

Growth and Structural Characterization of Single Layer Dichalcogenide MoS₂

Jae Seok Hwang, Dae Joon Kang

BK 21 Physics Research Division, Department of Energy Science, Institute of Basic Science, Sungkyunkwan University, Suwon 440-746, Republic of Korea

Synthesis of novel two dimensional materials has gained tremendous attention recently as they are considered as alternative materials for replacing graphene that suffers from a lack of bandgap, a property that is essential for many applications. Single layer molybdenum disulfide (MoS₂) has a direct bandgap (1.8eV) that is promising for use in next-generation optoelectronics and energy harvesting devices. We have successfully grown high quality single layer MoS₂ by a facile vapor-solid transport route. As-grown single layer MoS₂ was carefully characterized by using X-ray diffraction, Raman spectroscopy, field emission scanning electron microscopy and electrical transport measurement. The results indicate that a high quality single layer MoS₂ can be successfully grown on silicon substrate. This may open up great opportunities for the exploration of novel nanoelectronic devices.

Keywords: MoS₂, Two-dimensional single layer