Supporting Information:

Chemically Exfoliated SnSe Nanosheets and Their SnSe/Poly(3,4-ethylenedioxythiophene):Poly(styrenesulfonate) Composite Films for Polymer Based Thermoelectric Applications

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1. Figures

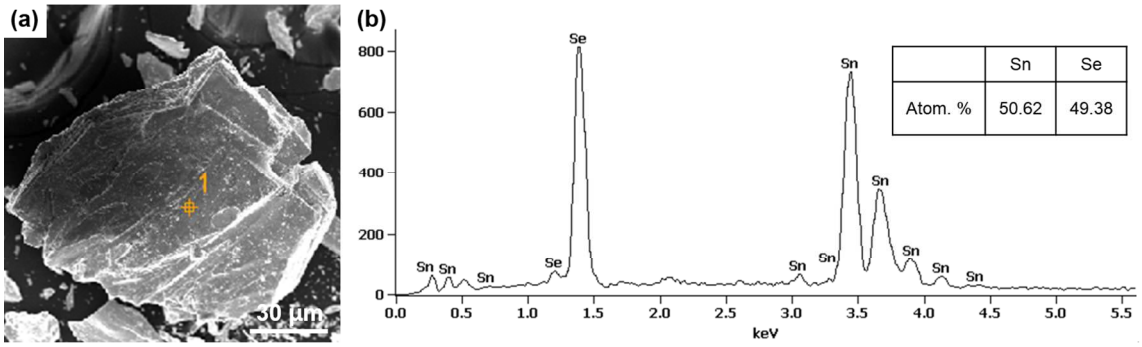

Figure S1. (a) FE-SEM image for the prepared SnSe particle and (b) the corresponding EDS spectrum.

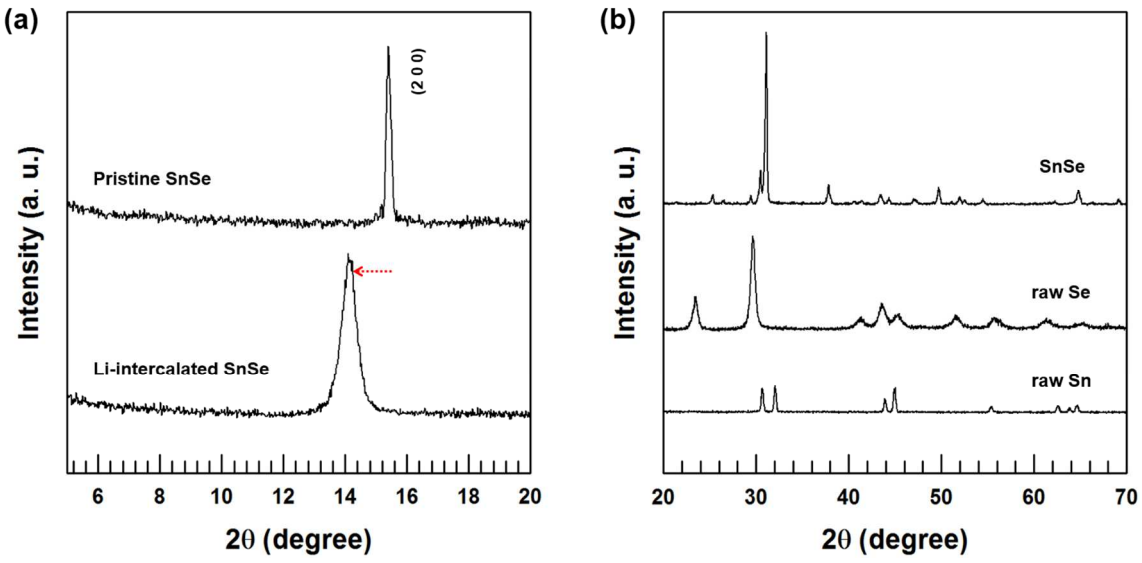

Figure S2. XRD patterns of (a) pristine SnSe powder and Li-intercalated SnSe, and (b) the raw Sn, raw Se, and the synthesized SnSe NSs.

