

Atoms and electrons

Extract from "Advanced chemistry for you", Lawrie RYAN, Nelson Thornes

► History of the atom

The Greeks were the first people to put forward the idea that all matter was made up from particles. But it wasn't until the early 1800s that theories about atoms were really developed and taken seriously.

It was **John Dalton** who first tried to explain the great variety of substances by thinking of different combinations of atoms. The word '**atom**' came from a Greek word meaning something that could not be split up. He thought of atoms as solid spheres, a bit like tiny snooker balls.

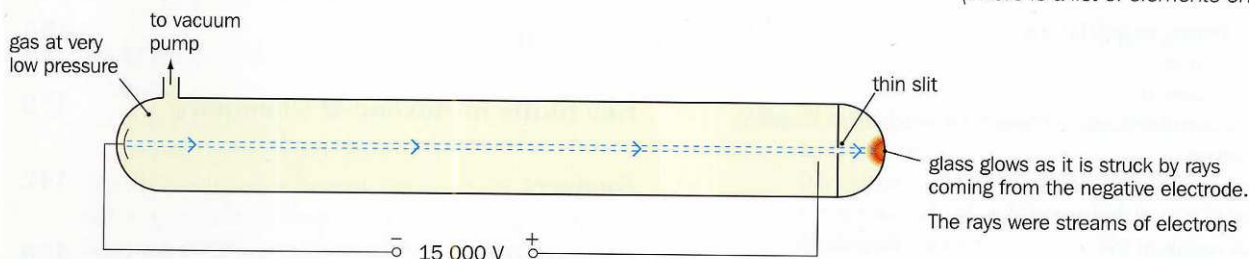
Dalton drew up a list of chemical elements. Look at the table opposite: He believed these to be made from only one type of atom.

- Can you think of any of Dalton's ideas that we no longer believe?

At the end of the century, another scientist called **J.J. Thomson** was investigating the effects of high voltages on gases.

In one of his experiments he noticed some strange rays coming from the negative electrode.

Look at the experiment below:



He carried out more work on these rays and found that they were made from tiny negatively charged particles. Their mass was much less than that of any atom.

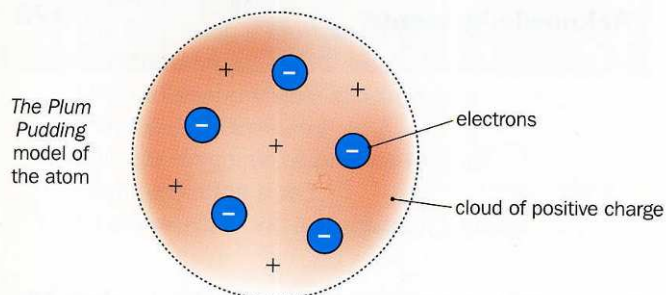
To explain these results Thomson put forward a new model of the atom.

He said that the negative particles were **electrons**. He believed that they must have come from **inside the atoms** in his apparatus.

He also knew that atoms were neutral. They had no overall charge on them.

So he suggested that the electrons were embedded in a cloud of positive charge.

Look at his vision of an atom below:



People called this the Plum Pudding theory. Can you see why?

The positive cloud was thought of as the pudding mixture.

What would represent the electrons in this model?

Hydrogen	1	Strontian	46
Nitrogen	5	Barytes	68
Carbon	3	Iron	56
Oxygen	7	Zinc	56
Phosphorus	9	Copper	56
Sulphur	13	Lead	96
Magnesia	20	Silver	190
Lime	24	Gold	190
Soda	28	Platina	190
Potash	42	Mercury	167

Which substances above did Dalton mistakenly label as elements? (There is a list of elements on page 89)