LIBERTY & SUCCESS LEARNING HUB
NUCLEAR PHYSICS / CHEMISTRY

ATOMIC MODELS

Dalton's Atomic Model (1803)

John Dalton proposed that matter is made up of tiny indivisible particles called atoms. Atoms of the same element are identical and combine in simple whole-number ratios to form compounds. Dalton described the atom as a solid sphere.

Limitations:

- Atoms are divisible into subatomic particles.
- Atoms of the same element may differ (isotopes).
- Does not explain radioactivity or bonding.

Thomson's Atomic Model (1897)

J. J. Thomson discovered the electron and suggested that the atom is a positively charged sphere with electrons embedded in it. This model is called the plum pudding model.

Limitations:

- Does not explain the nucleus.
- Fails to explain alpha particle scattering.
- No proper electron arrangement.

Rutherford's Atomic Model (1911)

Ernest Rutherford proposed that the atom has a small dense positively charged nucleus at the centre with electrons moving around it. Most of the atom is empty space.

Limitations:

- Does not explain atomic stability.
- Cannot explain atomic spectra.

Bohr's Atomic Model (1913)

Niels Bohr suggested that electrons move in fixed circular orbits with definite energy levels. Energy is absorbed or emitted when electrons jump between orbits.

Limitations:

- Applicable mainly to hydrogen atoms.
- Cannot explain complex spectra.

Modern Atomic Model (1926)

The modern atomic model explains that electrons exist in regions of probability called orbitals. It was developed using quantum mechanics by scientists such as Schrödinger.

Limitations:

- Highly mathematical.
- Difficult to visualize.