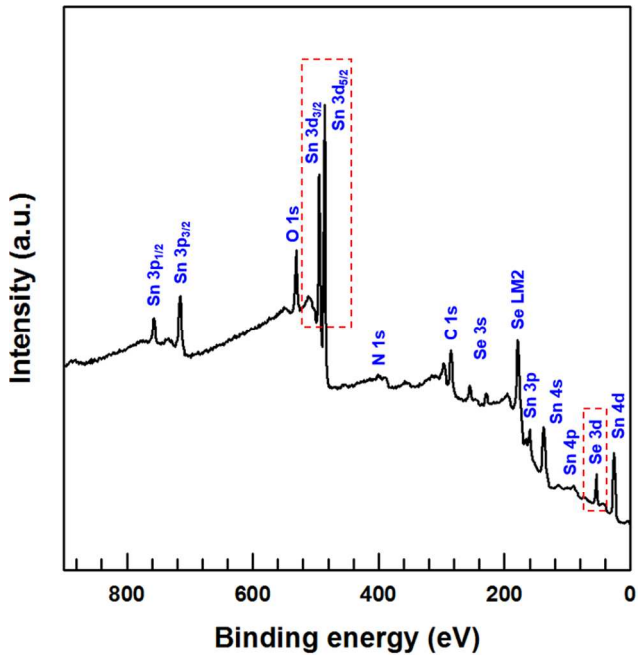

Figure S3. XPS survey spectrum of the as-prepared SnSe NSs. The red dotted prisms outline Sn 3d and Se 3d core levels.

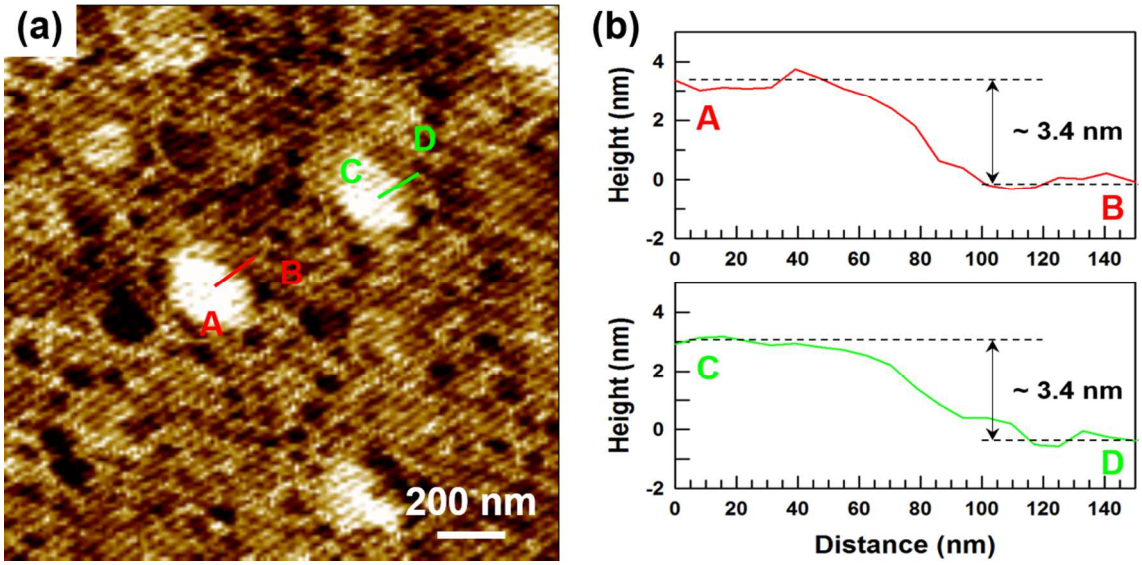

Figure S4. (a) AFM image of the exfoliated SnSe nanosheets and (b) the corresponding height profile.

