

Abstract

Metal-Semiconductor (MS), Metal-Insulator-Semiconductor (MIS) junctions are important building blocks for fabrication of different electronic and spintronic devices. Several Thin film deposition techniques involved in the fabrication of these devices, and various deposition parameters play significant roles deciding the device performance and behaviour. Formation of a good ohmic contact is of paramount importance while fabricating a MS/MIS device and often an imperfect ohmic contact having a considerable barrier height and non-linear current conduction is encountered. In this thesis, an alternative method has been initially suggested to analyse back to back connected asymmetric schottky junctions, where the second junction can be approximated as a non ideal ohmic contact. To test the feasibility of the proposed method, different Metal-Semiconductor junctions comprising of different metals such as FeGa, Nickel, Aluminium, Platinum and Silver as well as different semiconductors like Silicon and pulsed laser deposited ZnO have been fabricated. Depositing a uniform thin film is of paramount importance while fabricating these types of devices, so deposition characterization and optimization studies have been carried out experimentally. The fabricated devices have been initially analysed by using conventional current-voltage and capacitance-voltage measurements and later on by using the alternative method. The individual barrier heights obtained by using the proposed method agrees well with the values obtained using established conventional methods.

Keywords: *Schottky Junctions, Thermionic Emission, Dielectric Measurements, Impedance Spectroscopy*