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Abstract:

This paper explores the temperature dependent heterojunction behavior of *n*-type zinc oxide (ZnO) nanowires/*p*-Si diodes. The device behavior at different temperatures in forward as well as reverse biased conditions are studied and reported. From the detailed electrical properties, it is confirmed that the fabricated *p*-*n* diode showed a good stability over the temperature range of 25-130 °C. The turn-on and breakdown voltage of the device slightly decreases with an increase of temperature whereas the saturation current of the device increases. The effective potential barrier height is found increasing with the increase in temperature. The quality factor is found with and without the consideration of barrier height inhomogeneity. The mean potential barrier is also determined. Moreover, a value of activation energy of 53 meV which is close to the exciton binding energy of ZnO, is estimated.

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