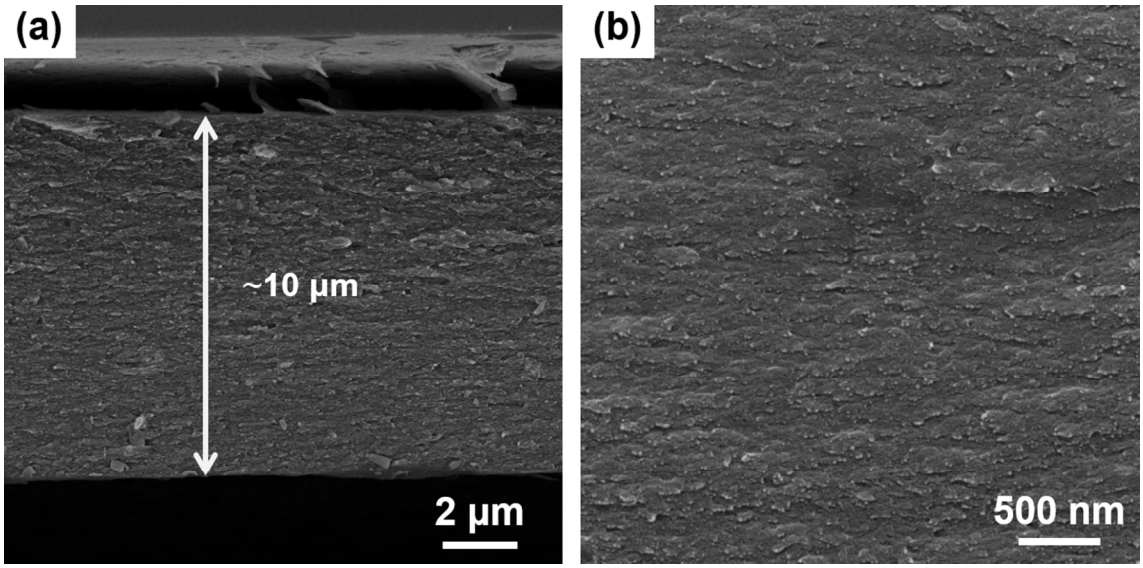

Figure S5. (a) Low- and (b) high-resolution cross-sectional FE-SEM images of drop-cast SnSe/PEDOT:PSS film with SnSe content of 20 wt.%.

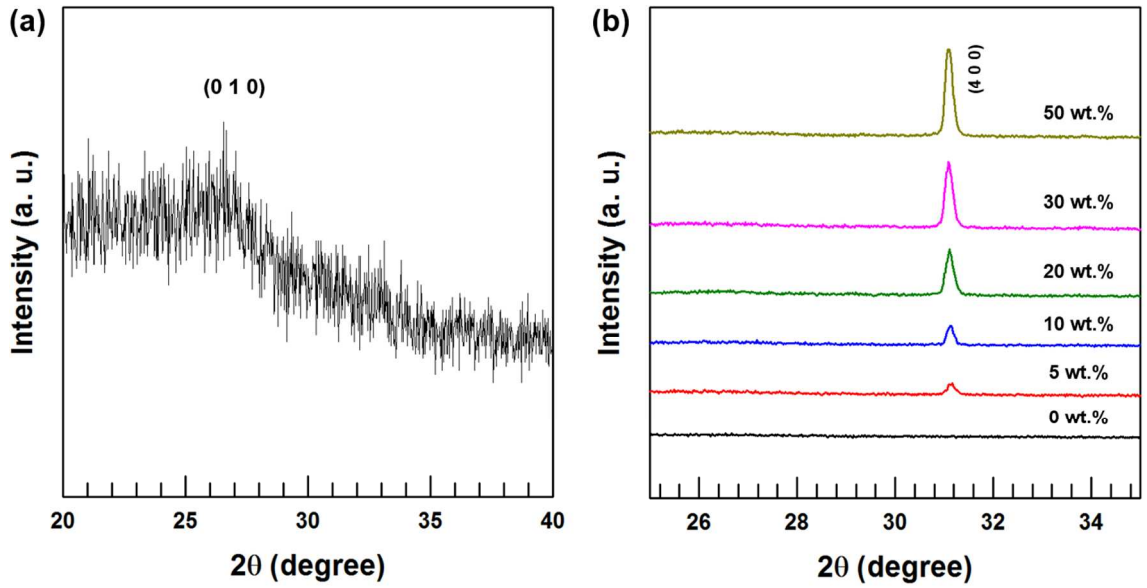

Figure S6. XRD patterns of (a) the pristine PEDOT:PSS and (b) the SnSe/PEDOT:PSS composites with varying SnSe content.

