

Abstract Submitted
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Improvement of I_{on}/I_{off} for h -BN encapsulated bilayer graphene by graphite local back gate electrode¹ TEERAYUT UWANNO, The University of Tokyo, Japan, TAKASHI TANIGUCHI, KENJI WATANABE, NIMS, Japan, KOSUKE NAGASHIO, The University of Tokyo, PRESTO-JST, Japan — The critical issue for bilayer graphene (BLG) devices is low I_{on}/I_{off} even at the band gap of 0.3eV. Band gap in BLG can be formed by creating potential difference between the two layers of BLG. This can be done by applying external electric field perpendicularly to BLG to induce different carrier densities in the two layers. Due to such origin, the spatial uniformity of band gap in the channel is quite sensitive to charge inhomogeneity in BLG. In order to apply electric field of 3V/nm to open the maximum band gap of 0.3eV, high- k gate stack has been utilized so far. However, oxide dielectrics usually have large charge inhomogeneity causing in-plane potential fluctuation in BLG channel. Due to surface flatness and small charge inhomogeneity, h -BN has been used as dielectrics to achieve high quality graphene devices, however, I_{on}/I_{off} for BLG/ h -BN heterostructures has not been reported yet. In this study, we used graphite as local back gate electrode to BLG encapsulated with h -BN. This resulted in much higher I_{on}/I_{off} , indicating the importance of screening of charge inhomogeneity from SiO₂ substrate surface by local graphite back gate electrode.

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