Contribution ID: **101** Type: **Oral Presentation**

Surface, structural, and optical investigations of heavy ion-irradiated polyaniline thin films

Tuesday, 27 July 2021 11:45 (15 minutes)

In this study, polyaniline thin films with thickness of approximately 100 nm were spin-coated on a silicon substrate. The films were then irradiated at normal incidence and room temperature by 150 keV Ar+ ions to fluences ranging from 1 × 10ˆ12 to 5 × 10ˆ16 ions/cm2. According to the Monte Carlo simulation code, Stopping and Range of Ions in Matter (SRIM), the approximate penetration depth of the Ar+ ions in the thin films was found to be 279 nm. The surface morphology and roughness of the irradiated films was investigated by atomic force microscopy (AFM), while the optical properties and bandgap determination of the thin films were investigated by ultraviolet-visible spectrophotometry (UV–Vis). Rutherford backscattering spectrometry (RBS) and elastic recoil detection analysis (ERDA) were used to study the effects of irradiation on the film thickness and compositional changes. AFM analysis showed that the roughness of the films decreases from about 33 nm to 19 nm as the ion fluence increases. The optical band gap of PANI film also decreased from 1,9 eV at 1 × 10ˆ12 ions/cm2 to 1,4 eV at 5 × 10ˆ16 ions/cm2 signifying the presence of new defect states within the bandgap as fluence increases. RBS results showed that there is a decrease of the thickness with increasing fluence while ERDA showed a decrease in hydrogen atoms of the film.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

Primary authors: Ms SEGOLA, Ingrid Kutlwano (TUT/iThemba LABS); Prof. MSIMANGA, Mandla (Tshwane University of Technology); Dr MTSHALI, Christopher (iThemba LABS)

Presenter: Ms SEGOLA, Ingrid Kutlwano (TUT/iThemba LABS)

Session Classification: Physics of Condensed Matter and Materials

Track Classification: Track A - Physics of Condensed Matter and Materials