

## Part Two: Air Pollution

### 1) **Definition:**

- **Air pollution:** The presence of substances in the atmosphere, particularly those that do not occur naturally.
- These substances are generally contaminants that substantially alter or degrade the quality of the atmosphere.
- The term is often used to identify undesirable substances produced by human activity, that is, anthropogenic air pollution.
- Air pollution usually designates the collection of substances that adversely affects human health, animals, and plants; deteriorates structures; interferes with commerce; or interferes with the enjoyment of life.

### **A) Primary Pollutants:** (*Injected directly into atmosphere*)

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- **Carbon Monoxide (CO)**
  - odorless, colorless, poisonous gas
  - byproduct of burning fossil fuels
  - body acts as if CO is O<sub>2</sub> in blood, can result in death
- **Nitrogen Oxides (NO<sub>x</sub>)**
  - NO - nitric oxide
  - emitted directly by autos, industry
- **Sulfur Oxides (SO<sub>x</sub>)**
  - SO<sub>2</sub> - sulfur dioxide
  - produced largely through coal burning
  - responsible for acid rain problem

- **Volatile Organic Compounds (VOCs)**
  - highly reactive organic compounds
  - released through incomplete combustion and industrial sources
- **Particulate Matter (dust, ash, smoke, salt)**
  - 10 um particles (PM10) stay lodged in your lungs
  - 2.5 um particles (PM2.5) can enter blood stream

**B. Secondary Pollutants:** (*Form in atmosphere from chemical-photochemical reactions that involve primary pollutants*)

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- **Sulfuric Acid H<sub>2</sub>SO<sub>4</sub>**
  - major cause of acid rain
- **Nitrogen Dioxide NO<sub>2</sub>**
  - brownish hue
- **Ozone O<sub>3</sub>**
  - colorless gas
  - has an acrid, sweet smell
  - oxidizing agent
- **Primary and secondary pollutants are found in the two types of smog:**
  - London-type smog
  - LA-type photochemical smog

SMOG = SMOKE + FOG