

Difference Between Dalton's Atomic Theory and Modern Atomic Theory

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Key Difference - Dalton's Atomic Theory vs Modern Atomic Theory

Dalton's atomic theory is the oldest theory about the [atom](#). In 1808, John Dalton published his theory, which was composed of several postulates that were built based on his experiments and laws of chemical combination. A number of scientists later contributed to the development of modern atomic theory, which is different from Dalton's atomic theory and has more advanced facts about the atom and its behavior. The key difference between Dalton's Atomic Theory and Modern Atomic Theory is that **the structure and properties of atom according to Dalton's theory are different from the structure and properties proposed by the modern atomic theory.**

What is Dalton's Atomic Theory?

Dalton's atomic theory is a set of postulates proposed to describe the structure and properties of an atom. The development of this first atomic theory was influenced by facts like the dissolution of different gases in water in different proportions, the composition of tin oxide with 88% Tin while the rest being [oxygen](#), etc. Then Dalton proposed the following postulates.

- All matter is made out of atoms which are indivisible.
- Atoms of one element are identical to each other in their mass, size, and shape.
- Atoms can combine with each other in small whole numbers.
- Atoms can neither be created nor destroyed.
- An atom is the smallest unit of matter that can take part in a [chemical reaction](#).

These postulates above does not explain the structure or properties of an atom in detail.

- The fundamental characteristic that all the atoms of the same element share is the number of protons. Atoms of the same element can have different numbers of electrons which are called ions and different numbers of neutrons which are called isotopes.
- Compounds can be made out of the same element or different elements.
- When all the elements are considered together, their atoms have properties that vary periodically.

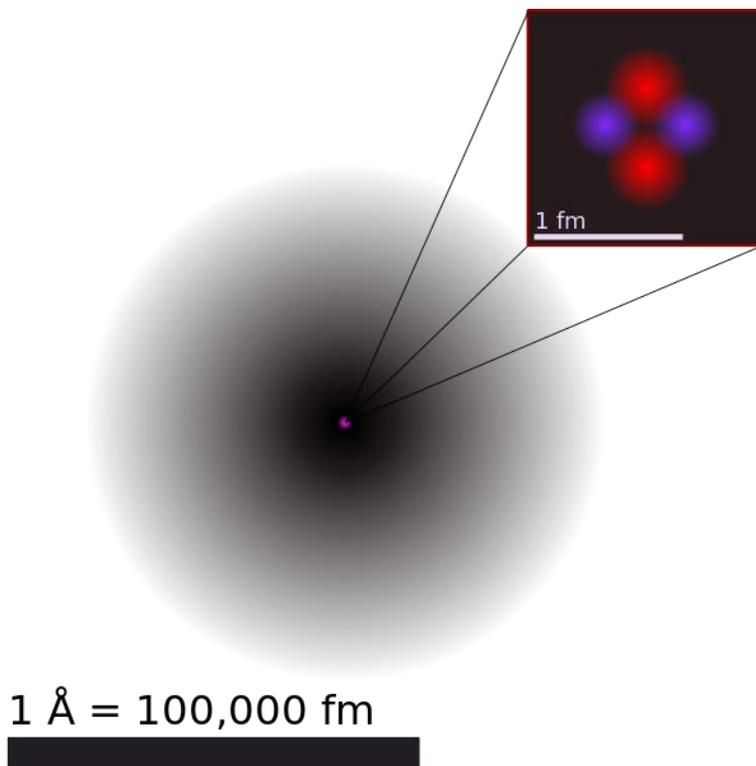


Figure 02: The structure of Helium atom according to the modern atomic theory.

What is the difference between Dalton's Atomic Theory and Modern Atomic Theory?

| Dalton's Atomic Theory vs Modern Atomic Theory | |
|---|---|
| Dalton's atomic theory is a theory about indivisible particles called atoms which are the smallest particles of all matter. | Modern atomic theory is the theory that explains the fully detailed structure of an atom. |
| Structure of Atom | |
| According to Dalton's atomic theory, atoms are indivisible particles. | Modern atomic theory says that atoms are composed of subatomic particles; protons, electrons, and neutrons. |

| Isotopes | |
|--|--|
| Dalton's theory does not explain details about isotopes. It states that all atoms of the same element are identical. | Modern atomic theory explains details about isotopes having a different number of neutrons and the same number of protons. |
| Electrons | |
| Dalton couldn't give details about electrons. | Modern atomic theory explains the location, reactions, and behavior of electrons. |
| Chemical Reactions | |
| Dalton's atomic theory explains that atoms are the smallest particle that can be engaged in reactions. | Modern atomic theory states that subatomic particles can participate in reactions. |

Summary - Dalton's Atomic Theory vs Modern Atomic Theory

Even though there were no well-equipped laboratories, Dalton was able to build up a theory on atoms, which are invisible to the eye. This led to the development of modern atomic theory, which can explain almost everything about the structure and properties of atoms. There is a large difference between Dalton's atomic theory and modern atomic theory since the structure and properties of atom according to Dalton's theory is different from the structure and properties proposed by the modern atomic theory.

Reference:

1. Gillaspay, Rebecca. "Modern Atomic Theory: Electron Clouds, Schrodinger & Heisenberg." Study.com. N.p., n.d. Web. [Available here](#). 07 June 2017.
2. Shrestha, Binod. "Postulates of Dalton's Atomic Theory." Chemistry LibreTexts. N.p., 21 Mar. 2017. Web. [Available here](#). 07 June 2017.

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