

## Electronic Supplementary Information

### Low-temperature wafer-scale synthesis of two-dimensional SnS<sub>2</sub>

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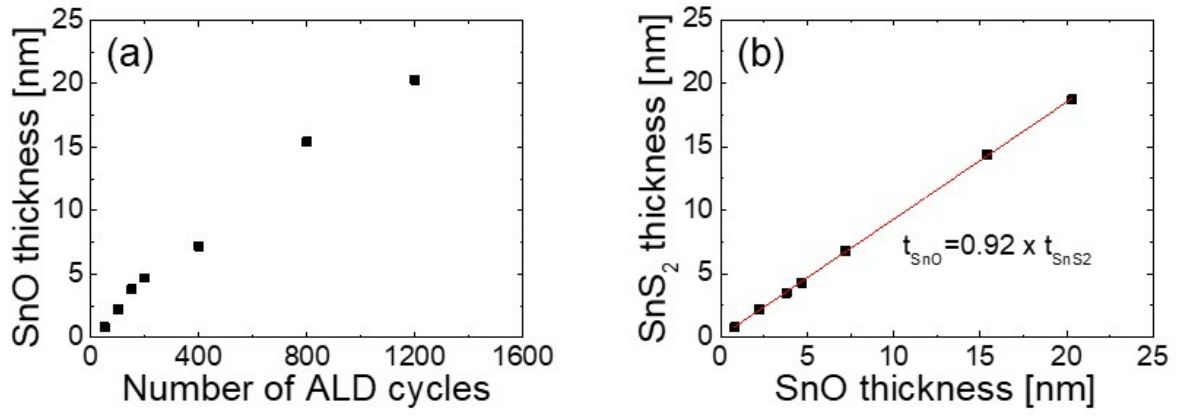
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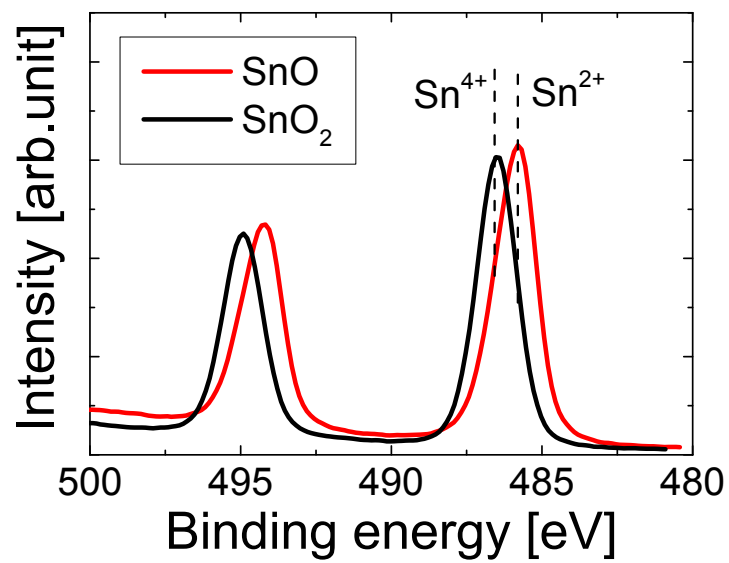
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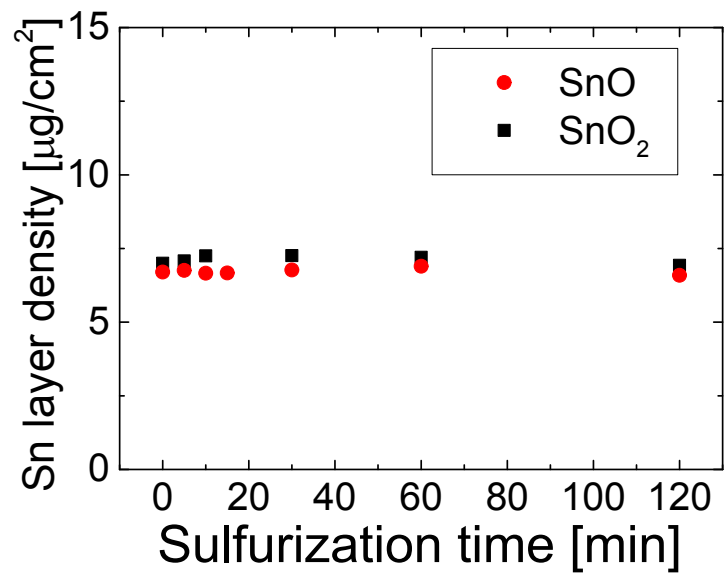
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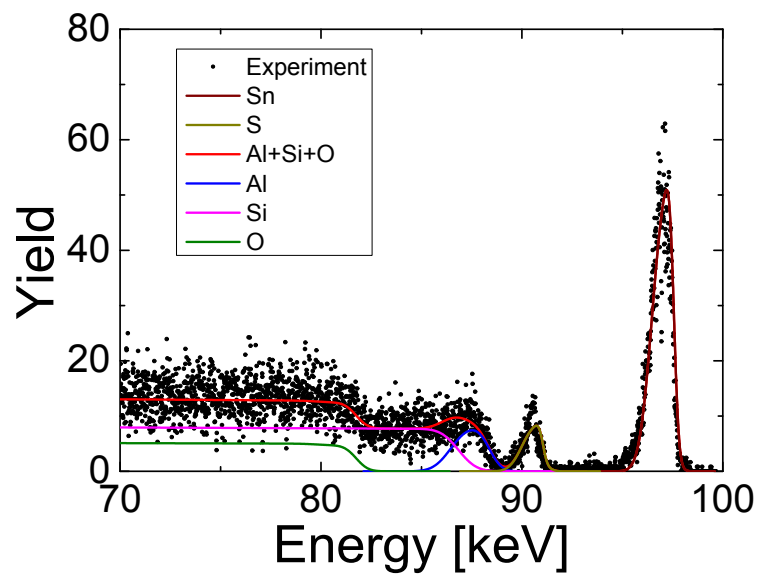
**Fig. S1** (a) Variation in the SnO thickness as a function of number of ALD cycles and (b) Variation in the SnS<sub>2</sub> thickness as a function of the SnO thickness.



