

Doping Dependent I-V Characteristics of Single Silicon Nanowire

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Abstract

In the present work, we have studied the electron transport properties of single silicon nanowire using Semiconductor Module of COMSOL Multiphysics software. We construct a MSM (metal-semiconductor-metal) model where metal is selected as copper and semiconductor is taken as silicon. Silicon is doped with n-type impurity by increasing doping concentration. Further, the Schottky diodes formed at both ends of silicon nanowire are biased by applying external potential so that one junction is in forward bias mode and another is in reverse bias mode. Here, we present the effect of changing the doping concentration on electron transport behaviour of silicon nanowire. It is observed that by increasing the doping concentration the Schottky junctions disappear and silicon nanowire shows a linear trend in I-V characteristics.

Reference

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Figures used in the abstract

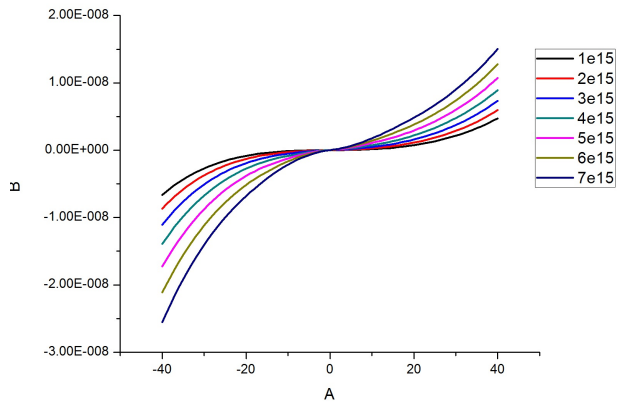


Figure 1: I-V Characteristics of SiNW with Change in Carrier Concentration.



Figure 2: COMSOL Model Diagram of Single Silicon Nano Wire.