → carbon + water

## 8, Types of organic homologous series:

- Hydrocarbons (made from hydrogen and carbon)
- Alkanes e.g. ethane ( $C_2H_6$ ), saturated, all single C-C bonds
- Alkenes e.g. propene ( $C_3H_6$ ), unsaturated, double C=C bond
- Alcohols e.g. butanol ( $C_4H_9OH$ )
- Carboxylic acids e.g. pentanoic acid ( $C_5H_9COOH$ )
- Esters e.g. methylhexanoic acid ( $C_6H_{11}COOCH_3$ )
- Addition polymers e.g. poly(ethene)
- Condensation polymers e.g. polyesters and polyamides