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Microstructure and surface properties of silver by nitrogen ion implantation AMIR H. SARI, M.K. SALEM, Plasma Physics Research Center, Science and Research Campus, Islamic Azad University, Tehran, Iran, A. AKHAVAN, A.R. HOJABRI, Physics Department, Islamic Azad University, Karaj Branch, Karaj, Iran — Ion implantation technique is a well-known technique to improve physical properties of metals and semiconductors. In the last two decades ion implantation has been used to produce new structural properties in the near surface region of metals. In this paper the effect of nitrogen ion implantation at the energy of 50 keV and doses in the range between $1e17$ to $2e18$ ions/cm² on silver substrate has been discussed. XRD analysis was used to characterize microstructure of implanted layer. The XRD results confirmed that by such implantation AgN₃ has been produced. AgN₃ with orthorhombic structure was formed on silver surface with cubic structure. RMS roughness of implanted samples have been obtained using AFM analysis and compared with un-implanted sample. By increasing the ion dose more than $1e17$ ions/cm² RMS roughness increases while it finally drops due to sputtering effect at highest dose. Micro-hardness properties of implanted samples measured by Vickers test. The results show that by increasing the ion dose up to $1e18$ ions/cm² hardness enhances. Finally, reflection changes at the UV-Vis-NIR region measured by diffuse reflectance accessory of a spectrophotometer.

Amir H. Sari
Plasma Physics Research Center, Science and Research Campus,
Islamic Azad University, Tehran, Iran

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