

## Supporting Information for

# The Impact of Substrate Surface Defects on the Properties of Two-Dimensional van der Waals Heterostructures

*Se-Yang Kim<sup>1</sup>, Jung Hwa Kim<sup>1</sup>, Sungwoo Lee<sup>2</sup>, Jinsung Kwak<sup>1</sup>, Yongsu Jo<sup>1</sup>, Euijoon Yoon<sup>2,3,4</sup>,  
Gun-Do Lee<sup>2,3</sup>, Zonghoon Lee<sup>1</sup>, and Soon-Yong Kwon<sup>1\*</sup>*

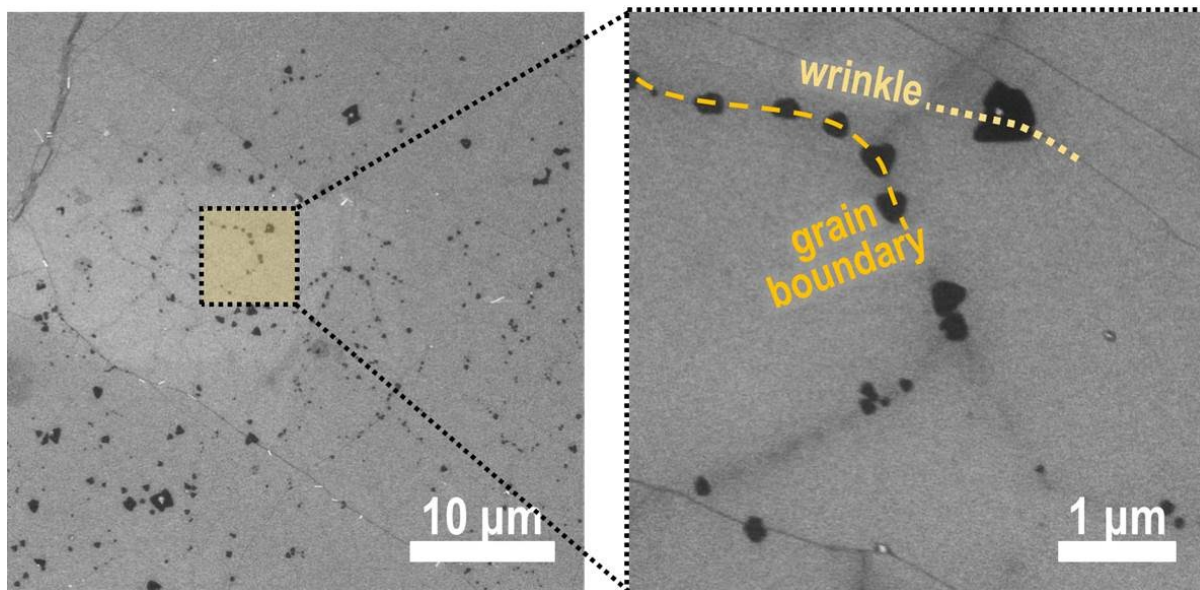
<sup>1</sup>School of Materials Science and Engineering, Low-Dimensional Carbon Materials Center,  
Ulsan National Institute of Science and Technology (UNIST), Ulsan, 44919, Republic of  
Korea

<sup>2</sup>Department of Materials Science and Engineering, Seoul National University, Seoul, 08826,  
Republic of Korea

