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SPUTTERING TECHNIQUES :

The ejection process, known as sputtering, takes place as a result of momentum transfer between the impinging ions and the atoms of the target surface or simply the ejection of atoms from the surface of a material (the target) by bombardment with energetic particles is called sputtering. The ejected or sputtered atoms can be condensed on a substrate to form a thin film. The sputtering phenomena has been known since 1852[121] and exploited for deposition of films. The sputtering process has the following unique characteristics of interest in thin film technology.

- (1) In general, the sputtered species are predominantly neutral and atomic. A small ($< 1\%$) percentage of the species is charged, both positively and negatively. The molecular or multi-ion cluster content is also small and depends on sputtering parameters and the target material.
- (2) The sputtering yield, defined as the number of ejected atoms per incident ion, increases

with the energy and mass of the ions. In most cases, the yield increases very slowly beyond ion energies of several thousand electron volts.

- (3) The yield depends on the angle of incidence of ions and increases as $(\cos \theta)^{-1}$ where θ is the angle between the normal to the target surface and the beam direction.
- (4) The yield of a single crystal target increases with decreasing transparency of the crystal in the direction of the ion beam.