Reversible Reactions and Chemical Equilibrium Explained

KS4 CHEMISTRY Ages 13-16 ⏰ 3 min read

What is a Reversible Reaction?

A **reversible reaction** is a chemical change where the products can turn back into the original substances. Unlike most reactions you might know about, reversible reactions don't just go in one direction. Instead, they work like a two-way street where chemicals can transform forward and backward at the same time.

In a normal **irreversible reaction**, something burns up or breaks down and you can't easily get it back. But in a reversible reaction, the process can flip. For example, when you heat **copper carbonate**, it breaks down into copper oxide and carbon dioxide gas. But if you cool it down or add carbon dioxide back, it can reform into copper carbonate again.

Think of it like a door that swings both ways. You can walk through from the left side to the right side, but you can also walk back through from right to left. The door works in both directions at the same time.

Understanding Equilibrium

Equilibrium is the point where a reversible reaction balances out. At equilibrium, the forward reaction (where substances change into products) and the backward reaction (where products change back into original substances) happen at exactly the same speed.

When equilibrium is reached, it looks like nothing is happening anymore because the amounts of all the chemicals stay the same. But actually, both reactions are still going on invisibly—they're just happening at equal rates, so nothing appears to change.

Think of it like a bathtub where water is flowing in from the tap at the same speed that it's draining out. The water level stays the same even though water is constantly moving in and out.

Why Does This Matter?

Understanding reversible reactions and equilibrium is crucial in chemistry because it helps us predict and control chemical processes. In industry, chemists use equilibrium knowledge to make medicines, fertilizers, and countless other products. They can shift equilibrium in useful directions by changing temperature, pressure, or the amounts of chemicals present. This knowledge gives scientists real power to create the materials our world depends on.