

Abstract of the disclosure

A sputtering gas containing a rare gas is introduced into a vacuum chamber 1 of a vacuum atmosphere, an electric power with a negative potential is supplied to a target 2, a positive potential is applied to the reflector plate 4, a plasma is generated, and subsequently the supply of the sputtering gas is stopped, then the target is sputtered while a self-holding discharge under low pressure of plasma is generated. A high-frequency bias power is supplied from a high-frequency power source 61 through an impedance matching device 62 to a stage 5 on which an object to be deposited is mounted. An electron matcher having at least one variable reactor to be electronically controlled is used as an impedance matching device, and a high-frequency bias power is intermittently supplied to the stage at a predetermined frequency.