Abstract

Magnesium oxide thin films are deposited on silicon substrate for diverse number of focus shots (10, 20, 30 and 40) using dense plasma focus device (DPF). X-ray diffractometer (XRD), scanning electron microscope (SEM), four point probe and optical ellipsometer are utilized for structural, morphological, electrical and optical properties of deposited magnesium oxide (MgO) thin films. Elemental compositional analysis is performed using energy dispersive X-ray spectroscopy (EDX) technique. XRD pattern shows the growth of polycrystalline magnesium oxide thin films with orientation along (200), (220) crystallographic planes. Decrease in crystallinity is observed with increasing number of focus shots. Strong dependence of films surface morphology is found on optical and electrical properties of MgO thin films. Films with finer crystallites (30 focus shots) having more dislocations and strain causing high electrical resistivity values, which is favorable for better insulating properties. High refractive index and extinction coefficients are found at (10 and 40 focus shots) for films with low defects and better crystallinity.