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Energy gap formation and gap states analysis in bilayer graphene
KAORU KANAYAMA, The University of Tokyo, KOSUKE NAGASHIO, The University of Tokyo & PRESTO-JST — The targeted issue for bilayer graphene is low I_{on}/I_{off} at the room temperature, which is explained by the variable range hopping in ?gap states?. However, there will be intrinsically no interface states in bilayer graphene because there is no dangling bonds, compared with P_b centers in SiO_2/Si system. The origin for the gap states is still open question. In spite of this, the detailed measurements on D_{it} and time constant for gap states have not been reported yet. One of reasons could be the leakage current through the top gate insulator since robust methodology is not established. Here, we demonstrates a considerable suppression of the low-field leakage in bilayer graphene by applying the high-pressure O_2 annealing to Y_2O_3 top gate insulator. The reliable Y_2O_3 top gate insulator provides the access to the carrier response issue in the largely-opened band gap. In this talk, we focus on the conductance measurements for bilayer graphene to extract D_{it} and time constant. Based on these measurements, two possible origins for the gap states, (i) border traps at the edge of Y_2O_3 and (ii) the local breakdown of A-B stacking in bilayer graphene, are discussed.

Kosuke Nagashio
Univ of Tokyo

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