

Now, we will look at advantages and disadvantages of this technique systematically :

The major advantages of the CVD technique are :

- (i) In general, no vacuum or pumping facilities are required and thus a relatively simple setup and fast recycle times are possible.
- (ii) High deposition rates are possible
- (iii) It is possible to deposit compounds and to control their stoichiometry easily;
- (iv) It is relatively easy to dope the deposits with controlled amounts of impurities;
- (v) It is possible to grow multicomponent alloys
- (vi) Refractory materials can be deposited at relatively lower temperatures compared to vacuum evaporation;
- (vii) Epitaxial layers of high perfection and low impurity content can be grown;
- (viii) Objects of complex shapes and geometries can be coated, and
- (ix) in-situ chemical vapour etching of the substrates prior to deposition is possible.

However, the technique suffers from several drawbacks, namely:

- (i) The thermodynamics and reaction kinetics involved in the deposition process are frequently very complex and poorly understood;
- (ii) Usually higher substrate temperatures are required than in the corresponding PVD technique;
- (iii) The reactive gases used for the deposition process and the reaction products are, in most cases highly toxic, explosive, or corrosive;
- (iv) The corrosive vapours may attack the substrate, the deposited film, and materials of the deposition set up and volatile products generated during the deposition process may lead to incorporation of impurities in the growing film;
- (v) The high temperatures may lead to diffusion, alloying, or chemical reaction on the substrate surface and thus the choice of substrates is limited;
- (vi) It is difficult to control the uniformity of the deposit, and
- (vii) Masking of the substrate is usually difficult.

The chemical reactions utilized in CVD process can be classified as :

- (i) Decomposition reactions
- (ii) Hydrogen or metal reduction of halogens
- (iii) Poly-merization, and
- (iv) Transport reactions.