Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Single-crystalline transition-metal dichalcogenide thin films grown by molecular-beam epitaxy YUE WANG, MASAKI NAKANO, YUUTA KASHIWABARA, MASARU ONGA, MASARO YOSHIDA, Dept. of Appl. Phys., Univ. of Tokyo, YOSHIHIRO IWASA, Dept. of Appl. Phys., Univ. of Tokyo, RIKEN CEMS — Emerging properties of 2D materials such as graphene and monolayer transition-metal dichalcogenides (TMDCs) have attracted considerable attention both from fundamental and applied viewpoints. To date, most of the researches have been performed on mechanically-exfoliated nano-thick crystals from top-down approach, while bottom-up approach by thin film growth technique has been of growing significance to further exploration of physical properties of TMDCs including their heterostructures as well as to practical device applications. One of promising routes to well-controlled growth of high-quality large-area TMDC thin films is to use chemical-vapor deposition. We have instead chosen to use molecular-beam epitaxy with a view to future heterostructure fabrication, and recently succeeded in growing single-crystalline TMDC thin films on insulating substrates, both semiconducting and metallic ones, with desired thickness and crystallographic orientation. In the presentation, we will discuss a detailed growth process essential for stabilizing single-crystalline phase, in particular for WSe2 and TiSe2, together with their electrical transport properties.

Yue Wang
Dept. of Appl. Phys., Univ. of Tokyo

Date submitted: 11 Nov 2016 Electronic form version 1.4