Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Interface states analysis in atomically thin MoS_2 FET[1] NAN FANG, Department of Materials Engineering, The University of Tokyo, Tokyo 113-8656, Japan, KOSUKE NAGASHIO, 1Department of Materials Engineering, The University of Tokyo, Tokyo 113-8656, Japan 2 PRESTO, Japan Science and Technology Agency (JST), Tokyo 113-86 — Two-dimensional (2D) materials such as MoS_2 have recently attracted much attention for use in next-generation field-effect transistors (FETs). The interface between the channel and gate insulator should be seriously considered especially for atomically thin channel devices. Defects in MoS_2 as well as dangling bonds from gate oxide could contribute to the interface states. At present, interface states density ($D_{\rm it}$) of MoS_2 FET extracted by various kinds of electrical measurements is largely scattered and very large. This large $D_{\rm it}$ should affect carrier transport seriously. Here, in order to gain insight to reduce $D_{\rm it}$, we study the correlation between interface states and carriers in terms of random telegraphic signals (RTSs) analysis, which complements noise study of MoS_2. RTSs measurements for multi-probe devices confirm that the defects at the channel/insulator interface cause RTSs. Moreover, conductance method is also applied for dual-gated MoS_2 FET to extract $D_{\rm it}$ and its time constant. In this talk, we focus on the RTSs analysis and conductance measurements for thin MoS_2 FET to study interface states.

[1]This research was partly supported by JSPS Core-to-Core Program, A. Advanced Research Networks.

Nan Fang
Univ of Tokyo

Date submitted: 29 Nov 2016 Electronic form version 1.4