Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Optical properties of large-area MoS2 thin films grown via magnetron sputtering: Thickness and substrate dependence ASMA ALKABSH, HASSANA SAMASSEKOU, DIPANJAN MAZUMDAR, Southern IL Univ-Carbondale — Transition metal dichalcogenides (TMDS) have gained exceptional attention because of their thickness dependent electronic structure which makes them suitable for electronic and optoelectronic applications. MoS2 is among the most promising material in this family. Recently we have successfully developed growth of large-area MoS2 using magnetron sputtering. In this work, we investigated the large-area optical properties of few and bilayer MoS2 grown on different amorphous underlayers (BN and SiO2) using spectroscopic ellipsometry (SE), UV-VIS and Raman spectroscopy. SE spectra provided thickness and optical constants within 1.0-3.0 eV range, whereas broadband (0.5-6.5 eV) transmission and reflectance measurements provided direct measurements of optical constants through Glover-Tinkham analysis. A comprehensive analysis of thickness and substance dependence of optical properties of our large-area films will be presented and compared with existing literature reports and first-principles electronic structure. Also, Raman measurements reveal interesting disorder related effects on our MoS2 films.

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Date submitted: 09 Nov 2016 Electronic form version 1.4