

Abstract

In this study, the effect of Au ions implantation on $Zn_{1-x}Ni_xO$ ($x= 0.0, 0.02, 0.03, 0.04, 0.05, 0.06$) thin films grown by pulsed laser deposition on Si substrate have been discussed. Structural, optical, electronic and morphological properties are examined by XRD, UV-Vis, XANES and FESEM. XRD results confirm the existence of single phase wurtzite structure of ZnO. The preferred orientation were observed along (002) plane. From the XRD results it has been analyzed that the due to co-doping of Au ions and Ni ions, the peaks shifts towards the minor angle, as a result lattice expansion occurs. XRD results also show the presence of the Au_2O_3 phase. Peaks shifted towards minor angle as a result lattice expansion occurs. The presence of functional groups and chemical bonding are confirmed by FTIR. UV-Visible measurements reveal that the band gap decreases upto $x= (2, 3, 4)$ Ni after that it starts increasing at $x= (5, 6)$. FESEM results reveal that the surface morphologies are scarcely changed. XAS results show that O-K edge energy first decreases upto Ni contents 3% then increases at 4% then again decreases. It confirms the presence of Zn, O and Ni.