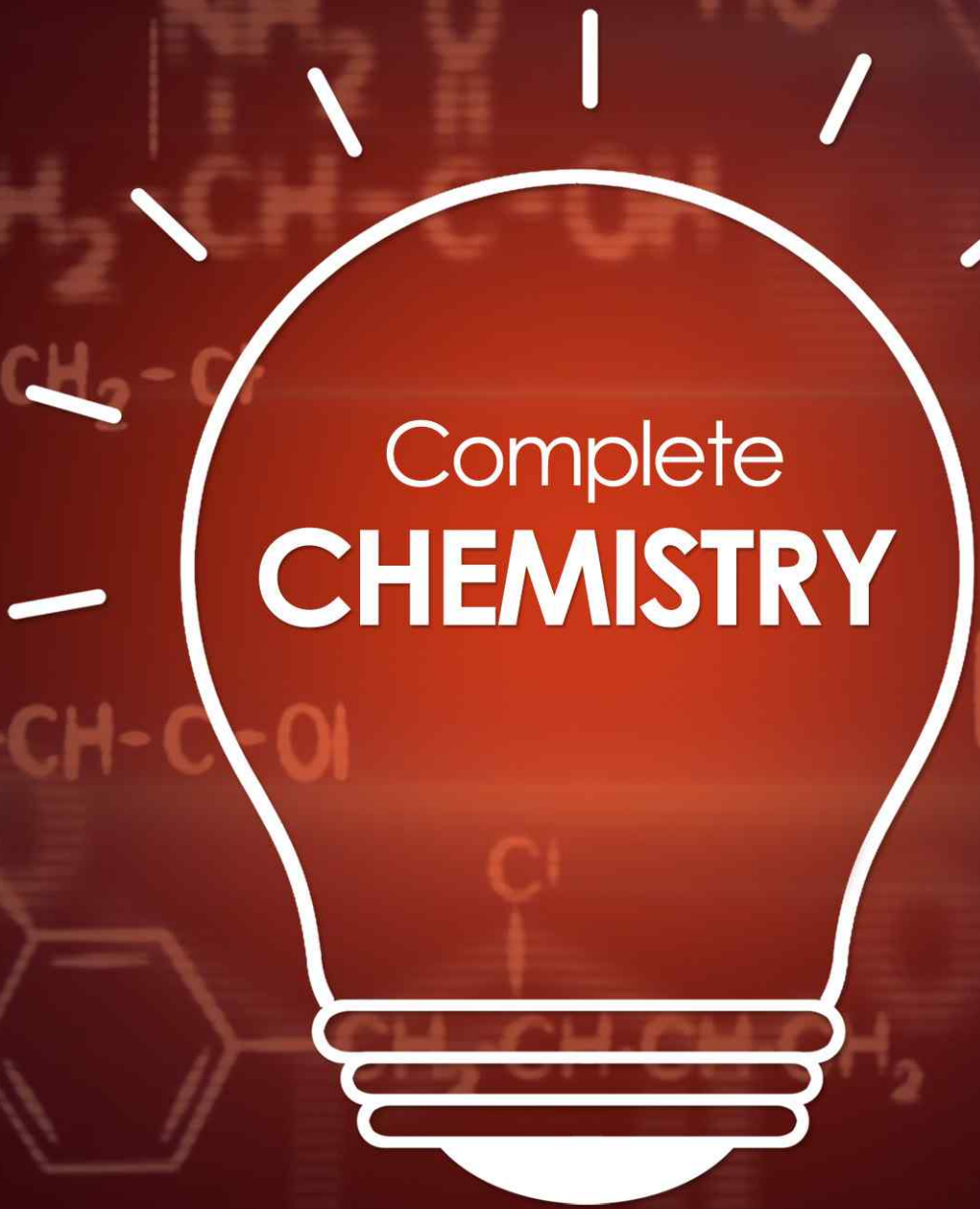
misostudy.com
smart learning



Complete CHEMISTRY

IIT-JEE · NEET · CBSE eBOOKS

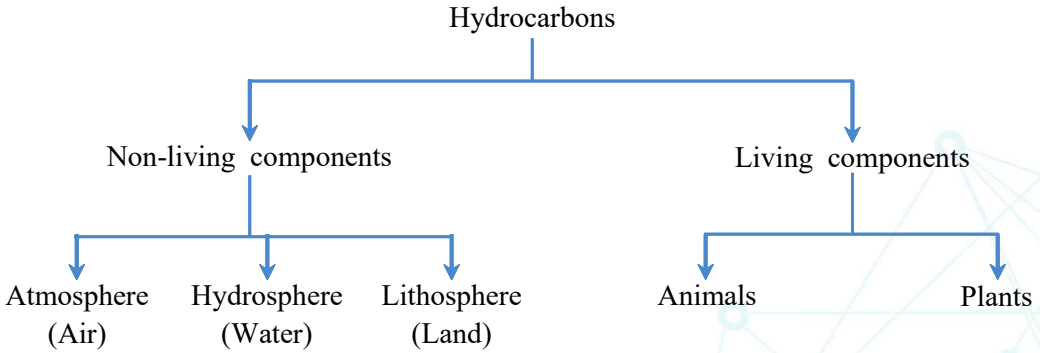
CLASS 11&12th

CLASS 11th

Environmental Chemistry

misostudy

01. Introduction



Components of Environment

There are four major components of environment :

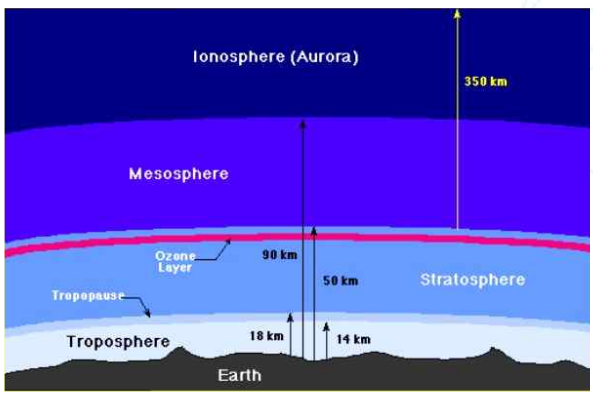
(i) Atmosphere
(ii) Hydrosphere
(iii) Lithosphere
