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**A Conductive Polar Interface with high mobility formed between $LaInO_3$ and $BaSnO_3$ perovskite oxides** USEONG KIM, CHULKWON PARK, Seoul Natl Univ, TAEWOO HA, Yonsei Univ, YOUNG MO KIM, NAMWOOK KIM, CHANJONG JU, JAEJUN YU, Seoul Natl Univ, JAE HOON KIM, Yonsei Univ, KOOKRIN CHAR, Seoul Natl Univ — $LaInO_3/BaSnO_3$ (LIO/BSO) polar interface is the interface between $BaSnO_3$ (BSO), a non-polar perovskite oxide with high oxygen stability and electron mobility, and $LaInO_3$ (LIO), a polar perovskite oxide with the matched lattice parameters. Once the LIO/BSO interface forms, the conductance in the interface is significantly enhanced. The high oxygen stability of BSO enables dopant-controlled transport experiments by ruling out the involvement of oxygen vacancies in the transport phenomena. The conductance enhancement at the LIO/BSO interface was monitored while varying the doping rate of La dopants in the BSO layer. As a result, we found that the La doping rate was a dominant factor determining the extent to which the conductance was enhanced. It implies that the electronic reconstruction at the polar interface depends critically on the initial position of the Fermi level in the BSO side. The high electron mobility of BSO enables the exploitation of the conductive LIO/BSO interface at room temperature. We fabricated a field effect transistor utilizing such interface. At room temperature the device shows outstanding performances in terms of three device parameters: field effect mobility higher than 90 $cm^2/Vs$, on/off ratio as high as $10^7$, and subthreshold swing as low as 0.65 V/dec.

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