

Radiation

Is energy that comes from a source and travels through space at the speed of light. This energy has an electric field and a magnetic field associated with it, and has wave-like properties.

We could also call radiation “electromagnetic waves”.

Ionization : Any process by which electrically neutral atoms or molecules are converted to electrically charged atoms or molecules (ions) through gaining or losing electrons.

Ionization is one of the principal ways that radiation, such as charged particles and X rays, transfers its energy to matter.

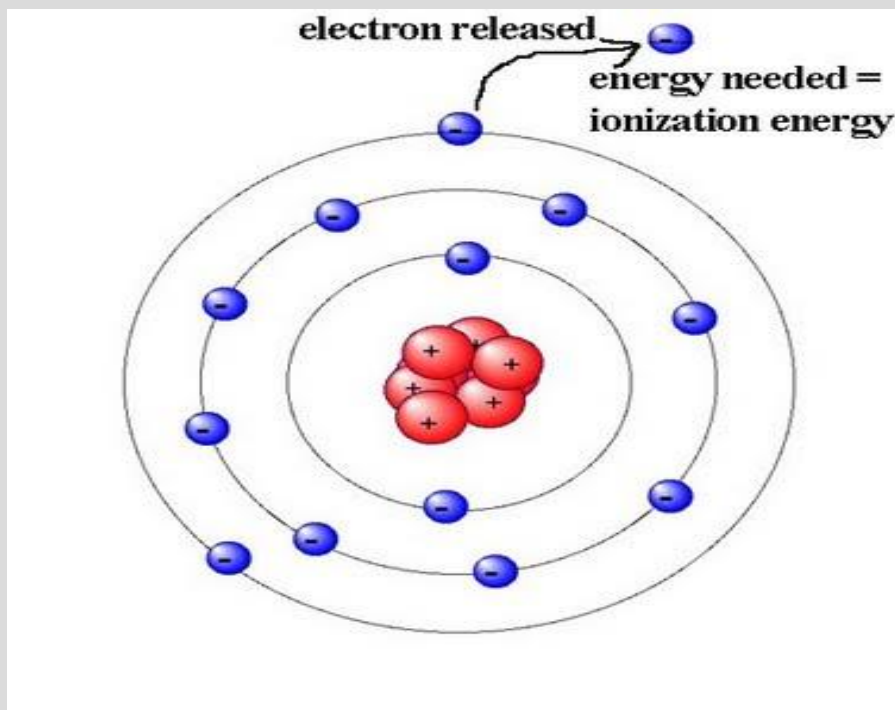


Fig (1) : Ionization.

Ionizing radiation : Is a form of energy that acts by removing electrons from atoms and molecules of materials that include air, water, and living tissue.

Ionizing radiation can travel unseen and pass through these materials.

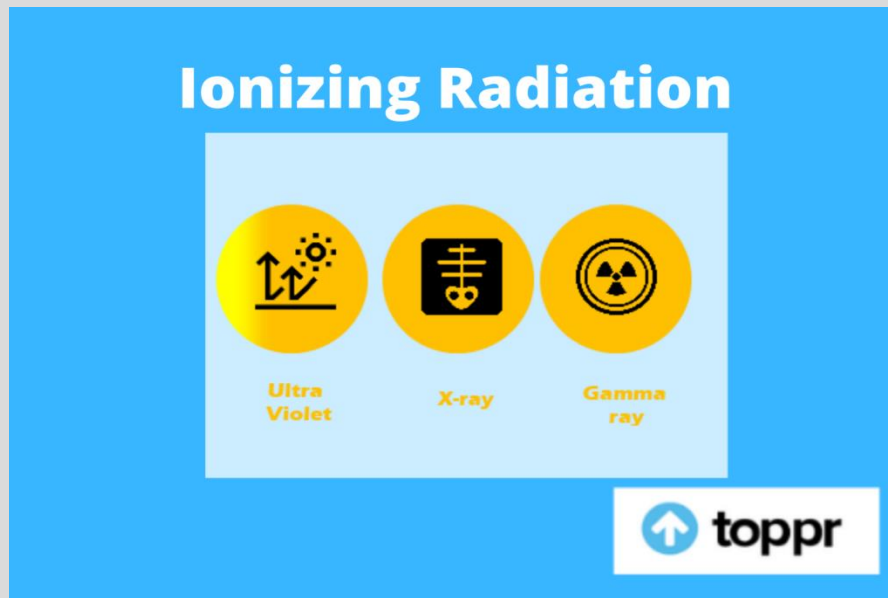


Fig (2) : Ionizing radiation

Nonionizing radiation : Refers to types of radiation that do not have enough energy to cause ionizations in atoms. In terms of electromagnetic radiation, photons of low-energy ultraviolet, visible light, infrared, microwaves and radio waves do not have enough energy to cause ionizations. Heat flow by thermal radiation typically involves an infrared electromagnetic wave, so it is nonionizing.

