Ministry of Higher Education and Scientific Research
AL-Mustaqbal University College of Science
Department of Biochemistry

Physical chemistry

Lecture 1

General properties of gases

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Introduction:-

General properties of gases

- **Matter**: is anything that occupies space and has mass.
- All physical objects are composed of matter, and an easily observed property of matter is its state or phase.

- **States of Matter**

They found Four States of Matter.

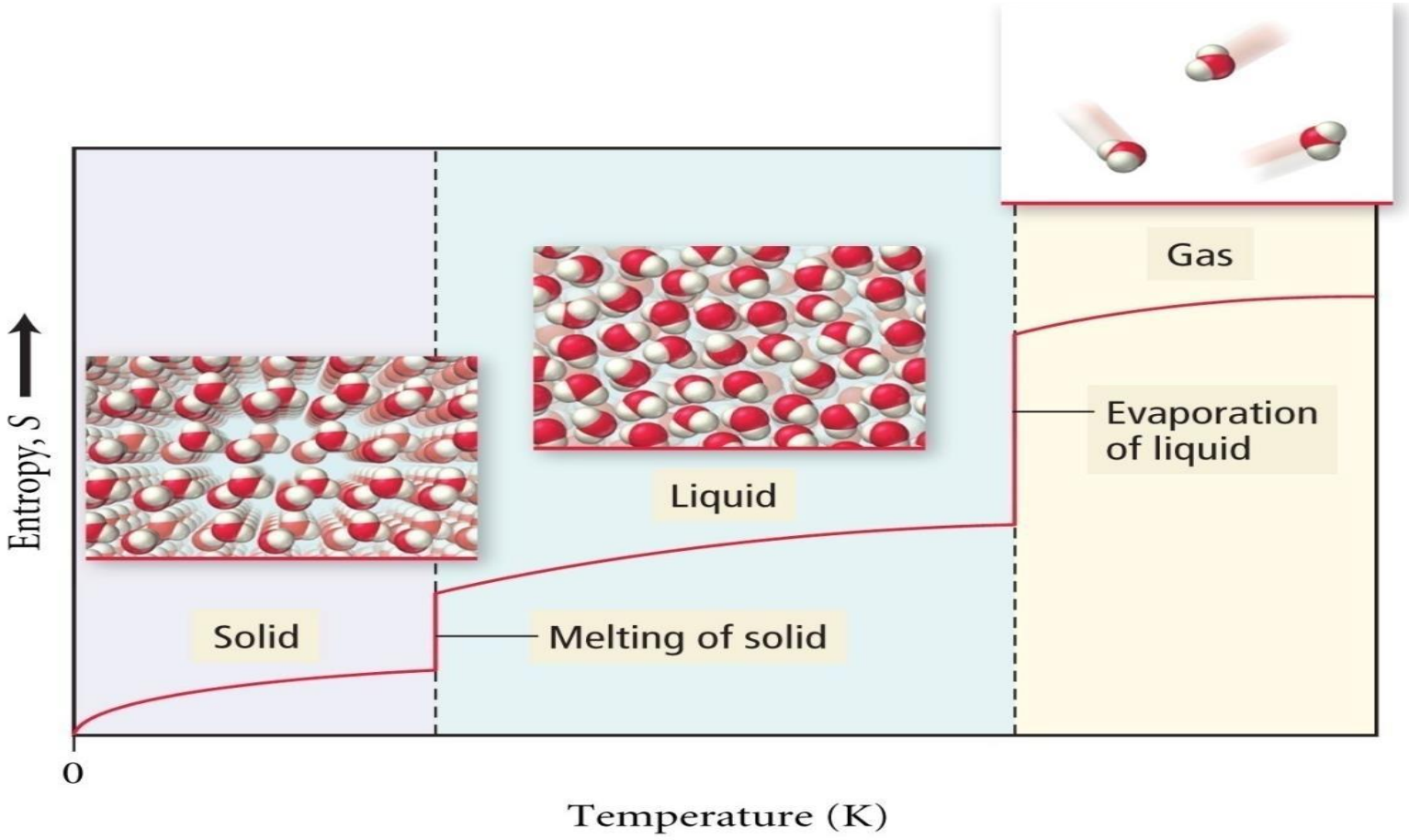
•Solid
•Liquid
•Gas
•Plasma

States of Matter

- Based upon particle arrangement
- Based upon energy of particles
- Based upon distance between particles

