

Effects of ion bombardments on the electrical properties of plasma treated ZnO nanowires

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Zinc oxide (ZnO) nanowire has been compelling research attention because of their superior properties, as they have wide band gap energy (3.37 eV), large exciton binding energy (60 meV), high thermal and mechanical stability. Therefore, it is suitable for the fabrication of variety of devices which includes transparent transistors, optoelectronic devices, chemical and biological sensors. The performance of these devices strongly relies on the electrical properties of ZnO nanowire. Accordingly, it is very important to modify the electrical properties of ZnO nanowire for various device applications. In this work, we investigate the electrical properties of ZnO nanowire using a back-gate ZnO nanowire FET by ion bombardments under Ar plasma treatment. In addition, structural, chemical compositional, and optical characteristics were studied to elucidate the changes of the surface chemistry and defect concentration of ZnO nanowire induced by ion bombardments under Ar plasma treatment.