



Electrolysis: Using electricity to split water

KS4 CHEMISTRY

Ages 11-16 ⌚ 3 min read

What is electrolysis?

Electrolysis is a clever chemical trick where we use **electricity** to break down substances into simpler parts. The most famous example is splitting **water** (H_2O) into **hydrogen** and **oxygen** gases. It's the opposite of what a battery does — instead of creating electricity from chemicals, we use electricity to change chemicals.

Think of it like: Imagine you have a LEGO model glued together. Normally, glue holds pieces permanently. But electrolysis is like using a special tool that vibrates so powerfully it shakes the glue apart and separates the bricks.

How does electrolysis work?

Electrolysis needs three key things: a liquid containing **ions** (charged particles), two metal sticks called **electrodes**, and an **electric current**. When you connect the electrodes to a power source like a battery, something magical happens.

The **positive electrode** (called the **anode**) attracts negatively charged ions, while the **negative electrode** (called the **cathode**) attracts positively charged ions. As these ions rush towards opposite electrodes, they gain or lose electrons, transforming into new substances. In water electrolysis, this creates bubbles of hydrogen gas at one electrode and oxygen gas at the other.

Think of it like: The electrodes are like magnets pulling dancers in opposite directions. When the music plays (electricity flows), positive dancers run to the negative magnet and negative dancers run to the positive magnet, creating new dance patterns.

Why is electrolysis useful?

Electrolysis isn't just a laboratory curiosity — it has real-world applications. We use it to **plate metals** (coating jewellery with gold or silver), to **refine metals** (purifying

copper and aluminium), and to **purify water**. Scientists are also excited about using electrolysis to produce **hydrogen fuel**, a clean energy source for the future.

Electroplating is perhaps the most familiar use. When you see shiny gold-plated earrings or chrome-plated bumpers on cars, electrolysis made those beautiful finishes possible.

Think of it like: Dipping your hands in paint makes them painted. Electroplating is like using electricity to force a thin coat of one metal onto another metal — it sticks much better than paint would.

The key takeaway

Electrolysis proves that electricity is incredibly powerful. By harnessing electrical energy, we can break down water, purify metals, and create new materials. It's chemistry and physics working together to transform our world.