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Rectifying Current-Voltage Characteristics of $BiFeO_3$/Nb-doped $SrTiO_3$ Heterojunction HAO YANG, H.M. LUO, Superconductivity Technology Center, Los Alamos National Laboratory, H. WANG, Dept. of Electrical and Computer Engineering, Texas A&M University, D.M. FELDMANN, Q.X. JIA, Superconductivity Technology Center, Los Alamos National Laboratory — Epitaxial c-axis oriented $BiFeO_3$ (BFO) thin films were deposited on (001) Nb-doped $SrTiO_3$ (Nb-STO) substrates by pulsed laser deposition. Introducing Bi vacancies causes the BFO thin film to evolve to a p-type semiconductor and form a $p-n$ heterojunction with n-type semiconductor Nb-STO. The current density vs voltage ($J-V$) and capacitance vs voltage ($C-V$) characteristics of the heterojunction were investigated. A typical rectifying$J-V$ effect was observed with a large rectifying ratio of 5×10^4. Reverse $C-V$ characteristics exhibit a linear $1/C^2$ vs V plot, from which a built-in potential of 0.6 V is deduced. The results show a potential application of BFO/Nb-STO heterojunction for oxide electronics.

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