* Application of Adsorption :-

1). Silica and alumina gels are used as adsorbents for removing moisture and for controlling humadity of rooms.

2). Animal charcoal is used as decoloriser in the manufacture of cane-sugar.

3). Soil contains small amount of colloidal fractions in the form of very fine particle of clay. It can adsorb and retain certain amount of moisture in which nutrients, such as compounds of nitrogen, phosphorus and potassium.

4). Adsorption plays an important role in heterogeneous catalysis.

for example -

(a). The role of finely divided iron in manufacture of ammonia.

(b). The role of finely divided nickel in the hydrogenation of oils.

5). Activated charcoal is used in the gas masks in which all toxic gases and vapours are adsorbed by the charcoal while pure air passes through its pores practically unchanged.

* Heterogeneous catalysis : Surface Reactions :-

Reaction between gaseous reactants are catalysed by solid state catalysts. Solid state catalysts are used in many large scale processes in chemical industries. The Heterogeneous catalysis is which the catalyst is in a different phase than the gaseous reactants has emerged as one of the ~~following~~ most important tools in industrial research.

A/c to Langmuir & others, a gaseous reaction taking place on the surface of a solid catalyst, i.e. a surface reaction, involves the following elementry steps:

1). Diffusion of reactants to surface.

2). Adsorption of reactants at the surface.

3). chemical reaction at the surface.

4). Desorption of products from the surface.

5). Diffusion of products from the surface.

The above steps are consecutive. If any of them has a slower rate constant than the others, it will become the rate-determining steps.

a). The rate-determining step is the chemical reaction occuring at the surface, i.e. the reaction involving the molecules adsorbed on the surface.

Continued.....

b). chemisorption played an important role in heterogeneous catalysis. In chemisorption, chemical bonds are formed between the adsorbate and the surface resulting in the formation of a monolayer.

c). The reaction rate per unit surface area is proptional to θ, the fraction of the surface covered.

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