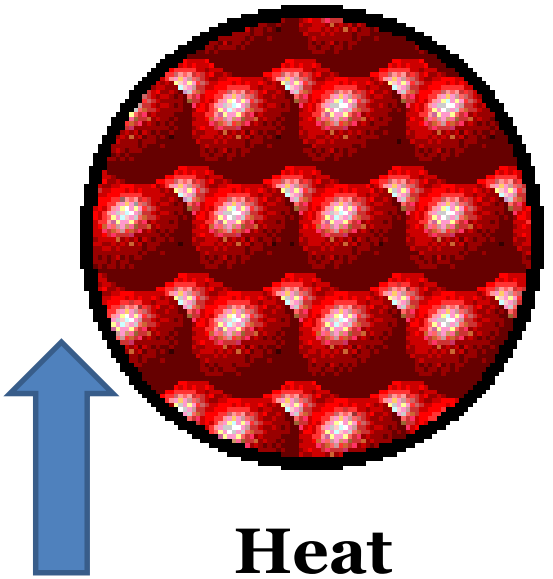
Kinetic Theory of Matter

Matter is made up of particles which are in continual random motion.



Solids

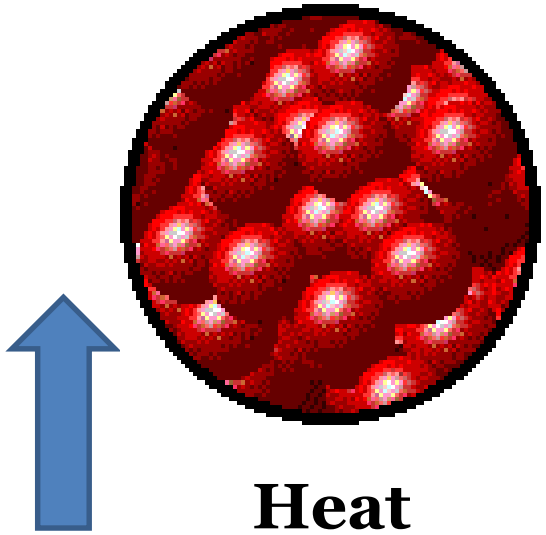
- **Particles of solids are tightly packed, vibrating about a fixed position.**
- **Solids have a definite shape and a definite volume.**



Liquid

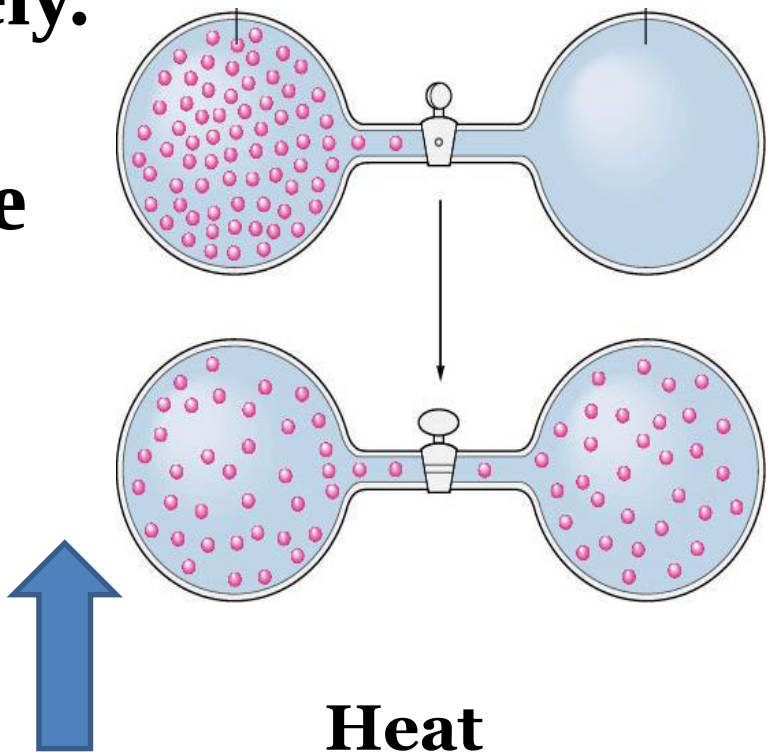
- **Particles of liquids are tightly packed, but are far enough apart to slide over one another.**

- **Liquids have an indefinite shape and a definite volume.**



Gas

- **Particles of gases are very far apart and move freely.**
- **Gases have an indefinite shape and an indefinite volume.**



PHASE CHANGES

Description of Phase Change	Term for Phase Change	Heat Movement During Phase Change
Solid to liquid	Melting	Heat goes into the solid as it melts.
Liquid to solid	Freezing	Heat leaves the liquid as it freezes.

