SURFACE CHEMISTRY

ADSORPTION

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SURFACE CHEMISTRY

ADSORPTION

- It refers to the existence of higher concentration of a species at the surface of a solid or liquid material than the bulk of the material.
- It is a surface phenomenon.
- ADSORBATE: Substance which is adsorbed on the other substance is called adsorbate.
- ADSORBENT: Material upon which adsorption take place.
- Desorption: The process of removal of adsorbed material from adsorbent.

ABSORPTION: It refers to the existence of uniform concentration of a substance on the surface and bulk of the other.

REASON FOR ADSORPTION

- Molecules present at the surface have different environment from that for molecules present in the bulk.
- The residual and unbalanced force exist at the surface of adsorbent.

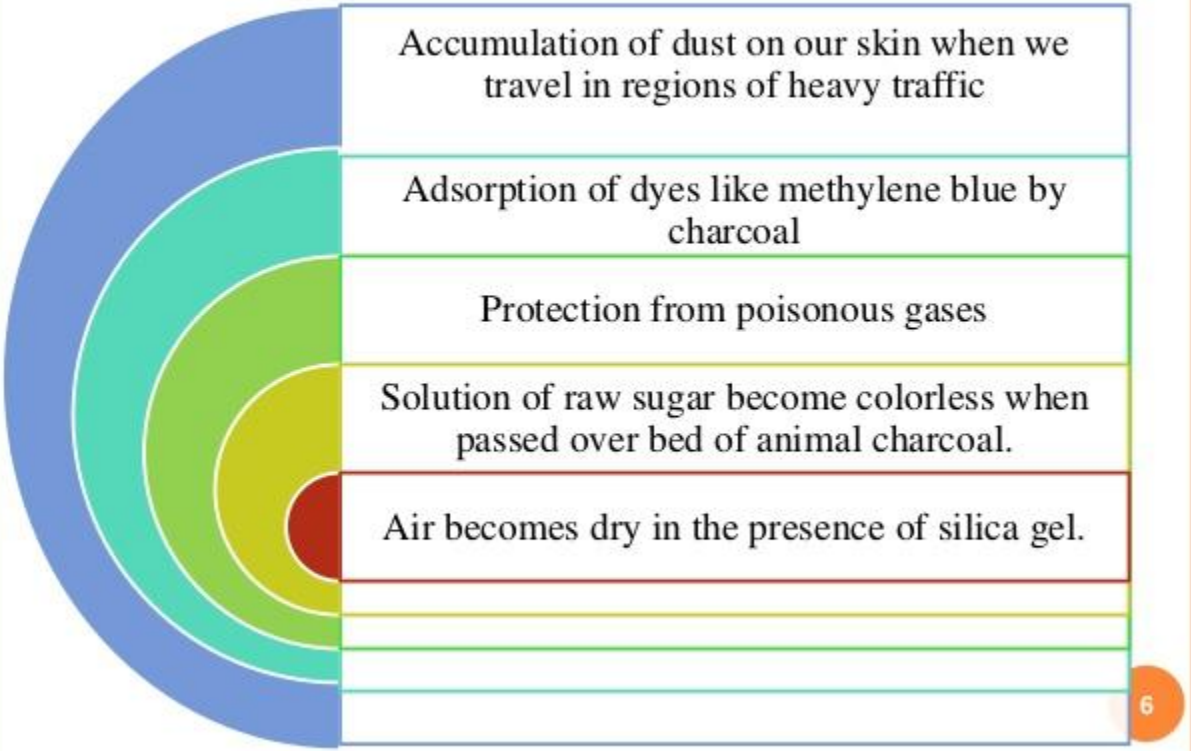
Examples of adsorption

- Activated charcoal is introduced into a jar of ammonia –the charcoal surface attracts and retains ammonia . {Ammonia –adsorbate & activated charcoal – adsorbent}

- Silica gel (adsorbent) removes water vapour (adsorbate) from its surrounding air .

- Animal charcoal(adsorbent) removes coloured impurities(adsorbate) from solutions.

Examples of adsorption



Adsorption	Absorption
Accumulation on the surface	Material(adsorbate) penetrates into and distributes uniformly throughout the adsorbent
Surface phenomenon	Bulk phenomenon
Concentration of adsorbate increases only on the surface	Concentration of adsorbate is uniform throughout the adsorbent.
Activated charcoal adsorbs ammonia	Water absorbs ammonia.
Silica gel adsorbs water vapour	Anhydrous Calcium chloride absorbs water vapour to form hydrate

Adsorption of gas by solids

- Adsorption is exothermic

  Adsorption causes decrease in residual surface forces. This cause decreases in surface energy and a cause liberation of energy as heat. Hence it is exothermic.

$\Delta G=\Delta H-T\Delta S$

ΔS=negative for adsorption

G is decreasing hence ΔG is negative

therefore,

ΔH is negative

Types of adsorption

- Depending upon the **nature of forces** that are operative in adsorption two types of adsorption are known :
- ***1. Physical adsorption*** (physisorption or van der Waals adsorption) and
- 2. ***Chemical adsorption***(chemisorption or activated adsorption)

THANK YOU