



Subject: Chemistry
Title: Structure of the Atom (*in terms of the orbital model*)
Ages: 17-18

Description

An atom is the smallest unit of matter that retains all of the chemical properties of an element. Atoms combine to form molecules, which then interact to form solids, gases, or liquids.

Atoms consist of three basic particles: protons, electrons, and neutrons. The nucleus (center) of the atom contains the protons (positively charged) and the neutrons (no charge). The outermost regions of the atom are called electron shells and contain the electrons (negatively charged). Atoms have different properties based on the arrangement and number of their basic particles.

In atomic theory and quantum mechanics, an atomic orbital is a mathematical function that describes the wave-like behavior of either one electron or a pair of electrons in an atom. This function can be used to calculate the probability of finding any electron of an atom in any specific region around the atom's nucleus. The term atomic orbital may also refer to the physical region or space where the electron can be calculated to be present, as predicted by the particular mathematical form of the orbital. There are four types of orbitals - s, p, d and f (sharp, principle, diffuse and fundamental). Within each shell of an atom there are some combinations of orbitals.

Each electron in an atom is described by four different quantum numbers. The first three (n, l, m_l) specify the particular orbital of interest, and the fourth (m_s) specifies how many electrons can occupy that orbital.

In atomic physics and quantum chemistry, the electron configuration is the distribution of electrons of an atom or molecule in atomic or molecular orbitals. The electron configuration of an atomic species allows us to understand the shape and energy of its electrons. Knowing the electron configuration of a species gives us a better understanding of its bonding ability, magnetism and other chemical properties.

Objectives

- to convey complex information about structure of an atom in a way that makes it relevant and easy to digest and understand;
- to give a visualization for effective understanding of the structure of an atom in terms of an orbital model;
- to clearly a theoretical concept related to Chemistry;
- to raise awareness for science.

Implementation

The infographic represents a visual description of the structure of an atom, particles, atomic orbitals, quantum numbers and electronic configuration. By combining elements of text and images, using the concept of informational infographic, in graphic program Adobe Photoshop, team of students choose the complex and make it simple, digestible and engaging.

Curators

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