



Al-Mustaqbal University College

Department of Medical Physics

First Class

General Chemistry

Lec 1 Matter and Atomic structure

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Matter

Matter is everything around you

Matter is composed of very tiny or microscopic particles called Atoms

Anything that has mass and takes up space.

Atoms and Molecules

An atom is the basic structure from which all matter is composed. Atoms are made of small particles called protons, neutrons, and electrons. Each of these particles is described in terms of measurable properties, including mass and charge. An atom is composed of two regions: the nucleus, which is in the center of the atom and contains protons and neutrons, and the outer region of the atom, which holds its electrons in orbit around the nucleus.

proton is a positively charged particle in an atom

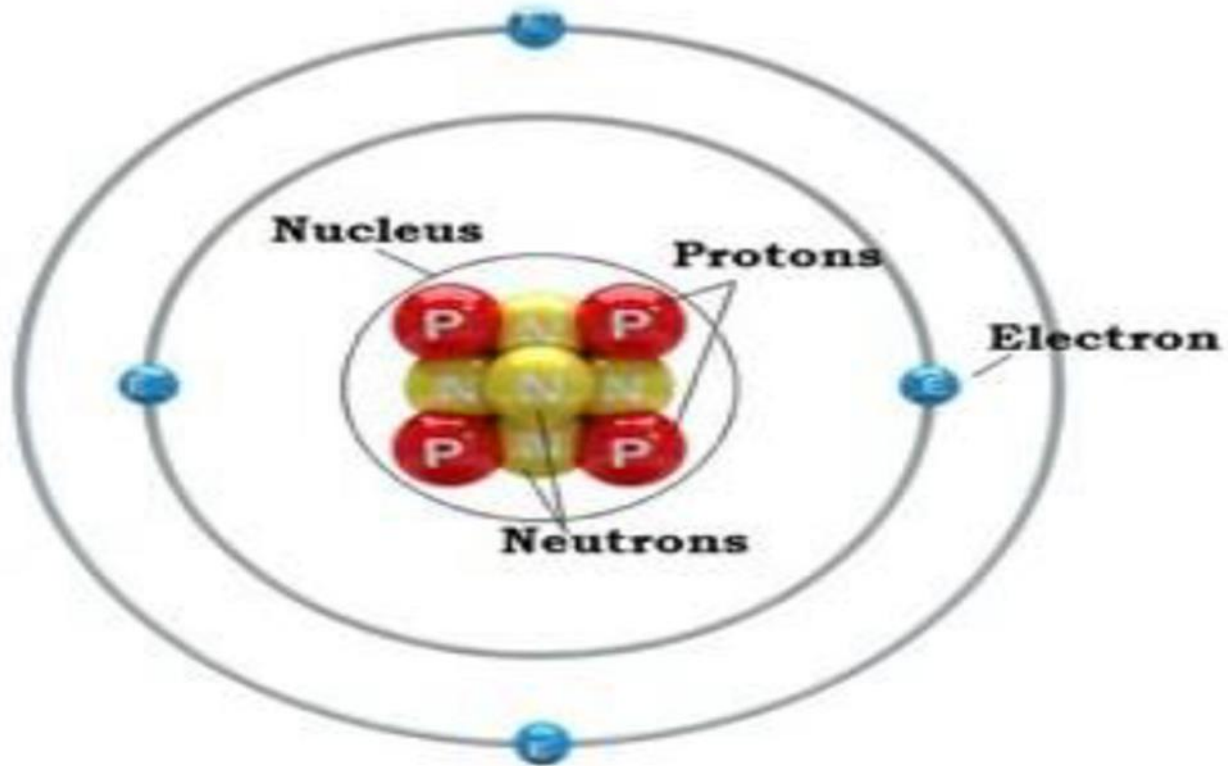
electron is a negatively charged particle in an atom

