

Chapter 2 Understanding the Atom

2-1 Discovering Parts of an Atom

Democritus 460-370 BC Greek philosopher

- Matter is made of atomos... small, solid, ~~divisible~~
- Atoms are constantly moving in empty space
- Different types of matter come from different



"Really?!"

types of atoms

- An atom's properties determine the matter's properties



Aristotle 384-322 BC Greek philosopher

- Matter is made of fire, water, air + earth

John Dalton 1766-1844 AD British teacher

The Atomic Theory

- All matter is made of atoms that cannot be divided, created, or destroyed

• During a chemical reaction, one element cannot be changed into another

- Atoms of one element are identical to each other, but different from other elements

- Atoms combine in specific ratios

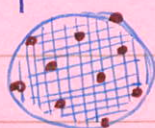


"Didn't see that coming!"

J. J. Thomson 1856-1940 AD English scientist

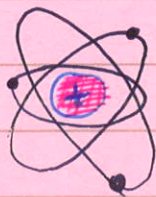
Discovered ELECTRONS!

Came up with the "plum pudding" model



Ernest Rutherford - Thompson's student

1871-1937 AD



discovered the idea of a
NUCLEUS and a PROTON.
He also realized most of an atom
is EMPTY SPACE!

James Chadwick - Figured out the Neutron

1891-1974

Neils Bohr - Rutherford's student

1885-1962

Understood energy levels

Came up with circular orbits



The Modern Atomic Model

Electrons are in a "cloud"



Quarks - Protons + Neutrons are made of quarks.

There are 6 kinds of quarks:

Up, Down, Charm, Strange, Top, and Bottom.

2-2 Protons, Neutrons, and Electrons - How Atoms Differ

Atomic Number = the number of protons

Atomic Mass = the sum of the protons + neutrons

Isotopes = atoms of the same element with
different numbers of neutrons

Average Atomic Mass - considers the different
isotopes

Radioactivity

Henri Becquerel 1852-1908

Pierre + Marie Curie 1867-1934

Uranium released radiation and changed into a different element... this is called nuclear decay.

- ★ Alpha decay - 2 protons + 2 neutrons released
Atomic number decreases by 2
- ★ Beta decay - a neutron changes into a proton and a high energy electron
↑ a beta particle
Atomic number increases by 1
- ★ Gamma decay - gamma rays are given off.
They contain energy, but not particles.
There is no change in the atomic number.
(element stays the same)

The energy released by radioactive decay can be helpful and harmful.

If an atom gains or loses electrons, it becomes an ion - it is no longer neutral.

An atom gaining an electron becomes negative.
An atom losing an electron becomes positive.