Electronic Supplementary Information (ESI)

Atomic layer deposition of $SnSe_x$ thin films using $Sn(N(CH_3)_2)_4$ and $Se(Si(CH_3)_3)_2$ with NH_3 co-injection

Jeong Woo Jeon,[a] Chanyoung Yoo, [a] Woohyun Kim, [a] Wonho Choi, [a] Byongwoo Park, [a] Yoon Kyeung Lee*[b] and Cheol Seong Hwang*[a]

[a]*Department of Materials Science and Engineering and Inter-University Semiconductor Research Center, Seoul National University, Seoul, Republic of Korea. E-mail: cheolsh@snu.ac.kr*

[b] *Division of Advanced Materials Engineering, Jeonbuk National University, Jeonju, 54896, Republic of Korea. E-mail: yoonklee@jbnu.ac.kr*

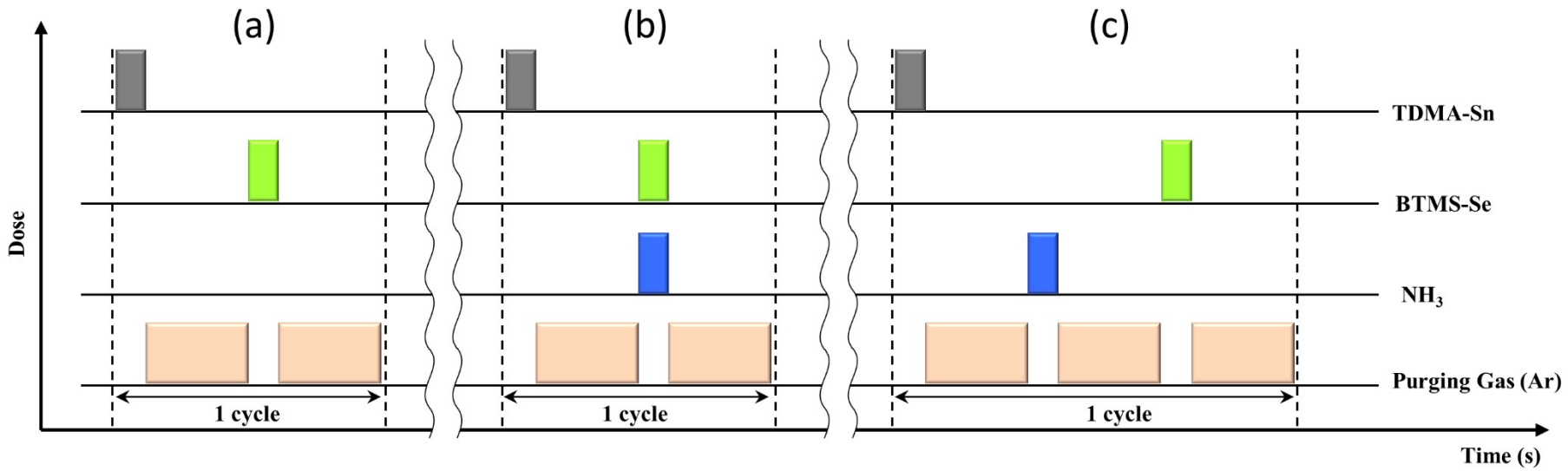

Fig. S1 Various ALD gas injection sequences with NH_3 to analyze the chemical interactions between NH_3 and the precursors. (a) Typical ALD (b) Synchronized injection of NH_3 with BTMS-Se (c) Asynchronized injection of NH_3 with BTMS-Se.