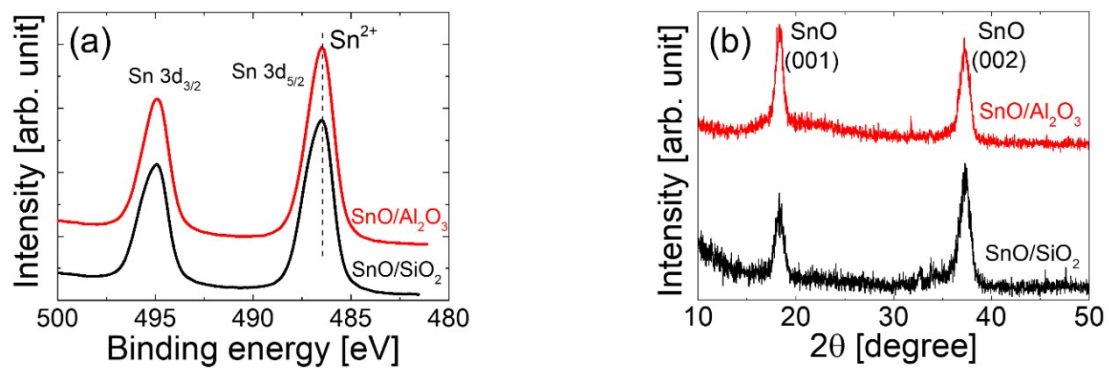
**Fig. S2** XPS spectra of Sn 3d core level in the SnO and SnO<sub>2</sub> thin films grown by ALD.



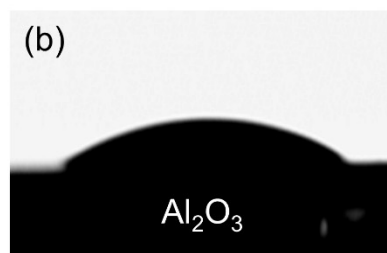
**Fig. S3** Variation in the Sn layer density of the SnO and SnO<sub>2</sub> sulfurized at 350 °C as a function of the sulfurization time. The Sn layer density was measured using WDXRF.



**Fig. S4** MEIS spectrum for the 3 nm-thick SnO grown on Al<sub>2</sub>O<sub>3</sub>/SiO<sub>2</sub>/Si sulfurized at 350 °C for 60 min.



**Fig. S5** (a) Sn 3d XPS spectra and (b)  $\theta$ -2 $\theta$  XRD patterns of the ALD-grown SnO on amorphous Al<sub>2</sub>O<sub>3</sub> and SiO<sub>2</sub>.



**Fig. S6** Optical images of water droplet on (a) amorphous  $\text{SiO}_2$  and (b)  $\text{Al}_2\text{O}_3$ .