

What is an oxidation reaction?

Write an equation to show an oxidation reaction.

What is a reduction reaction?

Write an equation to show a reduction reaction.

Place the following metals in order of reactivity – adding the names to the symbols.

Na, Zn, Fe, Cu, Li, K, Mg, Ca

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Why are hydrogen and carbon sometimes included in the reactivity series?

Place arrows on the reactivity series where hydrogen and carbon could go.

Why is gold often found in its pure state?

Complete the word equations.

zinc carbonate + sulfuric acid →

magnesium oxide + hydrochloric acid →

magnesium carbonate + nitric acid →

calcium carbonate + hydrochloric acid →

Describe what a metal reacting with an acid can tell you about the reactivity of the metal.



On the pH scale, label:

strong acid;
strong alkali;
neutral;
weak acid;
weak alkali.

What does the pH show?



Some metals react with water to produce

Some metals react with acid to produce

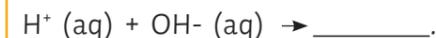
To measure pH you can use... (select two)

- universal indicator
- Litmus paper
- iodine
- methylene blue
- Benedict's solution
- pH meter

Describe how to make a soluble salt from an insoluble base.

1. Choose an a_____.
2. Choose an i_____ base.
3. Warm the a_____.
4. Add the insoluble base to the acid until there is no further r_____.
5. F_____ the mixture.
6. Heat the solution to e_____ the water.
7. C_____ of salt will start to form.

Complete the neutralisation reaction.



What is the pH of the products of a neutralisation reaction?

- a) 1 b) 7 c) 14

Complete the following:

O _____

I _____

L _____

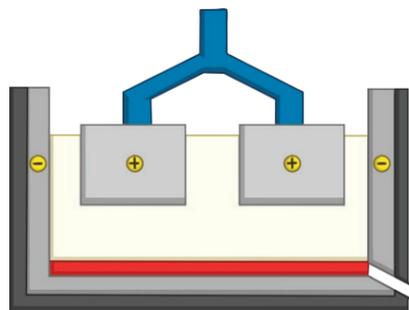
R _____

I _____

G _____

_____ is the loss of electrons and _____ is the gaining of electrons.

Describe how aluminium is extracted by electrolysis.



Why is aluminium oxide mixed with cryolite?

What is the overall equation for the electrolysis of Al_2O_3 to make aluminium and oxygen?

Why can aluminium not be extracted by carbon?

Write the equation for the reaction at the negative electrode.

Write the equation for the reaction at the positive electrode.

a

In which of the following reactions will a displacement reaction occur?

- copper oxide + magnesium
- magnesium oxide + iron
- potassium oxide + zinc
- zinc oxide + lithium

Why do some of them not work?

b

In copper sulfate solution what forms at the:

cathode

anode

Why?

In sodium chloride solution what forms at the:

cathode

anode

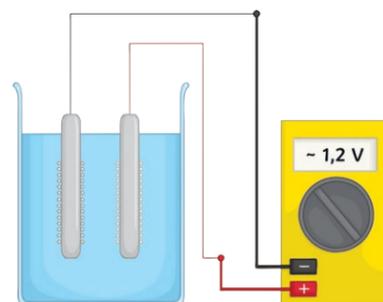
Why?

What are the tests for:
chlorine;

hydrogen;

oxygen?

Describe what happens during the process of electrolysis.



c

The pH of an acid or alkali is a measure of the concentration of _____ ions.

A pH change from 4 to 2 increases H^+ concentration by a factor of...

- a) 10
- b) 100
- c) 1000

(choose the correct answer)

The pH of a strong acid is _____ than the pH of a weaker acid if they have the same _____.

Acids produce _____ in aqueous solutions.

Alkalis produce _____ in aqueous solutions.

d

Strong acids are completely/partially ionised in an aqueous solution

A weak acid is completely/partially ionised in an aqueous solution.

The concentration of an acid is

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What is an oxidation reaction?

The gaining of oxygen in a reaction.

Write an equation to show an oxidation reaction.

e.g. **copper + oxygen → copper oxide**

What is a reduction reaction?

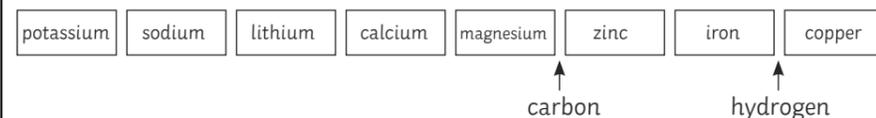
The loss of oxygen in a reaction.

Write an equation to show a reduction reaction.

e.g. **magnesium oxide → magnesium + oxide**

Place the following metals in order of reactivity – adding the names to the symbols.

Na, Zn, Fe, Cu, Li, K, Mg, Ca



Why are hydrogen and carbon sometimes included in the reactivity series?

They are used in the extraction of the metals.

Place arrows on the reactivity series where hydrogen and carbon could go.

Why is gold often found in its pure state?

Gold is a very unreactive metal.

