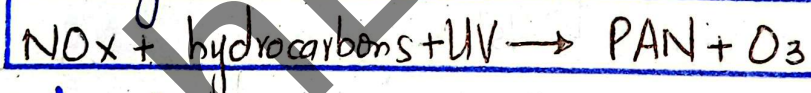


Photochemical Smog

→ Photochemical Smog also known as Oxidizing Smog. It's a mixture of pollutants that are formed when oxides of nitrogen & volatile organic compound (VOC) reacts with sunlight to produce Brown haze. Mostly ubiquitous in summer.

PAN:-

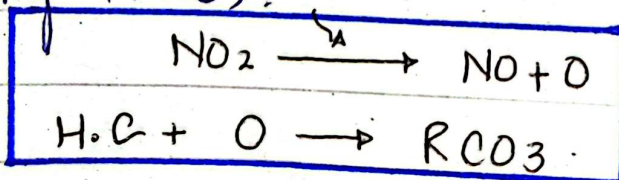
- It's one of the component of Photochemical Smog.
- One of the key reactions involving NO & NO₂ is their rxn with unburnt hydrocarbon leading to Peroxyacetyl nitrate (PAN).
- Secondary Pollutant.



mechanism:-

• formation of Peroxyacyl Radicals:-

In the presence of sunlight, NO₂ can undergo photodissociation, splitting into NO & O. The Oxygen reacts with un-burned hydrocarbons, forming (RCO₃).



• Reaction with NO:-

The Peroxyacyl Radicals now react with NO, leading to the formation of PAN.



Conclusion :-

- It's a highly reactive compound.
- Potent Respiratory Irritant
- Stable over long distance.
- Act as Reservoir for NO_x.
- Undergo thermal decomposition in lower atmosphere, releasing NO₂ & Reactive Organic Radicals.

ifferences

Oxidizing Smog

Reducing Smog

Composition

High levels of Ozone, NO_x, & Volatile organic Compound.

High levels of sulfur dioxide & particulate matter.

Formation

Formation in the presence of Sunlight.

Formation in the Presence of Reducing agents like SO₂.

Color

Brown haze.

Greyish / Bluish haze.

Common location

Urban Areas.

Industrial areas.

BOD

COD

definition

Amount of dissolved O_2 needed by aerobic biological organisms to break organic compounds.

Amount of Oxygen needed/ Required to chemically oxidize organic & inorganic matter.

Measurement

Measured over 5 days at $20^\circ C$.

Measured in a few hours using strong chemical oxidants.

Purpose

Indicates the amount of biodegradable organic matter.

Indicates the total amount of organic matter.

Units

mg/l.

mg/l.

Q. Why $PbCl_2$ is ionic but $PbCl_4$ is Covalent?
lead can exhibit 2 Common Oxidation states i.e. +2 & +4.

- In $PbCl_2$, Pb has an oxidation state of +2.

- In $PbCl_4$, the oxidation state that's exhibited +4.

- According to Fajan's rule.

"The smaller the cations with high charge density makes bond more covalent."

Therefore, $PbCl_2$ is ionic while $PbCl_4$ is Covalent.

Q. Why tetrahalides of CCl_4 are not hydrolysed but tetrahalides of Si, Sn, Ge are readily hydrolyzed.

- Carbon does not have available d-orbitals to facilitate bond breaking or to accept e^- pair during hydrolysis.

- Silicon, Germanium, and tin have more vacant d-orbitals that it can accept lone pairs from water molecules making hydrolysis feasible.