

Abstract Submitted
for the MAS14 Meeting of
The American Physical Society

Investigating the Work Function Evolution of WS_xSe_{2-x} Alloys

JACOB SHEVRIN, JUNJIE WANG, AN NGUYEN, TOM MALLOUK, JUN ZHU,
Pennsylvania State Univ — Two-dimensional layered transition metal dichalco-
genides (TMDs), such as WS_2 and WSe_2 , are an important class of materials because
of their novel physical and electrical properties. The work function of the material
can inform the choice of metal to use when making contacts and can also pro-
vide valuable information regarding the band alignment in heterostructures made
of dissimilar materials. Here we present work function measurements of multi-layer
 WS_xSe_{2-x} (x ranges from 0 to 2) sheets exfoliated from bulk alloys using Kelvin
Probe Force Microscopy. Using a graphite work function $W_G = 4.5$ eV as reference,
we find the average work function of WS_xSe_{2-x} to linearly interpolate between
 $W=4.52$ eV for WSe_2 to $W=4.74$ eV for WS_2 as x varies from 0 to 2. At every
alloy composition, W varies from sheet to sheet in a range of approximately 0.15
eV. Our experimental results provide useful information to the design of transistors
and heterostructures of these materials.

Jacob Shevrin
Pennsylvania State Univ

Date submitted: 28 Aug 2014

Electronic form version 1.4