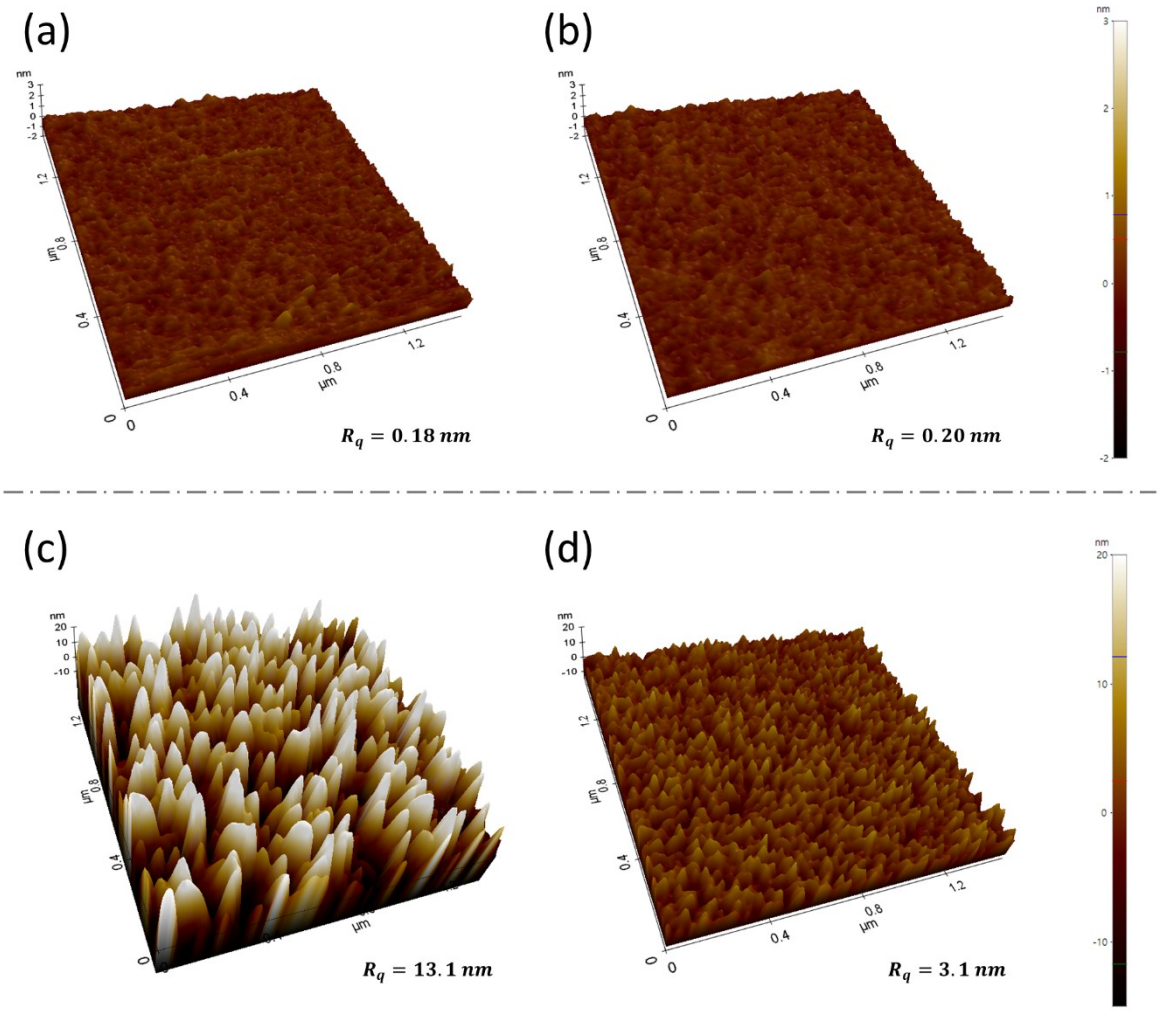

Fig. S2 AFM images of $SnSe_x$ films grown on SiO_2 substrate at deposition temperatures of (a) 110 ℃, (b) 150 ℃, (c) 170 ℃, and (d) 170 ℃ with two-step process.

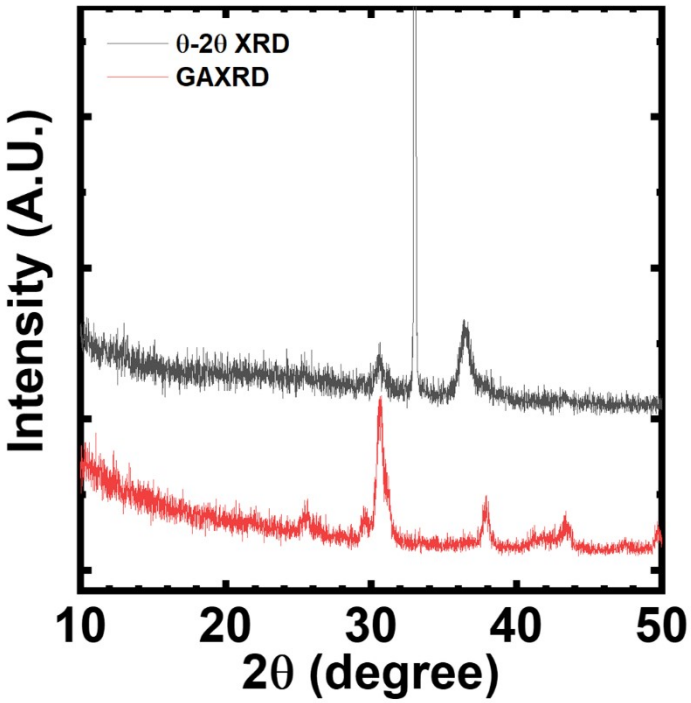

Fig. S3 θ-2θ and GAXRD results of SnSe film on TiN substrates with the two-step process