

- B. Chemical bath deposition technique.
- C. Screen Printing.
- D. Chemical vapour deposition.
- E. Exchange reactions.
- F. Electro deposition.
- G. Anodization.
- H. Electro phoresis.

A. Spray Pyrolysis Process :

This process was developed in 1960 by Hill and Chamberlin for preparing thin polycrystalline films of multi-component compounds such as CdS, CdZnS. Chemical spray deposition is regarded as one of the simplest and most economical method for preparing multicomponent thin films. We have used this technique to prepare ternaries and multi component thin films.

In this technique, an ionic solution containing the constituent element of the compound is sprayed over the heated surface in the presence of carrier gas. The complex ion in the solution decomposes at the heated substrate, resulting the formation of an adherent film of the desired material. In this technique vacuum is not needed as in case of other techniques.

It has been observed that the quality of the sprayed

film depends on the following parameters.

1. Substrate temperature;
2. Spray rate
3. Degree of Atomization;
4. Cation to anion ratio;
5. Environment.

By controlling and varying the substrate temperature the good quality film can be obtained. T_{sub} (substrate temperature) is different for different films.

The spray rate play an important role in the formation of thin films. Fast spray rate introduces defects such as stacking fault dislocation and reduced the grain size of the film.

Substrate also effects the nature of the film, metallic substrate produce amorphous film unless the surface of the material is not changed by the chemical reaction. Platinum and copper produce layers of PtS and CuO respectively on which a crystalline film of other metals may be deposited either by first depositing a thin amorphous film at low temperature followed by deposition of a crystalline film at high temperature.

The serious problem which has been noticed in chemical spray deposition is the presence of non-uniform droplets formed at the outlet of the spray nozzle, which fall over