neutron is a neutral (neither negative nor positive) particle in an atom

The Atomic Number is the number of protons in an atom

The Atomic Mass is the number of protons and the number of neutrons in an atom

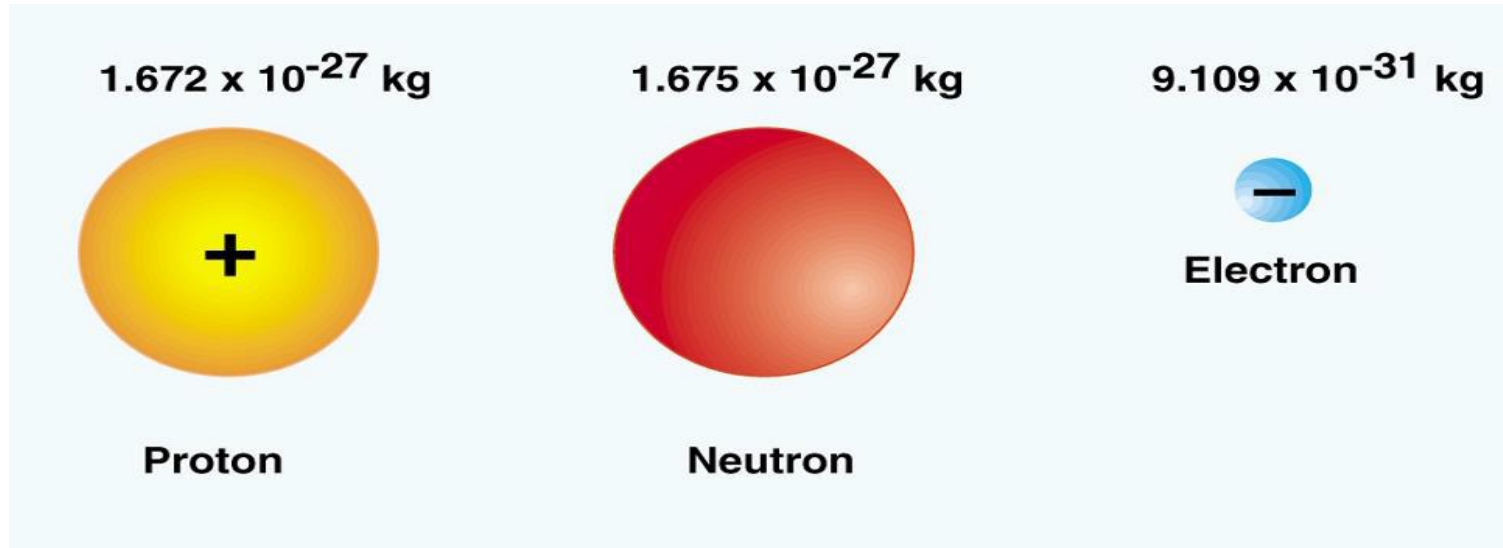
Molecules are atoms bonded together



Mass is the amount of matter that an object contains.

The proton and neutron have roughly the same mass and have approximately one thousand times the mass of the electron.

