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Polarity Control of Ferroelectric BiFeO₃/Metal Junctions for Switchable Diode and Photovoltaic Devices TAE WON NOH, DAESU LEE, T.H. KIM, ReCFI, Department of Physics and Astronomy, Seoul National University, Seoul 151-747, Republic of Korea, S.H. BAEK, C.M. FOLKMAN, C.B. EOM, Department of Materials Science and Engineering, University of Wisconsin-Madison, Madison, Wisconsin 53706, USA, J.-G. YOON, Department of Physics, University of Suwon, Kyunggi-do 445-743, Republic of Korea — Ferroelectric materials possess spontaneous polarization which can be used to control numerous functionalities of the materials by switching the polarization or modifying domain structure with an electric field. One of emerging phenomena in ferroelectrics is the control of charge transport by switching the polarization. Although charge conduction (*i.e.*, leakage current) in ferroelectrics has been considered as a detrimental factor to practical applications, an interaction between conduction and ferroelectric polarization has recently attracted much attention as a route for novel functionalities. In this presentation, we will report on the ferroelectric control of charge conduction in BiFeO₃/metal junctions: the BiFeO₃/metal interfaces can have either blocking or non-blocking contacts according to the polarization direction of the BiFeO₃ films, allowing non-volatile control of diode-like conduction characteristics. The resulting rectifying and photovoltaic effects can be turned on and off, as well as be flipped in polarity, depending on the ferroelectric domain structures.

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