particles have the benefits of increasing the surface area remarkably, the load bearing capacity and cost-effectiveness, exfoliation of coating, and the presence of metallic particles in the peri-implant area remain the main concern. Therefore, bioactive glass and ceramics (HA) have been used to replace titanium metallic particles for plasma spraying. The plasma-sprayed HA coating of 0.05 mm bonds to the substrate by mechanical interlocking and contains round interconnected pores.

11.2.1.2 Low-Pressure Plasma Spraying

The plasma jet size increases in low-pressure plasma spraying that provides very good adhesion of the CaP coatings to the substrate (Heimann and Vu, 1997); however, the substrate temperature increases, which may alter the crystallinity of the produced coatings (De Groot et al., 1998).

11.2.1.3 High-Velocity Oxy-Fuel Spraying

This is a combustion technique in which oxygen and fuel are combined to produce heat and high particle velocities to achieve dense coatings with increased bond strength. The flame temperature in this technique is relatively lower than in the standard spraying technique, which, however, results in better adhesion and density of the CaP coatings (De Groot et al., 1998).

11.2.1.4 Sputter Deposition

Sputter deposition is another promising technique to prepare CaP coatings on metallic or polymeric substrates. In this technique, the CaP target is bombarded with Argon or Nitrogen plasma, and the substrates are placed in front of the target at an appropriate distance. Sputter deposition is also a line of sight technique similar to plasma spraying. By applying bias voltage on the substrate holders, the positive ions of the plasma gas start hitting the target and erupts the CaP that eventually are deposited on the substrates (Fig. 11.2). The thickness,

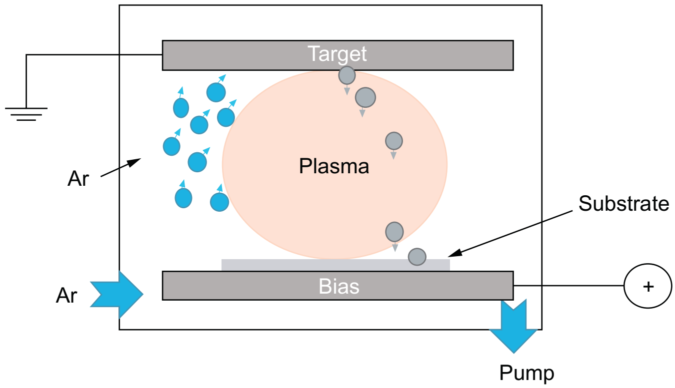

FIG. 11.2 A schematic representation showing the standard sputtering technique.