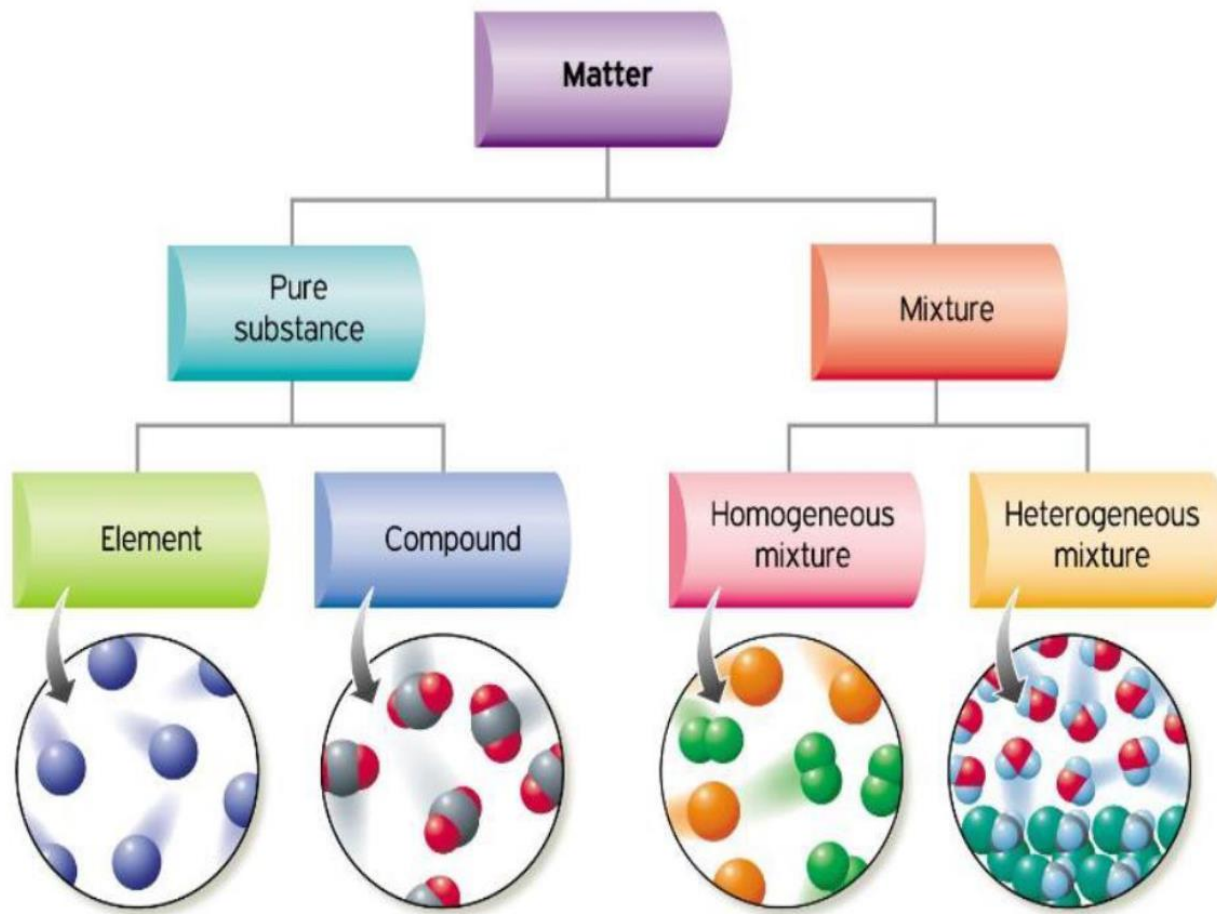
The proton and electron have equal, but opposite, electrical charges. A neutron does not have an electrical charge.



Model of Proton, Neutron and Electron

In an atom, the protons and neutrons clump together in the center and are called the nucleus. Because the protons are positively charged, the nucleus has a positive electric charge

Classification of Matter



Classification of Matter

Matter can be classified into two types

1-Pure Substance: A substance made up of only one type of atom or molecule.

a. Elements: is a pure substance consisting only of atoms that all have the same numbers of protons in their nuclei. here are 109 known elements in nature. exp

O₂ C Ca He

B-Compounds: Two or more atoms that are chemically combined. Substances such as water, salt, and sugar are simple examples of compounds.

Examples include:

- Sodium Chloride
- Ammonia

2- Mixture: two or more different types of matter (element, molecule, compound) are mixed to get mixture. All matters forming mixture keep their original properties. They are not pure matters.

a. Homogeneous Mixtures: All parts of mixture show same properties in homogeneous mixtures. We can call homogeneous mixtures as solutions. Salt water, sugar water, air are examples of homogeneous mixtures.

b. Heterogeneous Mixtures: Mixtures do not show same uniformity in all parts of it.

In this types of mixtures, you can see different phases of matters. Water + Sand, milk, blood, soil are some common examples of heterogeneous mixtures.