(iv) Biosphere

(i) **Atmosphere**

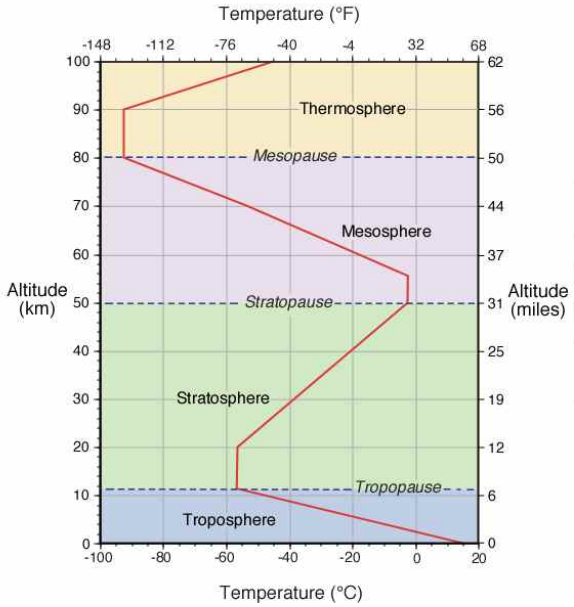
Gas	Percent	Gas	Percent
Nitrogen	78.08	Methane	1.5×10^{-4}
Oxygen	20.95	Nitrous oxide	2.5×10^{-5}
Argon	0.93	Hydrogen	5.0×10^{-5}
Carbon dioxide	3.3×10^{-2}	Ozone	4.0×10^{-6}
Neon	1.8×10^{-3}	Xenon	8.0×10^{-6}
Helium	5.2×10^{-4}	Sulphur dioxide, Nitrogen dioxide Ammonia, carbon monoxide, iodine, etc.	} Minute quantities
Krypton	1.1×10^{-4}		

