

CHAPTER NO. 13

ENVIRONMENTAL -

CHEMISTRY - AIR

COMPONENTS OF ENVIRONMENT

Environment is everything around us and it is composed of 4 basic components.

① Atmosphere

③ lithosphere

② Hydrosphere

④ Biosphere

① Atmosphere: all the layers of gases surrounding the planet earth.

Importance: ① It act as temperature regulator

② protect from UV radiations

③ provide us / gives weather

② **Hydrosphere**: All the water in various parts of earth e.g glaciers, oceans etc

Importance: ① maintenance of ecosystem

② heat distribution

③ distribution of plants nutrients

③ **Lithosphere**: solid outermost layer of earth. It is basically the soil. e.g acid bed, earth crust, continents etc.

Importance: ① provide minerals

② volcanic activities

③ geological process

④ **Biosphere**: all living organisms & their interactions with each other & its environment.

Importance: ① support life

② maintain ecosystem

③ nutrients cycle

④ Hydrological cycle.

AIR - POLLUTANTS

anything that pollutes, cause harm or has negative impact/effect on our environment

Sources of air pollutants:

It could be natural as well as (artificial) anthropogenic means man made.

Types of pollutants:

- ① Primary pollutant (direct into environment)
- ② Secondary pollutant (made from primary pollutant)

→ Particulate matter (tiny):

particles that are suspended in the air, which can originate from combustion process, construction & natural sources

effects of particulate matter:

- ① respiratory problems
- ② cardiovascular problems
- ③ carcinogens

Types of Particulate Matter (PM):

① PM of 10 mm (coarse)

the 10 mm size of PM is called coarse particle
e.g. dust, pollens etc

They don't enter in our blood stream

② PM of 2.5 mm (fine)

e.g. combustion, wild fire etc

They enter our blood stream

③ PM of 0.1 mm (UFP's - ultra fine particles)

e.g. sea sprays, fumes from vehicles etc

They enter our blood stream & are very harmful.

→ NO_x :

NO → nitrogen monoxide → colourless.

NO_2 → nitrogen dioxide → red-brown in color.

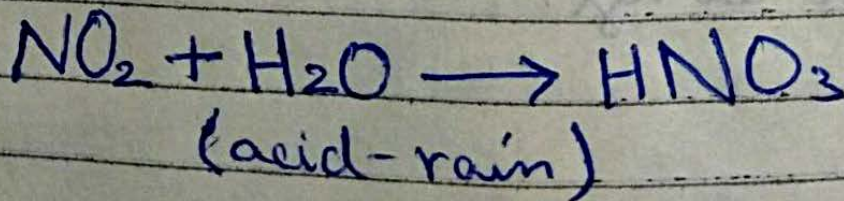
sources: ① fossil-fuel burning

② fumes from vehicles

③ industrial process

④ NO_x also contribute to acid rain

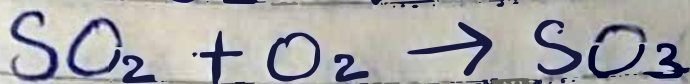
Formula:



→ SO_2 :

sources: ① burning of coal & oil
② acid rain

Formulas:



VOLATILE ORGANIC - COMPOUNDS (VOL's)

organic compounds that vaporize into air: at room temperature

Sources: ① vehicle emission

② industrial process

③ house hold products

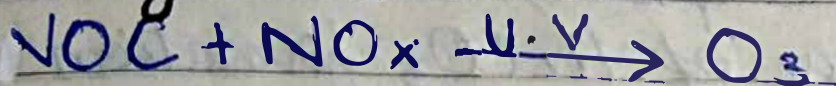
effects: ① increase ground level of O_3

② so, cause smog

③ effect lungs.

→ CO: produced by/due to incomplete combustion of carbon containing fuels.
It reduces the ability of blood to carry O_2 .

→ O_3 ground level:



It affects our respiratory track, cause asthma, also damage crops & ecosystem.

