ARTICLE

Electronic Supplementary Information

Boosted carrier mobility and enhanced thermoelectric properties of polycrystalline $Na_{0.03}Sn_{0.97}Se$ by liquid-phase hot deformation

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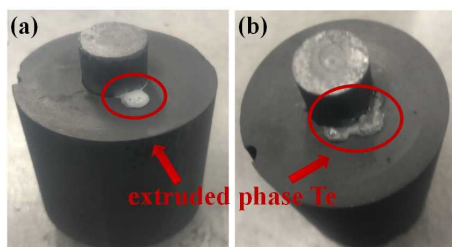E-mail: tanxiaojian@nimte.ac.cn, huanghuajie@hhu.edu.cn, jjun@nimte.ac.cn.

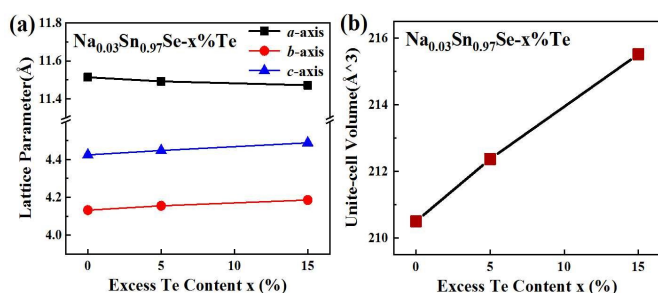**Fig. S1.** Pictures of graphite dies after liquid-phase hot deformation for (a) $Na_{0.03}Sn_{0.97}Se$-5%Te; (b) $Na_{0.03}Sn_{0.97}Se$-15%Te.

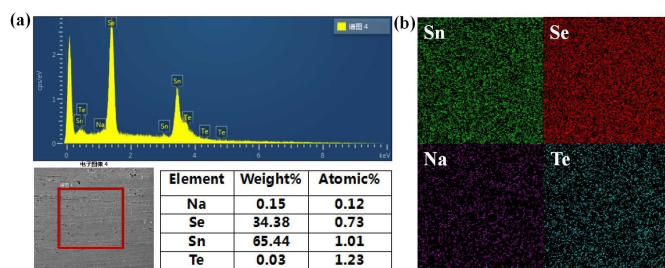**Fig. S2.** Pictures of graphite dies after liquid-phase hot deformation for (a) $Na_{0.03}Sn_{0.97}Se$-5%Te; (b) $Na_{0.03}Sn_{0.97}Se$-15%Te.

Fig. S3. The $Na_{0.03}Sn_{0.97}Se$-5%Te sample of (a) EDS spectrum taken from the red scanning area; (b) the elemental mapping of Sn, Se, Na and Te in the selected area.

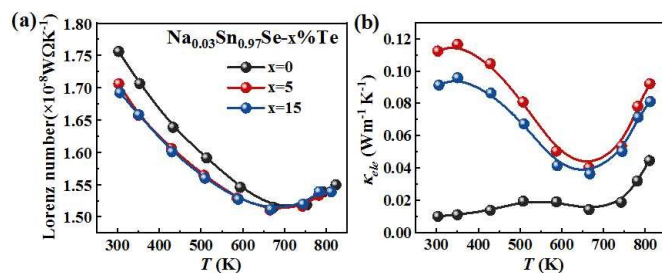**Fig. S4.** $Na_{0.03}Sn_{0.97}Se$-x%Te samples of (a) Lorenz numbers;[1] (b) electronic thermal conductivity as a function of temperature.

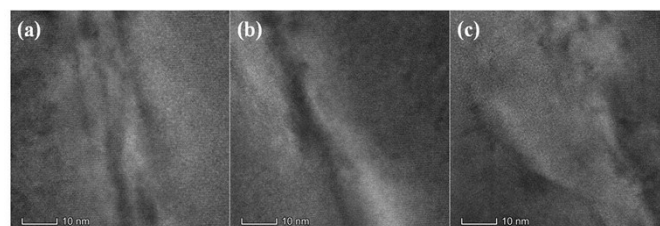**Fig. S5.** HRTEM images of strain-field images from different areas in the $Na_{0.03}Sn_{0.97}Se$-5%Te sample.

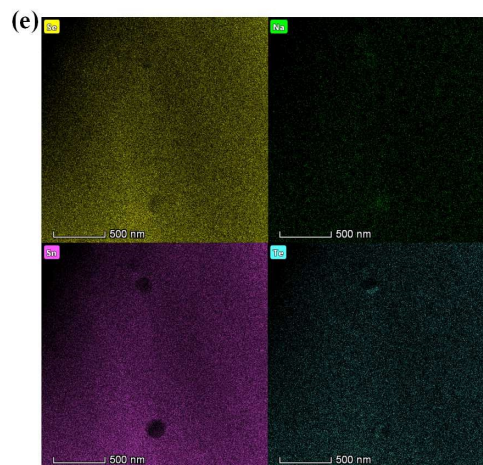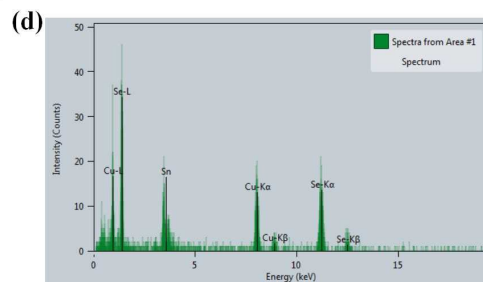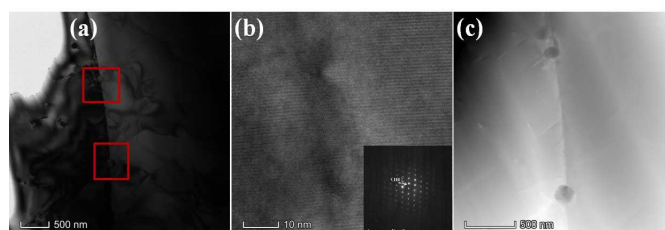**Fig. S6.** Microstructure of the $Na_{0.03}Sn_{0.97}Se$-5%Te sample: (a) Low-magnification TEM image where Se-rich and Sn-poor precipitates in the red boxes; (b) HRTEM image from (a) region with its electron diffraction pattern; (c) HAADF-STEM image taken from the entire area of (b); (d) the corresponding EDS results for the areas with the composition of each given in atomic percentage; (e) EDS elemental maps. The interface regions were selenium precipitates and $SnSe_2$ second phase.[2,3,4]

Table S1. The relative elemental content shown in Fig. S6d.

	Atomic (%)	Atomic error (%)	Mass (%)	Mass error (%)	Fit error (%)
Se	74.93	8.59	66.23	5.54	1.37
Sn	25.07	3.73	33.77	4.27	1.74
Te	0	0.33	0	0.46	0

References

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4. L. Cao, J. Pan, H. Zhang, Y. Zhang, Y. Wu, Y. Lv, X. Yan, J. Zhou, Y. Chen, S. Yao, Y. Pei, M. Lu and Y. Chen, *J. Phys. Chem. C*, 2019, **123**, 27666-27671.