STATES OF MATTER

Matter exist in three states in nature:

1.Solid state

2.Liquid state

3.Gaseous state

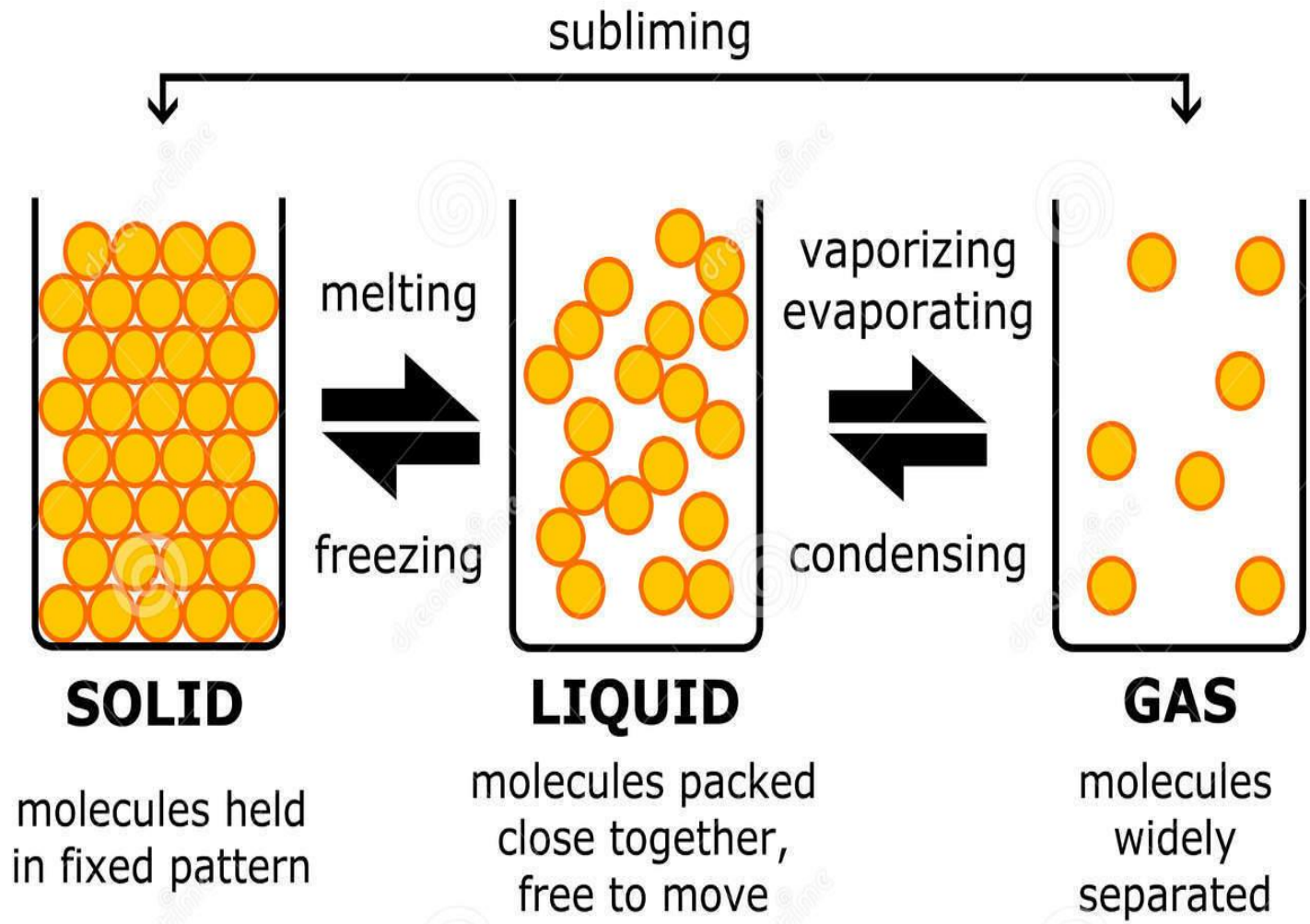
Solis state: Matter that has constant volume and constant shape

Liquid state: Matter that has a constant volume but not a constant shape

Gas state: Matter that has neither constant volume nor constant shape



Characteristics	Solid	Liquid	Gas
1. Shape	fixed shape	no fixed shape	no fixed shape
2. Volume	fixed volume	fixed volume	no fixed volume
3. Rigidity/fluidity	are rigid, cannot flow	can flow, not rigid	can flow, not rigid
4. Intermolecular force	maximum	less than solids	very less
5. Intermolecular space	very less	more than solids	maximum and less than gas
6. Compressibility	negligible	compressible	highly compressible



GOOD LUCK