Structure of atmosphere : On the basis of height, temperature and distinct characteristics, atmosphere may be divided to four zones :

(a) Troposphere
(b) Stratosphere
(c) Mesosphere
(d) Thermosphere



NOTE ☞ *Mesosphere and thermosphere are also known as ionosphere because this region contain gases in ionic form. The temperature of different parts of atmosphere is not same and varies from –100°C to 1200°C. The variation of temperature in different zones of atmosphere is given in the following figure.*



NOTE ☞ *The outermost part of atmosphere is exosphere and unbounded area beyond exosphere is known as Inter-stellar space.*

Functions of Atmosphere

(a) It provides the gases like O_2, CO_2, N_2 etc. which are essential for life. O_2 is essential for respiration while CO_2 is used in photosynthesis. N_2 is important source of nitrogenous fertilizers.

(b) It is important carrier of water vapours which are needed to run various natural cycles. Water vapours are also responsible for rain.

(c) It prevents the entry of cosmic rays (ozone layer) and saves the life from this highly energetic radiation.

(d) It maintains the temperature of earth's surface by absorbing and re-emitting the radiation.

(ii) **Hydrosphere**

(a) Hydrosphere includes all the water sources present on earth like ocean, river, lakes, ponds etc. The water may be present as solid (ice in glacier), liquid (river) or vapour (moisture).

(b) About 75% of earth's surface is covered by water and out of total water supply of the world 97.3% is from oceans, ≈ 2% from polar ice caps and galciers, ≈ 0.6% from underground sources and 0.01% from lakes and rivers.

(c) Oceanic water contains ≈ 3.5% dissolved salts and it is not fit for drinking purpose. The important ions present in sea water are given the following table.

(iii) **Lithosphere**

(a) Lithosphere includes whole rocky material. The outermost (8-40 km) part is called crust.

(b) The uppermost part containing weathered rocks as well as organic matter is known as soil.

(c) The outer layer is made up of rocks rich in silica and aluminium.

(iv) **Biosphere**

(a) Biosphere is that part of non-living components (atmosphere, lithosphere or hydrosphere) in which living organism interact with non-living parts.

(b) Biosphere extends from 10 km below the sea level to 6 km above the sea surface.

(c) Biosphere is regulated by various biogeochemical cycles like water cycle, carbon cycle, nitrogen cycle etc.

02. Pollution

Any undesirable change in physical, chemical or biological characteristics of environment is a type of pollution and the factor responsible for it is called pollutant.

Pollution is usually classified in two broad classes :

(i) **Natural pollution :** It is caused by natural processes like volcanic eruptions, forest and coal mine fires, decomposition of organic matter floods etc.

(ii) **Artificial pollution :** It is caused by human activities. Various sources of artificial pollution are industries, chemicals used in daily life burning of fuels etc.

Pollutants

Any substance present in such concentration as may be or may tend to be injurious to the environment.

Contaminants : A substance causing pollution which is not present naturally in the environment but introduced in significant amounts, accidently or by human activity is called **contaminant.**

Thresold limit value (TLV) : The permissible concentration of a pollutant in the atmosphere to which if a healthy worker is exposed for 8 hrs. a day and 40 hrs. a weak throughout his life, there is not adverse effect on him is called TLV e.g.

TLV for CO, CO_2 and phosgene are 40,5000 and 0.1 ppm respectively.

Types of Pollutants

(i) **On the basis of native :** Pollutants may be of three types

(a) **Chemical agents :** gases and particulates, heavy metals, pesticides, petroleum, solid and liquid wastes etc.

(b) **Physical agents :** heat, noise, radiation etc.

(c) **Biological agents :** microbes, population etc.

(ii) **Primary and secondary pollutants :** Primary pollutants are those which remain unchanged after entering in the environment. Secondary pollutants are formed by combination or primary pollutants in the environment.