

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Polarization resolved photoluminescence study of pulse laser deposition assisted grown monolayer MoSe₂-WSe₂ lateral hetero-junction.¹
FARMAN ULLAH, CHINH TAM LE, TRI KHOA NGUYEN, JONG WON YUN, YONG SOO KIM, Department of Physics, Semiconductor research laboratory (SDRL), University of Ulsan, Ulsan 680-749, South Korea — The development of lateral hetero-junctions between 2D semiconductors of different band gaps could pave the way for the fabrication of new 2D electronic devices, such as high-speed transistors, diodes, and light emitting diodes. Here we demonstrate the growth lateral hetero-junction between MoSe₂ and WSe₂ by pulse laser deposition assisted chemical vapor deposition method. The lateral hetero-junction can be clearly observed in morphological characterizations. The room temperature photoluminescence spectra at the interface show two strong peaks at 1.52 eV and 1.63 eV, corresponding to the *A* excitons arising from *K* point the first Brillion zone of monolayer MoSe₂ and WSe₂ respectively. The polarization resolved photoluminescence spectra's at 50 K reveals 55.2 % and 29.4 % valley polarization of WSe₂ and MoSe₂, respectively. However, the inter-band transition around (~1.32 eV), previously observed in vertical hetero-structure could not be observed in lateral case due to spatial separation of energy bands of MoSe₂ and WSe₂.

¹This research was supported by the Priority Research Centers Program (2009-0093818), the Basic Science Research Program (2015R1D1A3A03019609), and the Basic Research Lab Program (2014R1A4A1071686) through the National Research Foundation of Korea (NRF)

Farman Ullah
Semiconductor research laboratory (SDRL), University of Ulsan

Date submitted: 20 Nov 2016

Electronic form version 1.4