→ Heavy Metals: group of (metals) metallic elements having high density & are toxic at low concentration

e.g. Pb, Mg, Cd, As, Cr, Ni, Cu, Zn, Hg

→ CFC's (Chlorofluorocarbon): groups of man-made compounds that contain C, Cl, F & sometimes hydrogen.

Common Uses:

① compressor of fridge

② aerosols sprays

③ A/C

④ propellents

⑤ foam production

[Inert in troposphere but cause O_3 depletion in Stratosphere]

ACID - RAIN

The rain that has pH less than 5.6 is acid-rain. Normal rain has pH 7 but due to presence of CO_2 in atmosphere, the rain becomes slightly acidic because of H_2CO_3 formation

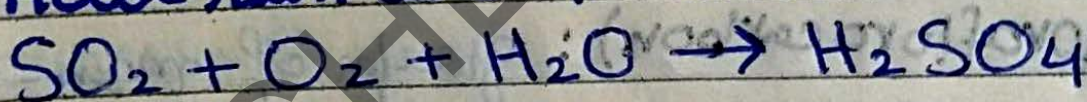


Reasons of acid rain:

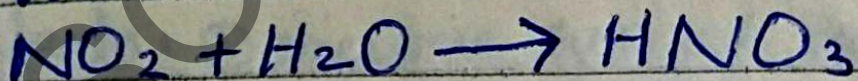
- ① emission of fossil fuels, coal, vehicle fumes (NO_x & SO_x)
- ② industrial process & mining (SO_x , NO_x , CO_2 , CO)

Formula:

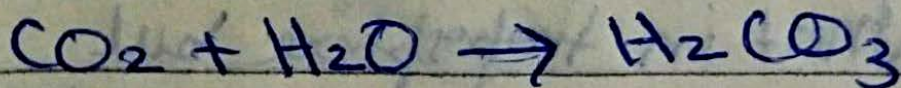
→ Acid rain due to SO_x :



→ Acid rain due to NO_x :

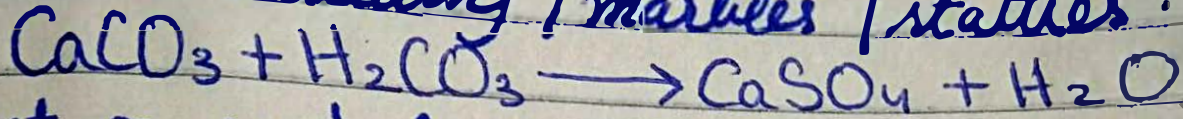


→ Acid rain due to CO_2 :

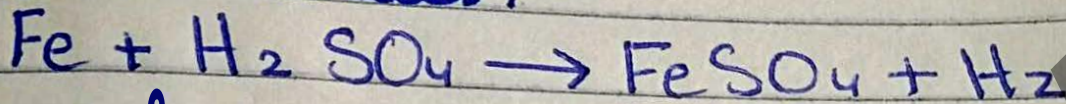


Impacts of acid rain:

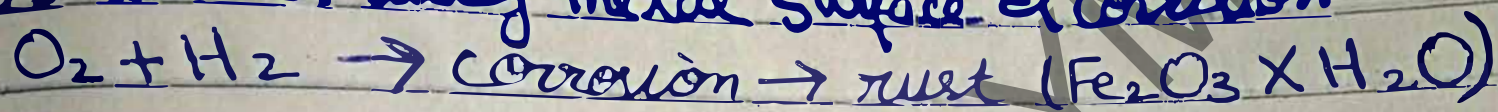
→ effect on building / marbles / statues:



→ effect on metals:



→ It washes away metal surface & corrosion:



GLOBAL - WARMING

increase in average temperature of earth due to excessive green house gases in atmosphere is called global-warming.

Causes.. ① deforestation

② Burning of fossil fuels

③ industrial process.