

Computational Study of I-V characteristics of ITO/Cu₂/Metal junctions

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A theoretical model for current-voltage (I-V) characteristics of back-to-back diode systems was developed using the ideal diode equation. A computer model was developed using the language C++ to fit the experimental data to the theoretical equation and to determine the ideality factors and reverse saturation currents of each diode. This model was tested with commercial back-to-back diode systems. The values obtained for the above parameters from the theoretical fits were in very good agreement with the standard values. The experimental I-V characteristics data obtained for fabricated ITO/Cu₂O/Metal (Au, Ag and Hg) structures were fitted to the model and values for the relevant parameters were obtained. These values indicate that the fabricated systems are back to back diodes except the ITO//Cu₂O/Hg structure. Using this model, a good understanding of I-V characteristics of metal-semiconductor-metal diodes can be gained and thereby the quality of junction devices can be tested.