

Atomic Structure

Atomic Structure

1. Atom Definition

- An atom is the smallest unit of an element that retains the chemical properties of that element.

2. Components of an Atom

- **Nucleus:** Center of the atom containing protons and neutrons.
- **Electron Cloud:** Region surrounding the nucleus where electrons are found.

3. Subatomic Particles

- **Protons:** Positively charged particles found in the nucleus.
- **Neutrons:** Neutral particles found in the nucleus.
- **Electrons:** Negatively charged particles found in the electron cloud.

4. Atomic Number

- Represents the number of protons in an atom.
- Determines the element's identity on the periodic table.

5. Mass Number

- Sum of protons and neutrons in the nucleus.
- Not the same as atomic mass.

6. Isotopes

- Atoms of the same element with different numbers of neutrons.
- Have the same atomic number but different mass numbers.

7. Electron Configuration

- Describes the arrangement of electrons in energy levels around the nucleus.
- Follows the principle of filling lower energy levels before higher ones.

8. Energy Levels

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- Electrons occupy specific energy levels or shells around the nucleus.
- Each energy level can hold a specific number of electrons.

9. Valence Electrons

- Electrons in the outermost energy level of an atom.
- Involved in chemical bonding and determining an element's reactivity.

10. Atomic Structure Models

- **Thomson Model:** Plum pudding model with electrons embedded in a positive sphere.
- **Rutherford Model:** Nucleus surrounded by electrons in empty space.
- **Bohr Model:** Electrons orbit the nucleus in specific energy levels.

Understanding atomic structure is crucial in chemistry as it forms the basis for explaining the behavior of elements and their interactions in chemical reactions.