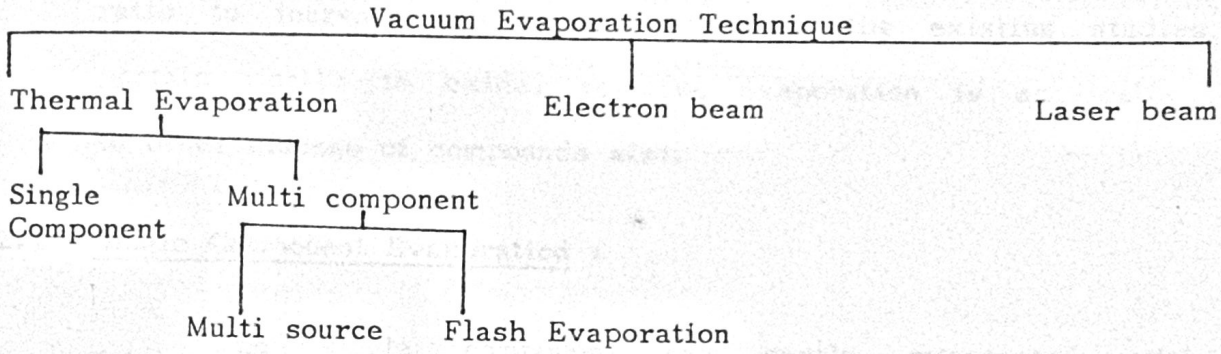
The vacuum evaporation technique can be classified as follows :



1. REACTIVE EVAPORATION :

This technique is used to deposit the metal and their oxide films. In deposition of metal films, the background temperature is kept as low as possible because the interaction of residual gases with evaporant affects the film properties. However, in reactive evaporation, high oxygen pressure is maintained to produce fully oxide metal films. This technique is applicable in those cases where metal oxide cannot be evaporated directly because of complete or partial decomposition.

The reactive evaporation of metals or metal oxides onto substrates at moderate temperatures, produce amorphous or fully crystalline films whose stoichiometry is largely determined by the impingement ratio of the constituents. However, because of the differences in the condensation

ratio, film composition is not the same as impingement ratio. In metal oxide, which have been reactively evaporated, the deposition rates are small to ensure a high impingement ratio to increase the oxygen pressure, the existing studies pertain mostly to oxide, reactive evaporation is applicable to other classes of compounds also.

2.1 Single Component Evaporation :

The single component can easily evaporated with the help of resistance heated wires or boat and finally the film is deposited on a substrate.

2.2 Multisource Evaporation :

In this case multicomponent alloys or compounds are thermally evaporated. The composition may evaporarte at different rate because of their different vapour pressure due to their different tendencies to react with support material.

A satisfactory method to prepare alloys and compounds with precisely controlled composition is to evaporate each component from a separate source. The growth of the film can be controlled (thickness and growth rate) with the help of the thickness monitor and growth rate monitor.

2.3 Flash Evaporation :

Flash Evaporation is the another technique for

the deposition of the film whose constituents have different vapour prssure. The film composition is accomplished by evaporating small quantity of the constituents in the desired ratio. Only one filament is used at a temp. (sufficiently high) to evaporate the material.

In the above case the evaporation of material is only possible in the powder form and not in the wire form. Flash evaporation is performed in vacuum of the order of 10^{-5} torr. This technique has been used to prepare single phase pseudo binary compounds of different groups and multicomponent alloys.

2.4 Laser Evaporation:

The high intensity of the laser can be used to heat and vaporize materials by keeping the laser source outside the vacuum system and focussing the beam on to the surface of a material to be evaporated. But the disadvantage is, since the layer penetration depth is small ($\sim$ 100 A^0) evaporation takes place at the surface only. Non-Q-spoiled glass neodynium laser is used to deliver 80 to 150 J of energy per brust with duration of 2 to 4 m sec. to evaporate $BaTiO_3$, $SrTiO_3$ and Sb_2S_3.

2. CHEMICAL DEPOSITION TECHNIQUES :

A. Spray Pyrolysis Process.