Ionizing radiation carries enough energy to cause ionizations in atoms.

Nonionizing radiation does not carry enough energy to cause ionizations.

Ionizing radiation is known to have the ability to cause cancer.

Nonionizing radiation may cause cancer, but there is no direct evidence to support this.

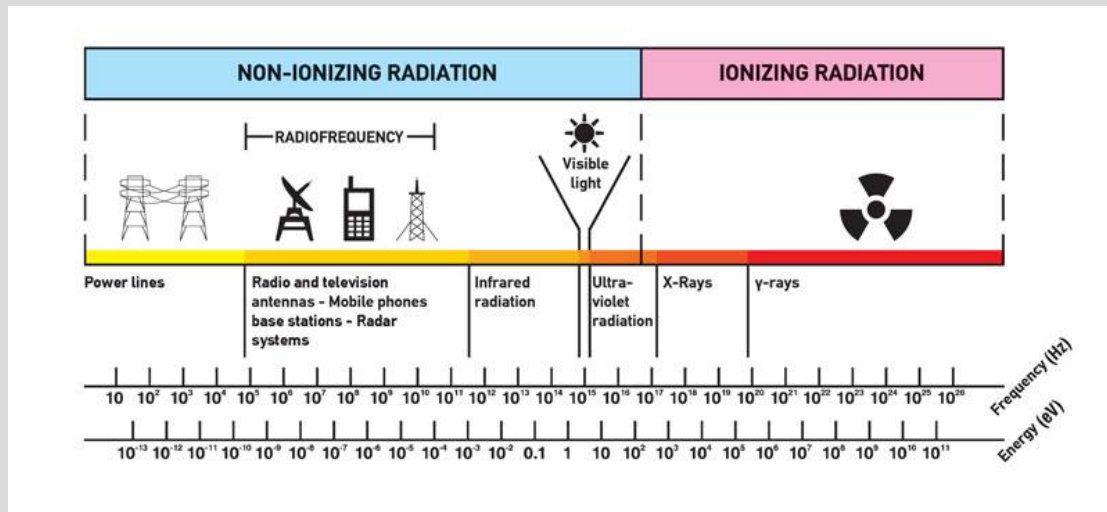


Fig (3) ionizing-and-nonionizing-radiation

The Electromagnetic Spectrum

- There is a wide range of electromagnetic radiation in nature. Visible light is one example.
- Radiation with the highest energy includes forms like ultraviolet radiation, x-rays, and gamma rays.
- X-rays and gamma rays have a lot of energy. When they interact with atoms, they can remove electrons and cause the atom to become ionized.

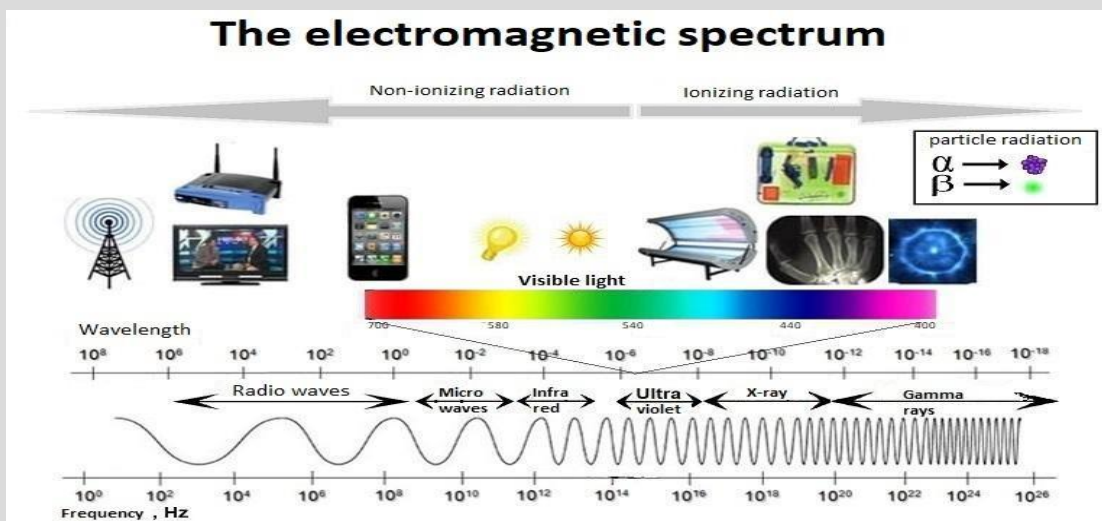


Fig (3) The Electromagnetic Spectrum.