

Mechanism of surface reactions.

(1) Heterogeneous catalytic reactions generally proceed via adsorption of reactants on the surface of the catalyst.

(2) Mechanism of such surface reactions may be explained in terms of **diffusion theory of catalysis**. This theory postulates the following sequence for gaseous reactions on a solid surface.

Step: (i) Diffusion of the reactants to the surface.

Step: (ii) Adsorption of the reactant molecules onto the surface.

Step: (iii) Actual chemical reaction on the surface.

Step: (iv) Desorption of the products from the surface.

Step: (v) **Diffusion** of the products away from the surface.

In generally, Step (iii) determines the rate of reaction. However step (ii) and (iv) may be rate determining.

(3) According to **Langmuir-Hinshelwood**, the rate of a catalytic reaction is proportional to the concentration of the reacting species on the surface. For this, the reacting species must get adsorbed on the neighboring sites.

(4) Another way in which two reacting molecules may react on a solid surface is that one of them gets adsorbed and then the adsorbed molecules reacts with a molecule in the gas phase. This mechanism is called **Rideal mechanism**.

