## **Supporting Information**

## Zn-doped Sb<sub>2</sub>Te<sub>3</sub> flexible thin film with decoupled Seebeck coefficient and electrical conductivity via band engineering

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Sample name	Sb (at.%)	Te (at.%)	Zn (at.%)
pristine	40.62	59.38	
Zn 0.21%	37.17	62.62	0.21
Zn 0.58%	38.58	60.84	0.58
Zn 0.73%	37.33	61.94	0.73
Zn 1.18%	36.74	62.08	1.18

Table S1 Atomic% of the Zn-doped Sb<sub>2</sub>Te<sub>3</sub> samples.



Fig. S1 SEM image of the cross-sectional morphology of the synthesized Zn-doped Sb<sub>2</sub>Te<sub>3</sub> samples.

## The fabrication of flexible thermoelectric generator

The fabricated f-TEG was built up by the Zn 0.58% sample as p-leg, connecting with Ag electrodes. The structure of the fabricated f-TEG was presented in Fig. S2(a). This fabricated device was then characterized by a home-made equipment as Fig. S2(b) shows. The device was connected to a multimeter, loaded on the specimen holder.

During the measurement, one side of the holder was heated to create a temperature difference of  $\Delta T$  of 10 K, 20 K, 30K, and 40K. The output voltage U and output power P recorded by the multimeter was observed at each temperature difference.



Fig. S2 (a) The structure of f-TEG; (b) The schematic photo of the home-made measurement furniture.