

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Thermal stability of MBE-grown epitaxial MoSe₂ and WSe₂ thin films¹ YOUNG JUN CHANG, BYOUNG KI CHOY, Department of Physics, University of Seoul, Seoul, 130-743, Korea, SOO-HYON PHARK, Center for Nanometrology, Korea Research Institute of Standards Science, Korea, MINU KIM, Center for Correlated Electron Systems, Institute for Basic Science (IBS), Seoul 151-747, Republic of Korea — Layered transition metal dichalcogenides (TMDs) draw much attention, because of its unique optical properties and band structures depending on the layer thicknesses. However, MBE growth of epitaxial films demands information about thermal stability of stoichiometry and related electronic structure for high temperature range. We grow epitaxial MoSe₂ and WSe₂ ultrathin films by using molecular beam epitaxy (MBE). We characterize stoichiometry of films grown at various growth temperature by using various methods, XPS, EDX, and TOF-MEIS. We further test high temperature stability of electronic structure for those films by utilizing in-situ ellipsometry attached to UHV chamber. We discuss threshold temperatures up to 700~1000°C, at which electronic phases changes from semiconductor to metal due to selenium deficiency. This information can be useful for potential application of TMDs for fabrication of Van der Waals multilayers and related devices.

¹This research was supported by NanoMaterial Technology Development Program through the National Research Foundation of Korea(NRF) funded by the Ministry of Science, ICT and Future Planning.(2009-0082580), NRF-2014R1A1A1002868

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Date submitted: 06 Nov 2015

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