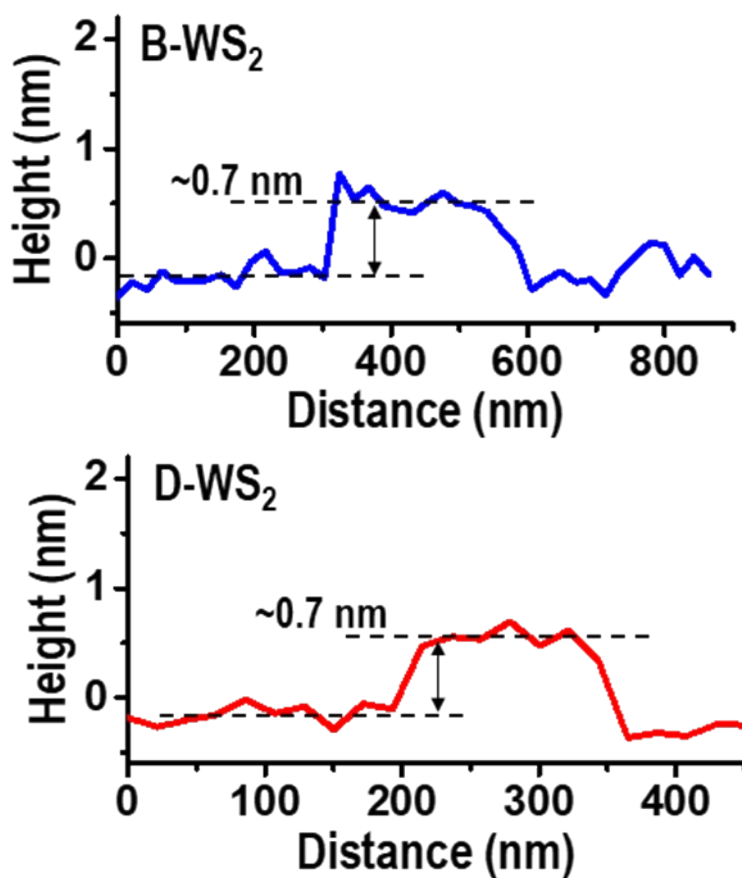
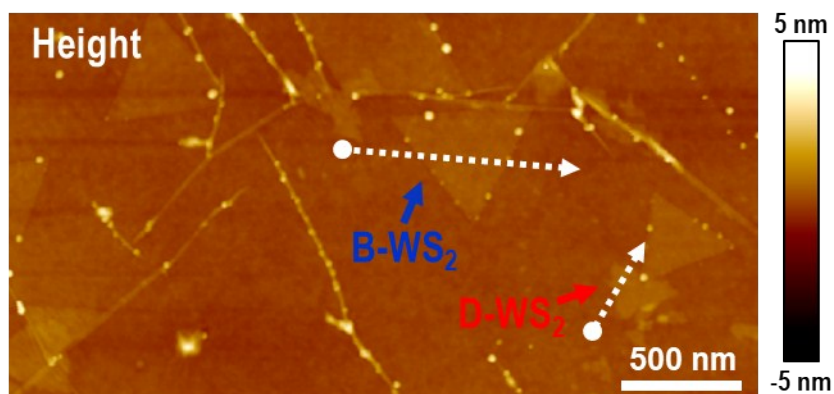
<sup>3</sup>Research Institute of Advanced Materials, Seoul National University, Seoul, 08826,  
Republic of Korea

<sup>4</sup>Inter-university Semiconductor Research Center, Seoul National University, Seoul, 08826,  
Republic of Korea

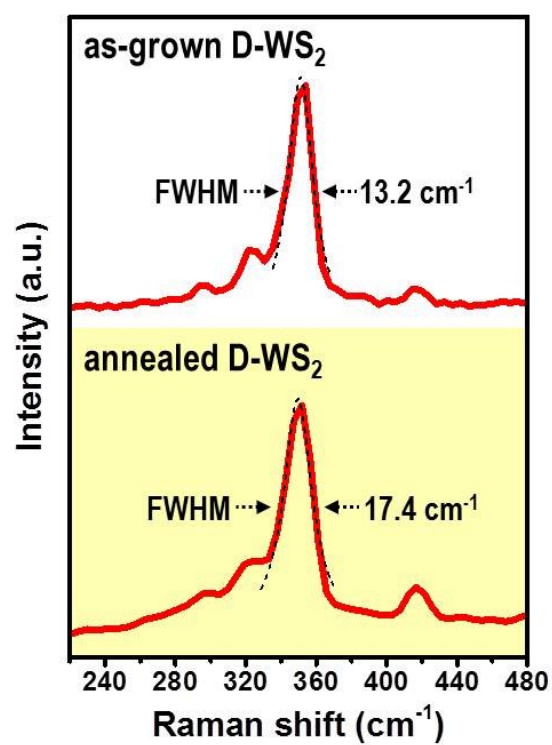
\*To whom correspondence should be addressed: sykwon@unist.ac.kr



**Fig. S1.** (a) Representative SEM images of WS<sub>2</sub> grown on graphene obtained at the early stage of growth with a reduced growth time (10 min). (b) A high-magnification SEM image of (a).



**Fig. S2.** The topography (height) image of WS<sub>2</sub> flakes grown on graphene measured using the tapping mode AFM (Figure 2) and line profiles across isolated B-WS<sub>2</sub> flakes (blue line) and D-WS<sub>2</sub> flakes (red line).



**Fig. S3.** Raman spectra measured on D-WS<sub>2</sub> flakes before and after annealing at 500 °C in air for 1 h.