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The interface between ferroelectric and 2D material for a Ferroelectric Field-Effect Transistor NAHEE PARK, Center for Integrated Nanostructure Physics, Institute for Basic Science, DOES, Sungkyunkwan University, HAEYONG KANG, DOES, Sungkyunkwan University, SANG-GOO LEE, IBULE Photonics Co. Ltd., YOUNG HEE LEE, DONGSEOK SUH, Center for Integrated Nanostructure Physics, Institute for Basic Science, DOES, Sungkyunkwan University — We have studied electrical property of ferroelectric field-effect transistor which consists of graphene on hexagonal Boron-Nitride (h-BN) gated by a ferroelectric, PMN-PT (i.e. (1-x)$Pb(Mg_{1/3}Nb_{2/3})O_3$-x$PbTiO_3$) single-crystal substrate. The PMN-PT was expected to have an effect on polarization field into the graphene channel and to induce a giant amount of surface charge. The hexagonal Boron-Nitride (h-BN) flake was directly exfoliated on the PMN-PT substrate for preventing graphene from directly contacting on the PMN-PT substrate. It can make us to observe the effect of the interface between ferroelectric and 2D material on the device operation. Monolayer graphene as 2D channel material, which was confirmed by Raman spectroscopy, was transferred on top of the hexagonal Boron-Nitride (h-BN) by using the conventional dry-transfer method. Here, we can demonstrate that the structure of graphene/hexagonal-BN/ferroelectric field-effect transistor makes us to clearly understand the device operation as well as the interface between ferroelectric and 2D materials by inserting h-BN between them. The phenomena such as anti-hysteresis, current saturation behavior, and hump-like increase of channel current, will be discussed by in terms of ferroelectric switching, polarization-assisted charge trapping.

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