PHASE CHANGES

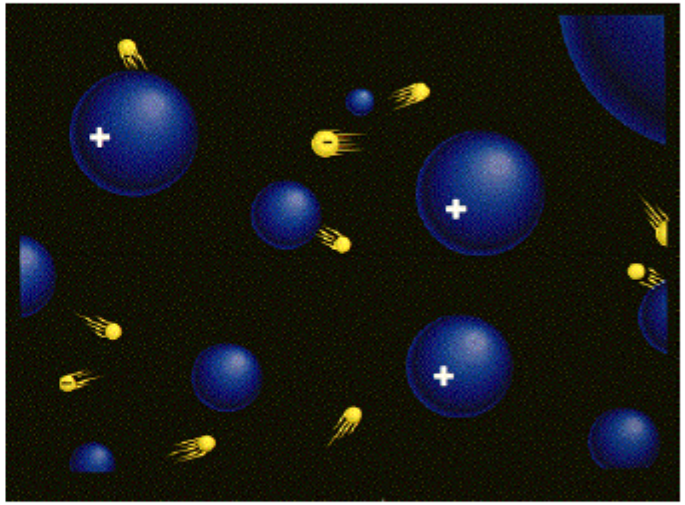
Description of Phase Change	Term for Phase Change	Heat Movement During Phase Change
Liquid to gas	Vaporization, which includes boiling and evaporation	Heat goes into the liquid as it vaporizes.
Gas to liquid	Condensation	Heat leaves the gas as it condenses.
Solid to gas	Sublimation	Heat goes into the solid as it sublimates.

Q// what happens if temperature is raises to super-high levels... between 1000°C and 1,000,000,000°C ?

Will every thing just be a gas?

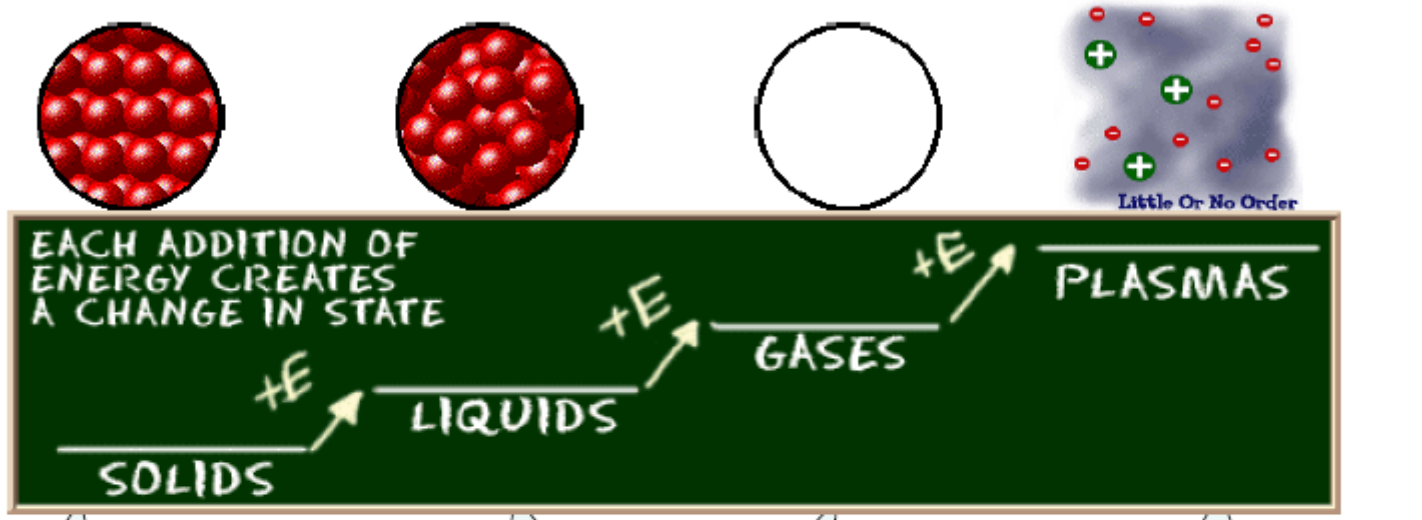
STATES OF MATTER
PLASMA

- **A plasma is an ionized gas.**
- **A plasma is a very good conductor of electricity and is affected by magnetic fields.**
- **Plasmas, like gases have an indefinite shape and an indefinite volume.**



