

## Supporting information:

### Enhanced Thermoelectric Properties of SnSe Polycrystals via Texture Control

*Dan Feng<sup>1,†</sup>, Zhen-Hua Ge<sup>2,3,†</sup>, Di Wu<sup>2</sup>, Yue-Xing Chen<sup>2</sup>, Tingting Wu<sup>2</sup>, Ju Li<sup>1,4,\*</sup>, and  
Jiaqing He<sup>2,\*</sup>*

<sup>1</sup>State Key Laboratory for Mechanical Behavior of Materials and Frontier Institute of Science and Technology, Xi'an Jiaotong University, Xi'an 710049, China.

<sup>2</sup>Shenzhen Key Laboratory of Thermoelectric Materials, Department of physics, South University of Science and Technology of China, Shenzhen 518055, China.

<sup>3</sup>Faculty of Materials Science and Technology, Kunming University of Science and Technology, Kunming, 650093, China.

<sup>4</sup>Department of Nuclear Science and Engineering and Department of Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139, USA

Email: [liju@mit.edu](mailto:liju@mit.edu), [he.jq@sustc.edu.cn](mailto:he.jq@sustc.edu.cn)

Key words: Thermoelectrics; SnSe; texturing

#### 1. The Sn vacancies in SnSe samples

We used 450 °C sintered specimen as an example. First, the low magnification HAADF-STEM image (Figure S1) shows a uniform contrast, which confirms the single phase feature without any second phase. Thus we further analysis the composition using Energy dispersive X-ray spectroscopy (EDS) in SEM. The semiquantitative analysis result is shown in Figure S2 and the absence of the Sn element is confirmed. The existence of Sn vacancies is consistent with the p-type properties. This is partly responsible for the low thermal conductivity.

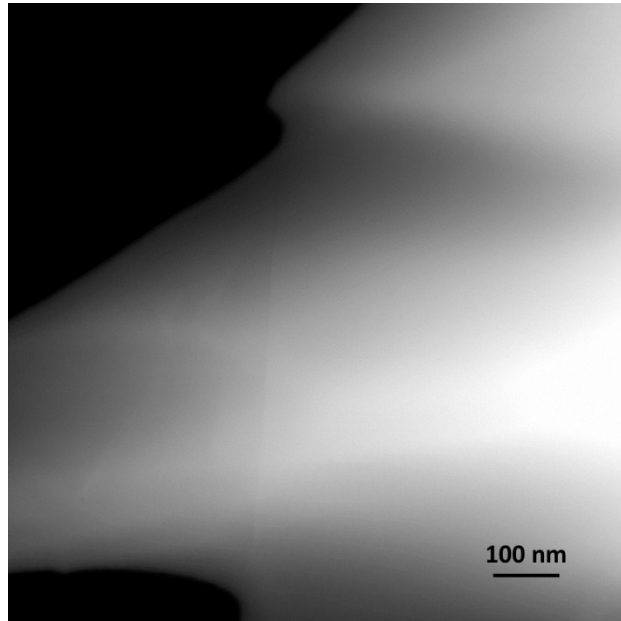


Figure 1. The low magnification high-angle annular-dark-field (HAADF)-STEM micrograph of 450 °C sintered SnSe.

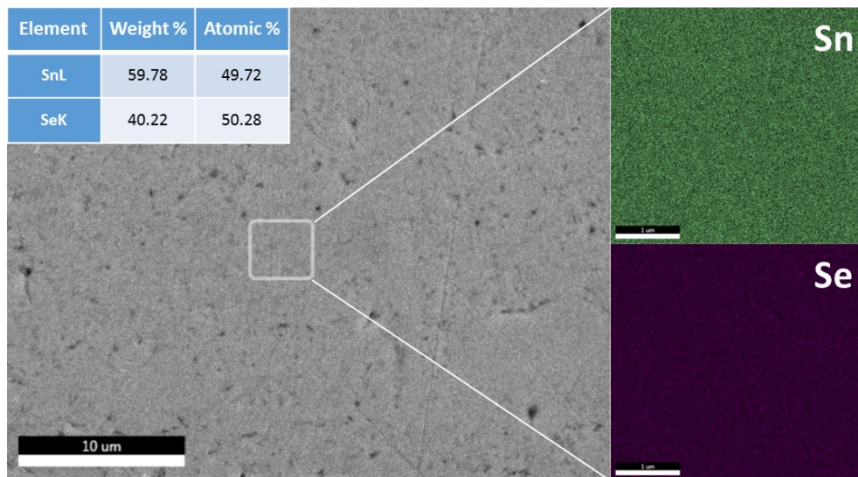


Figure 2. SEM observation of 450 °C sintered SnSe and corresponding elements mapping result.

Table S1. Conduction type and average ZT values for pristine polycrystalline SnSe

Ref.	Samples	Conduction type	Average ZT value from 300K to 773K
------	---------	-----------------	------------------------------------

---

26	polycrystalline SnSe	p	0.07
32	polycrystalline SnSe	p	0.10
41	polycrystalline SnSe	p	0.19
34	polycrystalline SnSe	p	0.14
33	polycrystalline SnSe	p	0.12
38	polycrystalline SnSe	p	0.38
This work	polycrystalline SnSe	p	0.38

---