

Ozone Layer Depletion and Nuclear Accidents

OZONE LAYER DEPLETION

Ozone gas is present in the atmosphere. It is highly concentrated at the stratosphere between 10 to 50 Km above the sea level and is called as ozone layer.

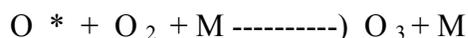
Importance: O₃ protects us from damaging UV radiation of the sun. It filters UV-B radiation. Now a days certain parts of O₃ layer is becoming thinner and O₃ holes are formed. Because of this more UV-B radiation reaches the earth's surface. UV-B radiation affects DNA molecules, causes damages to the outer cell of plants and animals.

It causes skin cancer and eye disease in human beings.

Formation of O₃: It is formed in the atmosphere by photochemical reaction

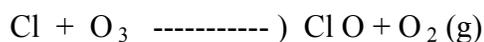


The atomic oxygen reacts with molecular O₂ to form O₃



Where M = third body like nitrogen.

Causes of O₃ layer depletion : Refrigerators, air conditioners, aerosol sprays and cleaning solvents release CFCs into the atmosphere. CFCs release chlorine which breaks O₃ to O₂

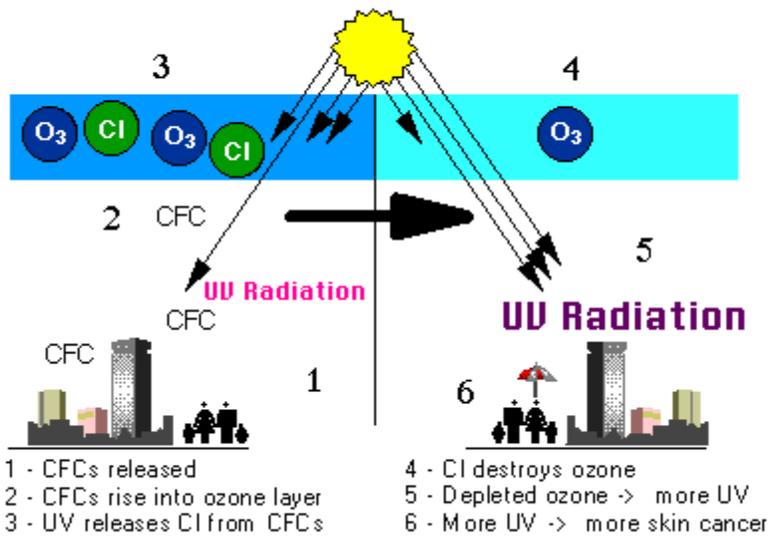


Each chlorine atom is capable of breaking several O₃ molecules. It is a chain reaction.

1% loss of O₃ results in 2% increase in UV rays reaching the earth surface.

Ozone depletion chemicals CFC, HCFC, BFC. Some times atmospheric sulfur dioxide

is converted into H₂SO₄ which increases the rate of O₃ layer depletion.



Effects ozone layer depletion:

Effects on human beings 1. UV rays causes skin cancer. 2. Increases the rate of non melanin skin cancer in fair colored people. 3. Prolonged expose to UV rays leads to actinia Katatities (slow blindness) and cataracts.

Effects on aquatic system : 1. UV rays affects phytoplankton , fish , larval crabs. 2. phytoplankton consumes large amounts of CO₂ .Decrease in phytoplankton results in More amount of CO₂ in atmosphere. This contributes to global warming. 3. Ozone Depleting chemicals can causes global warming.

Control measures : Manufacturing and using of O₃ depleting chemicals should be stopped. Use of methyl bromide .which is a crop fumigant should be controlled .
 Replacing CFC s by other maerials which are less damage

NUCLEAR ACCIDENTS AND HOLOCAUST

Energy released—during a nuclear reaction is called nuclear energy. Nuclear fission and Nuclear fussion are used to prepare nuclear energy.

During nuclear accidents large amount of energy and radioactive products are released into the atmosphere.

Types of nuclear accidents :-

Nuclear Test- Nuclear explosions –release radioactive particles and radioactive rays into the atmosphere.

Nuclear power plant accidents: Nuclear power plants located in seismic vulnerable area may cause nuclear accidents which release radiation .

Improper disposal of radioactive wastes: Drums with radioactive wastes, stored underground rust and leak radioactive wastes into water , land and air.

Accidents during transport . Trucks carrying radioactive wastes (or) fuels in accidents.

The major accident at a nuclear power plant is a core melt down.

Effects of nuclear radiation

1. Radiation affects DNA in cells.
2. Exposure to low dose of radiation (100 to 250 rds) people suffer from fatigue, vomiting ,and loss of hair.
3. Exposure to high radiation (400- 500 rds) affect bone marrow ,blood cells , natural resistance fail of blood clot.
4. Exposure to very high dose of radiation (10000 rds) kills organisms by damaging the tissues of heart and brain.

Nuclear Holocaust : -Destruction of Biodiversity by nuclear equipments and nuclear bombs is called nuclear holocaust.

Effects of nuclear holocaust.

Nuclear winter. Nuclear bombardment will cause combustion of wood , plastics , forests etc.

Large quantity of soot will be carried out into the atmosphere .

Black soot absorb all UV radiation and will not allow the radiation to reach the earth . Therefore cooling will result. This reduces evaporation of water .In stratosphere there won't be significant moisture to rain out the black soot. Due to nuclear explosion a process opposite to global warming will occur . This is called Nuclear winter.

Effects of nuclear winter 1. Lower the global temperature.2;Crop productivity will be reduced causing famines-

And human sufferings.

Examples of nuclear holocaust: Nuclear war in Japan. Hiroshima and Nagasaki are examples of holocaust during

Second World War.

At Chernobyl. When the operators lost the control of water cooled graphite moderated reactor during low power tests

At Chernobyl in Ukraine the nuclear reactor exploded.

Case study : Chernobyl Nuclear disaster.

On April 28th 1986 the world worst nuclear power accident occurred at Chenobyl in Ukrain .

This disaster was caused mainly due to poor reactor design and human error.

Impact : Chernobyl accident killed more than 80000 people and 35 million people have suffered ill because of

The accident. Nearly 135000people have to be evacuated at around Chernobyl.

Nuclear holocaust in Japan

In 1945 two nuclear bombs were dropped in Hiroshima and Nagasaki in Japan . About 100000 people were

Killed and the cities were badly destroyed. This explosion emitted forceful neutrons and gamma radiation.

Radioactive Strontium liberated in the explosion replaced calcium in the bones .Large scale bone deformities

Occurred in the people of these cities.

Source : <http://nprcet.org/e%20content/eee/EVS.pdf>