- **Plasma is the common state of matter**

STATES OF MATTER



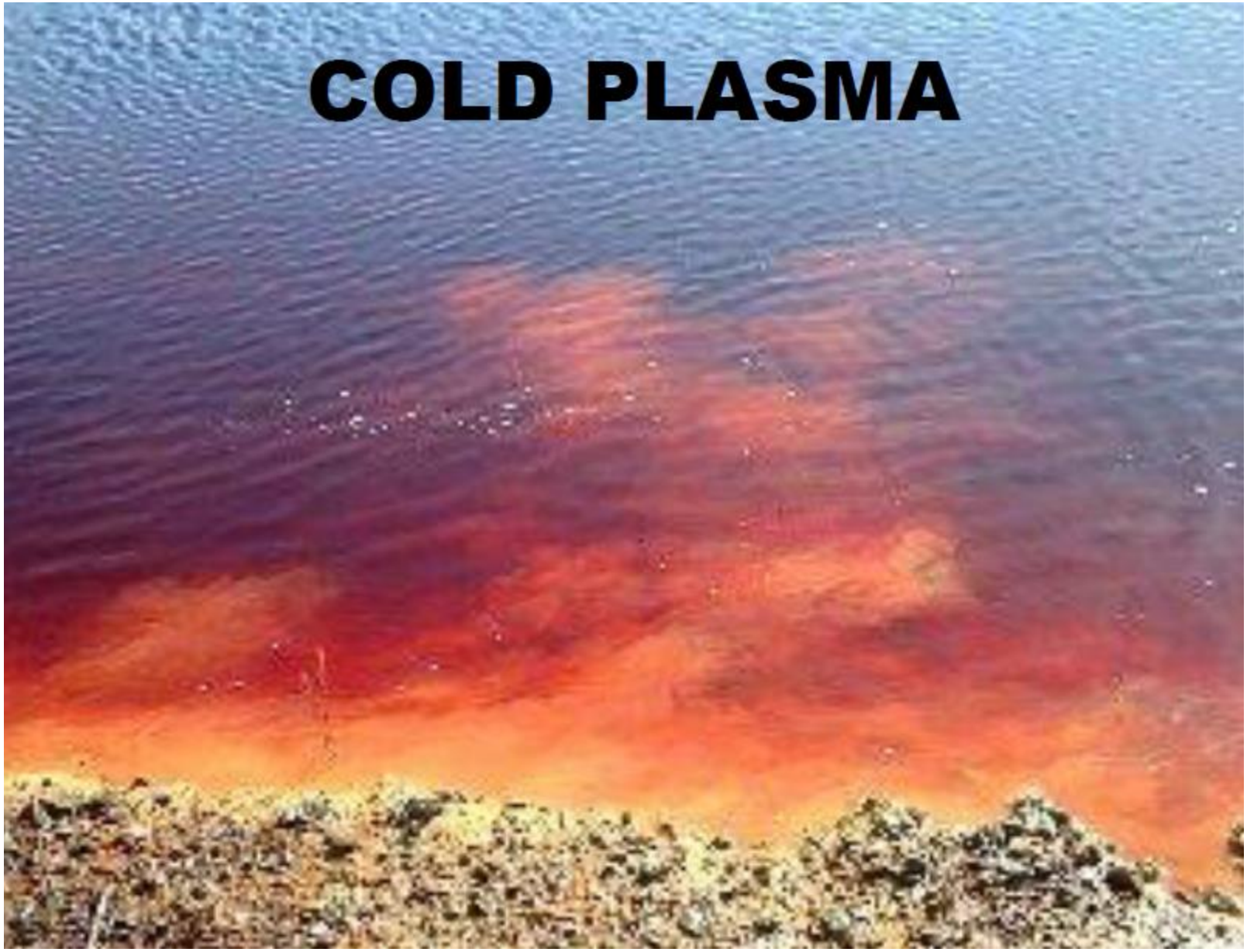
SOLID	LIQUID	GAS	PLASMA
Tightly packed, in a regular pattern Vibrate, but do not move from place to place	Close together with no regular arrangement. Vibrate, move about, and slide past each other	Well separated with no regular arrangement. Vibrate and move freely at high speeds	Has no definite volume or shape and is composed of electrical charged particles


Some places where plasmas are found...
1. Flames


2. Lightning


3. Aurora (Northern Lights)
العراقي TV


The Sun is an example of a star in its plasma state


COLD PLASMA

Thank you