Complete the word equations.

zinc carbonate + sulfuric acid → **zinc sulfate + water + carbon dioxide**

magnesium oxide + hydrochloric acid → **magnesium chloride + water**

magnesium carbonate + nitric acid → **magnesium nitrate + water + carbon dioxide**

calcium carbonate + hydrochloric acid → **calcium chloride + water + carbon dioxide**

Describe what a metal reacting with an acid can tell you about the reactivity of the metal.



The speed of a reaction is shown by the rate that hydrogen gas is given off by the reaction.

The more reactive the metal, the faster the reaction will be.

Slow reactions: copper, zinc, iron

Quick reactions: potassium, sodium, lithium

On the pH scale, label:

strong acid; **(0 - 3)**

strong alkali; **(12 - 14)**

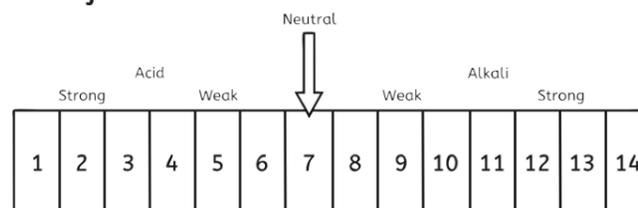
neutral; **(7)**

weak acid; **(4 - 6)**

weak alkali. **(8 - 11)**

What does the pH show?

The measure of H⁺ ions in the solution.



Some metals react with water to produce **metal hydroxide and hydrogen**

Some metals react with acid to produce **salt and hydrogen**

To measure pH you can use... **(select two)**

universal indicator

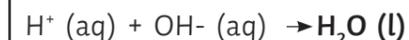
pH meter

Describe how to make a soluble salt from an insoluble base.

1. Choose an **acid**.
2. Choose an **insoluble** base.
3. Warm the **acid**.
4. Add the insoluble base to the acid until there is no further **reaction**.
5. **Filter** the mixture.
6. Heat the solution to **evaporate** the water.
7. **Crystals** of salt will start to form.

Complete the neutralisation reaction.

acid + base → **salt + water**



What is the pH of the products of a neutralisation reaction?

a) 1 **b) 7** c) 14

Complete the following:

Oxidation

Is

Loss

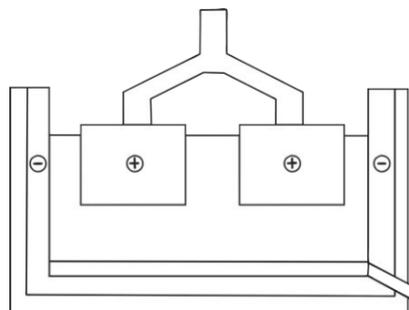
Reduction

Is

Gain

Oxidation is the loss of electrons and **reduction** is the gaining of electrons.

Describe how aluminium is extracted by electrolysis.



The positive Al^{3+} ions are attracted to the negative electrode (cathode) where they gain electrons (3) – making them neutral. The negative O^{2-} ions are attracted to the positive electrode (anode) where they lose electrons (2) – making them neutral.

Why is aluminium oxide mixed with cryolite?

To lower the melting point.

What is the overall equation for the electrolysis of Al_2O_3 to make aluminium and oxygen?

aluminium oxide → aluminium + oxygen



Why can aluminium not be extracted by carbon?

Aluminium is more reactive than carbon so cannot be displaced.

Write the equation for the reaction at the negative electrode.



Write the equation for the reaction at the positive electrode.



Which of the following reactions will occur? (displacement)

copper oxide + magnesium

magnesium oxide + iron

potassium oxide + zinc

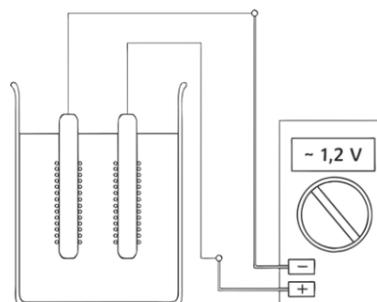
zinc oxide + lithium

Why do some of them not work?

The metal has to be more reactive than the metal in the compound to take its place.

Describe what happens during the process of electrolysis.

When electricity is passed through the solution, the positive ions in the solution go towards the negative electrode where they gain electrons. The negative ions go towards the positive electrode where they lose electrons.



The pH of an acid or alkali is a measure of the concentration of H^+ ions.

A pH change from 4 to 2 increases H^+ concentration by a factor of...

a) 10 **b) 100** c) 1000

(choose the correct answer)

The pH of a strong acid is **less** than the pH of a weaker acid if they have the same **concentration**.

Acids produce H^+ in aqueous solutions.

Alkalis produce OH^- in aqueous solutions.

In copper sulfate solution what forms at the:

cathode

anode

copper

oxygen and water

Why?

Copper is less reactive than hydrogen so copper is formed.

In sodium chloride solution what forms at the:

cathode

anode

hydrogen

chlorine

Why?

Sodium more reactive than hydrogen so hydrogen is formed.

What are the tests for:

chlorine;

bleaches damp litmus paper

hydrogen;

squeaky pop test

oxygen?

relight a glowing splint

Strong acids are **completely**/partially ionised in an aqueous solution

A weak acid is completely/**partially** ionised in an aqueous solution.

The concentration of an acid is

a measure of the number of hydrogen ions in a solution.

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