

## 2.1: Introduction to Molecular Adsorption

The adsorption of molecules on to a surface is a necessary prerequisite to any surface mediated chemical process. For example, in the case of a surface catalyzed reaction it is possible to break down the whole continuously-cycling process into the following five basic steps:

1. Diffusion of reactants to the active surface
2. Adsorption of one or more reactants onto the surface
3. Surface reaction
4. Desorption of products from the surface
5. Diffusion of products away from the surface

The above scheme not only emphasizes the importance of the adsorption process but also its reverse - namely desorption. It is these two processes which are considered in this chapter.

### Notes on Terminology

- **Substrate** - frequently used to describe the solid surface onto which adsorption can occur; the substrate is also occasionally (although not here) referred to as the adsorbent.
- **Adsorbate** - the general term for the atomic or molecular species which are adsorbed (or are capable of being adsorbed) onto the substrate.
- **Adsorption** - the process in which a molecule becomes adsorbed onto a surface of another phase (note - to be distinguished from absorption which is used when describing uptake into the bulk of a solid or liquid phase)
- **Coverage** - a measure of the extent of adsorption of a species onto a surface (unfortunately this is defined in more than one way !). It is usually denoted by the lower case Greek "theta",  $\theta$
- **Exposure** - a measure of the amount of gas which a surface has seen; more specifically, it is the product of the pressure and time of exposure (normal unit is the Langmuir, where  $1 \text{ L} = 10^{-6} \text{ Torr s}$ ).

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