

Chemistry Study Materials for Class 9 (NCERT Questions –Answers of Chapter -04) Ganesh Kumar

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Structure of the Atom

DRAWBACKS OF RUTHERFORD MODEL

(a) According to Rutherford's Model, electron revolves round the positively charged nucleus which is not expected to be stable. But a charged particle in an accelerated motion along a circular path would lose energy because of radiation and finally would fall into nucleus. This makes an atom unstable while atoms are quite stable.

If atoms were not stable no matter would exist in nature.

(b) Rutherford model could not solve the problem of atomic mass of atom as it proposed only the existence of protons in the nucleus.

However, the problem of atomic mass could be solved after the discovery of neutron.

BOHR'S MODEL OF ATOM

Neils Bohr, a Danish physicist, in 1913 proposed model of atom which rectified the problems left by Rutherford's Model. He proposed that

(a) Electrons revolve round the nucleus in a fixed orbit.

(b) He called these orbits as 'stationary orbit'.

(c) Each stationary orbit is associated with fixed amount of energy, thus electrons do not radiate energy as long as they keep on revolving around the nucleus in fixed orbit.

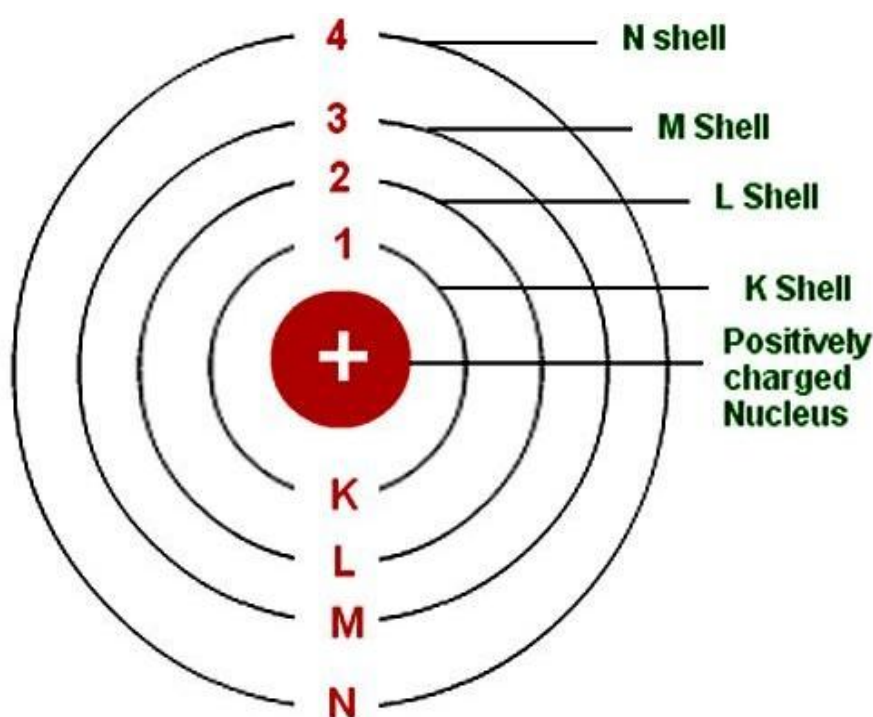
The circular path around the nucleus is called orbit, energy level or shell.

Energy level are represented by letter – K, L, M, N,.and so on.

Therefore,

- 1st orbit is denoted by – K
- 2nd orbit is denoted by – L
- 3rd orbit is denoted by – M, and so on.

The orbits are denoted by 1, 2, 3, and so on.



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Q1. On the basis of Thomson's model of an atom, explain how the atom is neutral as a whole.

Answer:

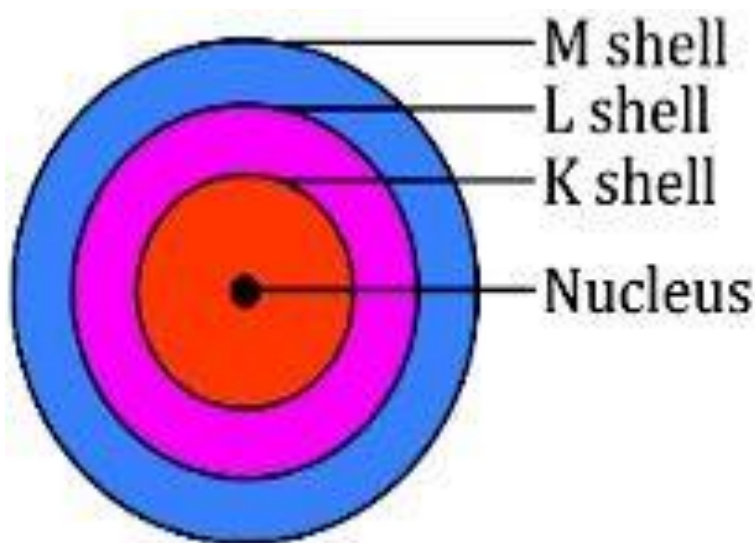
As per Thomson's model of the atom, an atom consists both negative and positive charges which are equal in number and magnitude. So, they balance each other as a result of which atom as a whole is electrically neutral.

Q2. On the basis of Rutherford's model of an atom, which subatomic particle is present in the nucleus of an atom?

Answer: On the basis of Rutherford's model of an atom, protons are present in the nucleus of an atom.

Q3. Draw a sketch of Bohr's model of an atom with three shells.

Answer:



Q4. What do you think would be the observation if the α -particle scattering experiment is carried out using a foil of a metal other than gold?

Answer: If α -particle scattering experiment is carried out using a foil of any metal as thin as gold foil used by Rutherford, there would be no change in observations. But since other metals are not so malleable so, such a thin foil is difficult to obtain. If we use a thick foil, then more α - particles would bounce back and no idea about the location of positive mass in the atom would be available with such a certainty.
