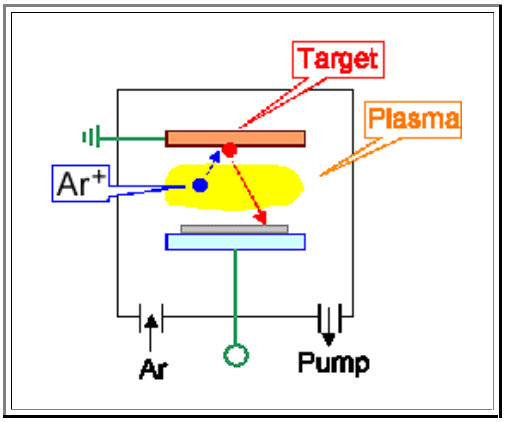
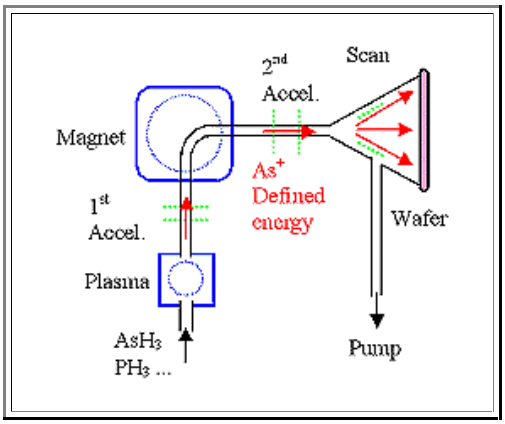
6.3.4 Summary to: 6.3 Physical Processes for Layer Deposition

Sputter deposition



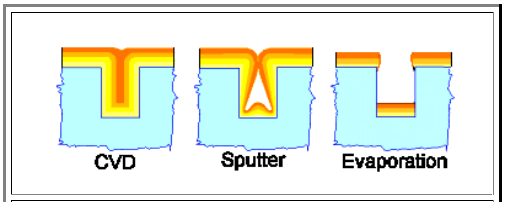
- Plasma technique ⇒ Vacuum + high voltage (and possible high frequency): complicated and expensive
- Layers amorphous to highly defective ⇒ needs usually annealing after deposition.
- Very versatile because of easy control of layer composition by target composition
- Decent depositioen rates possible. Particularly suited to conductors.
- Coverage is *not* conformal!

Ion implantation



- Depth (**< ca. 1 µm)** and dose precisely controllable.
- Very compley and expensive
- Method od choice for making doped layers.
- Introduces defects or destroys crystallinity ⇒ annealing at high ***T*** (**> 800 °C**) is a must

- There are many more techniques for producing thin layers
  - **Evaporation**. Relatively simple but limited as to materials and edgencoverage
  - **Molecular beam epitaxy**. (**MBE**) Standard for **III-V's**
  - **Spin-on techniques** ("Sol- Gel"). Used for making photo resist layers; occasionally for others
  - **Galvanics**. Kind of crude but necessary for **Cu** interconnects in modern **IC's**
- Edge coverage may be the decisive property!



Comparing edge coverage

Questionaire

Multiple Choice questions to all of 6.3