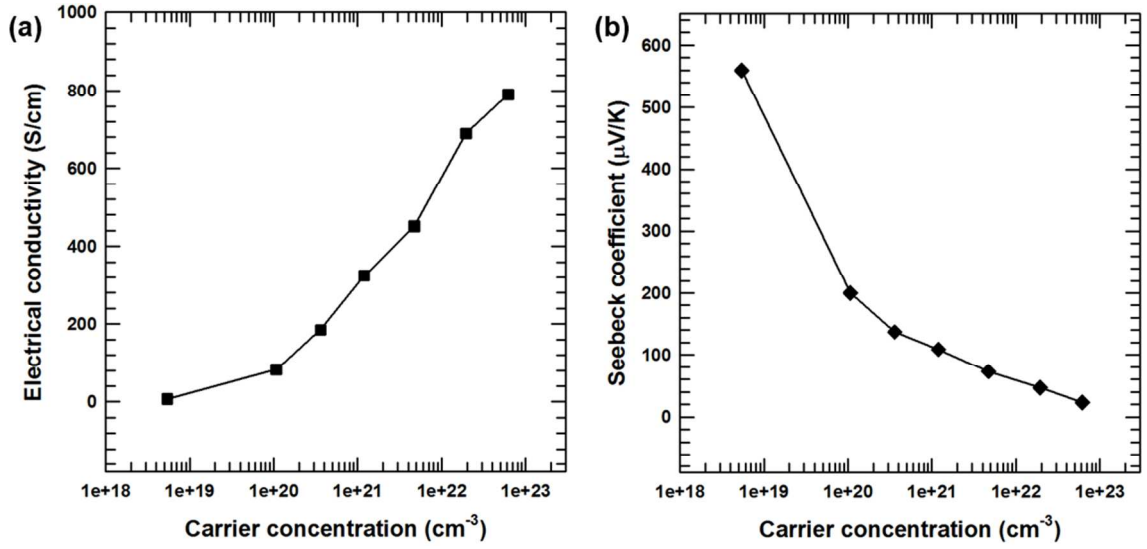

Figure S7. (a) Electrical conductivity and (b) Seebeck coefficient of the prepared SnSe NS/PEDOT:PSS composites as a function of carrier concentration.

