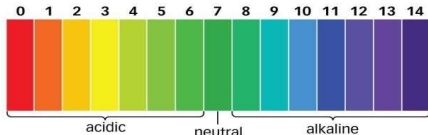



AQA C4a Chemical Changes: Metal & Acid Reactions

TRIPLE CHEMISTRY

RP – Making salts



Reactivity Series

metals form positive ions when they react	<i>The reactivity of a metal is related to how easily it forms positive ions</i>	The reactivity series arranges metals in order of their reactivity. You do not need to learn it.
carbon and hydrogen	<i>carbon and hydrogen are non-metals but included in the reactivity series</i>	This is so we can compare them to the metals
displacement	<i>A more reactive metal can displace a less reactive metal from a compound.</i>	silver nitrate + sodium  sodium nitrate + silver

Strong & Weak Acids

strong acids	completely ionise in water
weak acids	partially ionise in water
hydrogen ions	as pH decreases by 1, H ⁺ concentration goes up x10
H⁺ + OH⁻ ⇌ H₂O	

Metal Salt Production

acid name	salt name
hydrochloric acid	chloride
sulfuric acid	sulfate
nitric acid	nitrate

from most to least reactive	reaction with water	reaction with dilute acid	extraction method
potassium	bubbles, gives off hydrogen and leaves an alkaline solution	explode	electrolysis
sodium			
lithium			
calcium			
magnesium	<div>carbon</div> very slow reaction	bubbles, gives off hydrogen and forms a salt	reduction (removal of oxygen) with carbon
aluminium			
zinc			
iron			
tin	slight reaction with steam	slow reaction with warm acid	
lead			
copper	<div>hydrogen</div> no reaction	no reaction	found as native metal
silver			
gold			

Neutralisation of Acids

neutralisation	<i>acids can be neutralised by bases</i>	A base is a substance that neutralises an acid e.g. a metal carbonate, metal oxide, or soluble metal hydroxide, An alkali is a soluble base e.g. a metal hydroxide.
acid + base → metal salt + water		

Ionic Half Equations

displacement reactions	<i>ionic half equations show what happens to each of the reactants during reactions</i>	The ionic equation for the reaction between iron and copper (II) ions is: Fe + Cu²⁺ → Fe²⁺ + Cu The half-equation for the oxidation of iron is: Fe → Fe²⁺ + 2e⁻ The half-equation for the reduction of copper (II) ions is: Cu²⁺ + 2e⁻ → Cu
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Oxidation, Reduction and Metal Oxides

metals and oxygen	<i>metals react with oxygen to form metal oxides</i>	magnesium + oxygen → magnesium oxide 2Mg + O₂ → 2MgO
reduction	<i>when oxygen is removed during a reaction</i>	e.g. metal oxides reacting with carbon, extracting low reactivity metals
oxidation	<i>when oxygen is gained during a reaction</i>	e.g. metals reacting with oxygen to form metal oxides
Reactions between metals and acids are redox reactions . The metal donates electrons to the hydrogen ions. This displaces hydrogen as a gas while the metal ions are left in the solution.		
OIL RIG - O xidation I s L oss (of electrons), R eduction I s G ain (of electrons)		

Reactions of Acids

acid + metal → metal salt + hydrogen sulfuric acid + iron → iron sulfate + hydrogen
acid + metal oxide → metal salt + water sulfuric acid + iron oxide → iron sulfate + water
acid + metal hydroxide → metal salt + water sulfuric acid + iron hydroxide → iron sulfate + water
acid + metal carbonate → metal salt + water + carbon dioxide sulfuric acid + iron carbonate → iron sulfate + water + carbon dioxide