Abstract

Silicon oxycarbide thin films are deposited using dense plasma focus device for various acetylene and oxygen concentrations. Xray diffraction analysis, field emission scanning electron microscopy, energy dispersive x-ray spectroscopy is performed for structural, morphological, compositional analysis. Optical ellipsometry is performed for optical properties analysis. Xray diffraction analysis confirms the deposition of crystalline silicon oxycarbide thin films for relatively low oxygen concentrations (5 to 20 %), whereas relatively higher oxygen concentrations (25 to 40 %) amorphous or weakly crystalline films are formed. Compositional analysis confirms increase in oxygen content with increased oxygen concentration in the admixture. SEM micrographs confirms formation of nano grains and grain size was found to increase with oxygen concentration upto 20 %. Results for optical ellipsometry show that refractive index of deposited films strongly depends on film composition. Films with higher silicon content shows maximum refractive index value (4.9) whereas low refractive index (1.5) is found for higher oxygen contents in the film which confirms SiO_XC_Y type film deposition.