Abstract :

Antimony trisulfide Sb2S3 thin films of different thickness ranging from 0.35 to 9.7 𝛍m were prepared by thermal vacuum evaporation. The films deposited at 300 K on glass substrates have amorphous structure, while the same films annealed at 493 K in argon atmosphere changed to polycrystalline structure as identified by x-ray diffraction and scanning electron microscope techniques. Optical constants (refractive index(n)) , extinction (K) and absorption (𝛼) coefficients , and optical gap were studied for both amorphous and polycrystalline films. The dark electrical resistivity at room temperature was decreased by increasing the thickness of the film by one order of magnitude for amorphous and polycrystalline films. The activation energies for all films were calculated in the temperature range from 300 K to 453 K , which decreased slightly with increasing film thickness and lower values of activation energies were observed for polycrystalline films in comparison to the amorphous one.