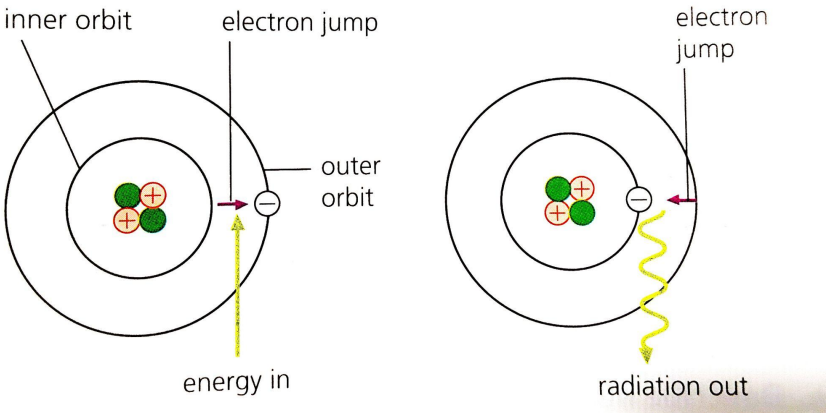
3.1 Atomic structure

Rutherford- Bohr model of the atom

Niels Bohr, a Danish scientist, created the nuclear model of the atom shortly after Rutherford presented it to explain how atoms emit light. He proposed that electrons circled the nucleus at great speeds, held in specific orbits by the nucleus' electrical attraction to them.
The electrons normally stay in their orbits unless the atom is given energy, for as by being heated.
Electrons have the potential to jump to the outer orbit. After that, the atom is said to be stimulated. Soon after, electrons return to an inner orbit, transferring energy via bursts of electromagnetic radiation (called photons), such as infrared light, ultraviolet light, or X-rays. The wavelength of the radiation released is determined by the electrons' jumping between two orbits. If an atom accumulates enough energy to allow one electron to escape completely, the atom becomes an ion, and the energy required to achieve this is referred to as the atom's ionisation energy.



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Schrödinger model of the atom

The Rutherford-Bohr model was superseded by an enigmatic mathematical model created by Erwin Schrödinger, while it is still applicable in certain situations. The best explanation we can provide, devoid of complex mathematics, is that the atom in the Schrödinger model is made up of a nucleus encircled by an ill-defined cloud of electrons. Denser shading corresponds to areas of the atom where electron probability is predicted by mathematics.

Energy levels that are distinct for each element take the role of the concept of electrons travelling in predetermined orbits in this theory. An electromagnetic radiation photon with energy equal to the difference between the two levels is released when an electron "jumps" from one

level. The arrangement of energy levels therefore determines the frequency (and wavelength) of radiation released by an atom.

The spectrum that is created, say, by a prism, for each atom that emits visible light is a collection of coloured lines specific to each element. Two adjacent yellow-orange lines are produced by sodium vapour in a gas discharge tube, like that of a yellow street light. Energy shifts in numerous distinct atoms produce light from the sun, and the resulting spectrum is continuous and contains every colour.