ABSTRACT

The molybdenum nitride thin films are deposited on silicon by using a Mather-type plasma focus device. The consequences of focus shots on crystallographic structures, morphology and surface roughness are examined. The XRD pattern confirms the presence of molybdenum nitride phases for samples synthesized with five, ten and fifteen focus shots. At 5 plasma focus shots exhibits weak diffraction planes of γ-Mo_2N(111), γ-Mo_2N(220), γ-Mo_2N(311), δ-MoN(112) along with Si(111) phase. Sample treated with 10 focus shots have γ-Mo_2N(111), γ-Mo_2N(220), γ-Mo_2N(311), δ-MoN(112) phases along with Si(111) phases. Thin film grown at 15 plasma focus shots have γ-Mo_2N(220), γ-Mo_2N(111) planes along with Si(111) planes. The SEM results reveal that at 5 focus shots granular structures are formed. At 10 focus shots show compact film formed having large agglomerates. At 15 shots film smoothness is better. The AFM analysis indicates that average roughness value of molybdenum nitride thin film is recorded 36.01 nm, 115.76nm and 91.86 nm at five, ten and fifteen focus shots.