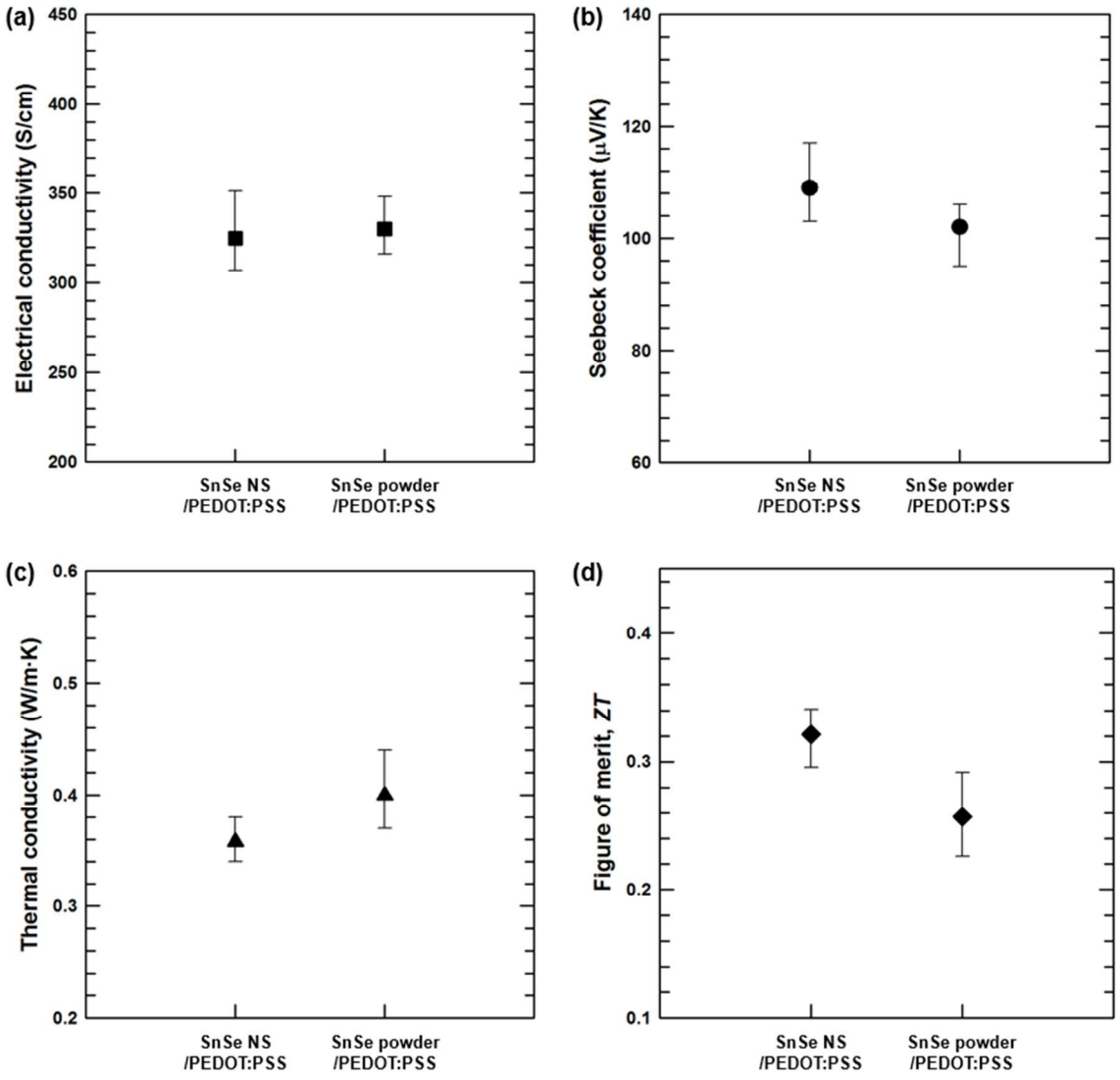

Figure S8. (a) Electrical conductivity, (b) Seebeck coefficient, (c) thermal conductivity, and (d) *ZT* values for the SnSe NS/PEDOT:PSS and SnSe powder/PEDOT:PSS composites with SnSe contents of 20 wt.%.

2. Tables

	α (mm^2/s)	ρ (g/cm^3)	C_P (J/g·K)	κ (W/m·K)
PEDOT:PSS	0.160	1.301	1.210	0.25
SnSe (5)	0.181	1.508	1.032	0.28
SnSe (10)	0.199	1.726	0.908	0.31
SnSe (20)	0.218	2.088	0.786	0.36
SnSe (30)	0.274	2.572	0.570	0.40
SnSe (50)	0.304	3.343	0.432	0.44

Table S1. Thermal properties of SnSe/PEDOT:PSS composites with various SnSe contents. SnSe (x) indicates the x weight percent ratio of SnSe nanosheets (5, 10, 20, 30, and 50 wt.%).

3. Experimental procedures

3.1 Fabrication and thermoelectric characterization of pristine SnSe NS sample

The SnSe nanosheets were pressed into a thin pellet for 10 min at 823 K under 50 MPa. Then, a square sample with 10 mm × 10 mm × 1 mm dimensions was cut from the pellet and used to measure the electrical conductivity and Seebeck coefficient. The thermal conductivity was investigated using a disk-shaped sample from the pellet. Five samples were prepared to demonstrate the reproducibility of our experiment. The characterization equipment was the same as that used for the SnSe/PEDOT:PSS composite samples.