Thermoelectric performance optimization of n-type PbTe by In and Cu_2Te co-doping and anomalous temperature-dependent transports

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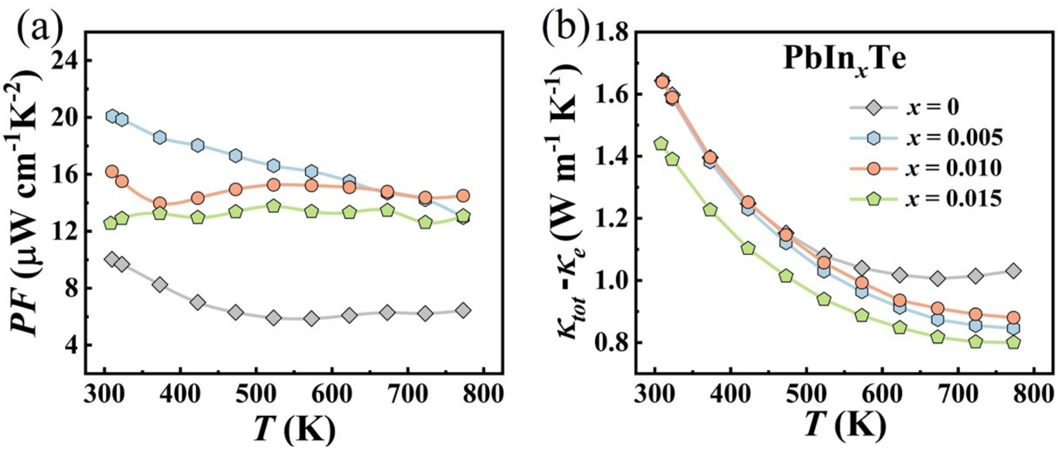

Figure S1. Temperature dependence of (a) *PF*, (b) lattice thermal conductivity κ_l for *n*-type $PbIn_xTe$ (x = 0, 0.005, 0.01, 0.015).

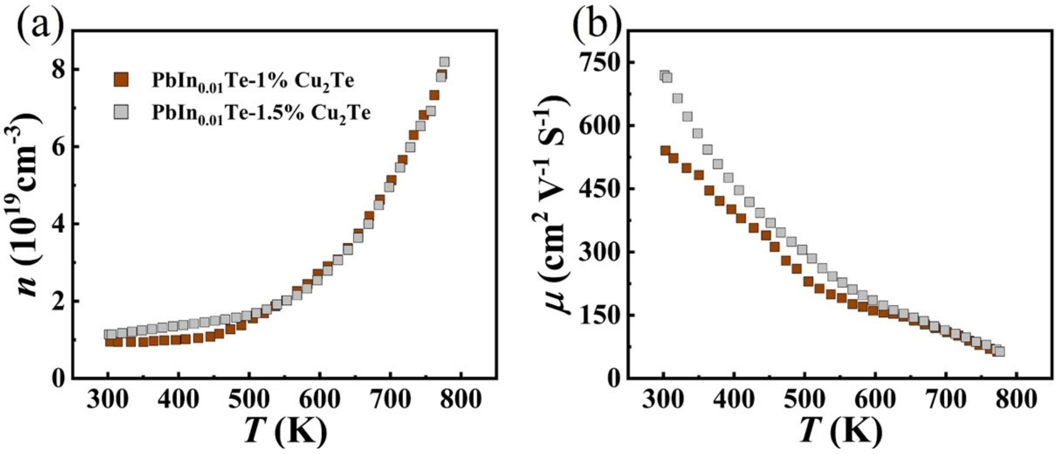

Figure S2. Temperature dependence of (a) carrier concentration, (b) carrier mobility for $PbIn_{0.01}Te$-y%Cu_2Te (y = 1, and 1.5)

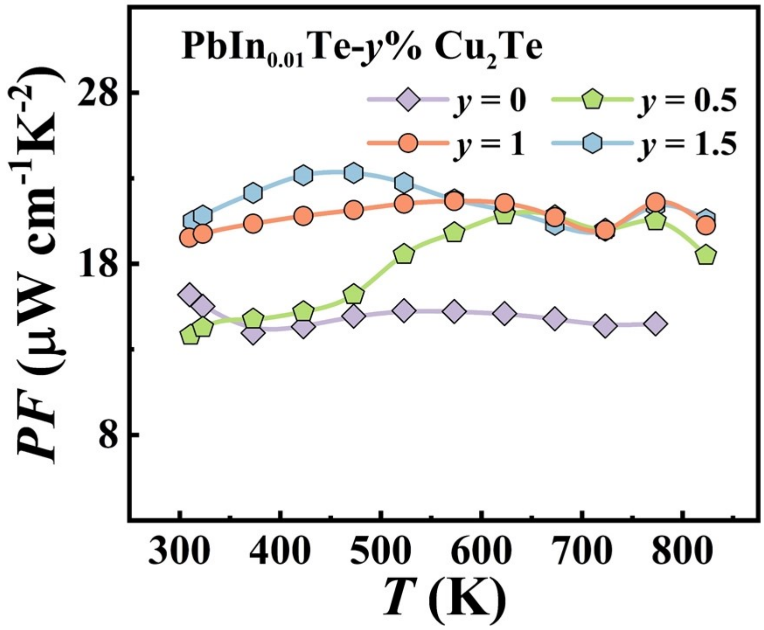

Figure S3. Temperature-dependent *PF* for *n*-type $PbIn_{0.01}Te$-y%Cu_2Te (y = 0, 0.5, 1, 1.5)

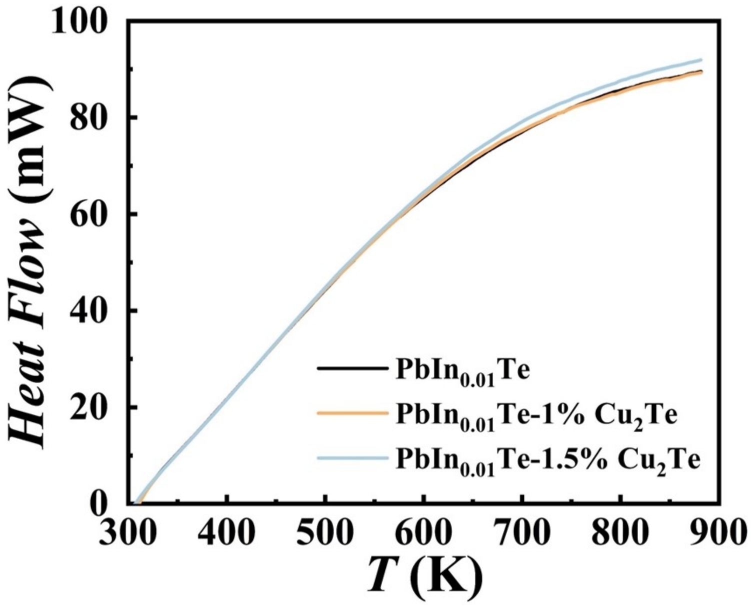

Figure S4. DSC testing of $PbIn_{0.01}Te$, $PbIn_{0.01}Te$ -1% Cu_2Te, and $PbIn_{0.01}Te$-1.5% Cu_2Te

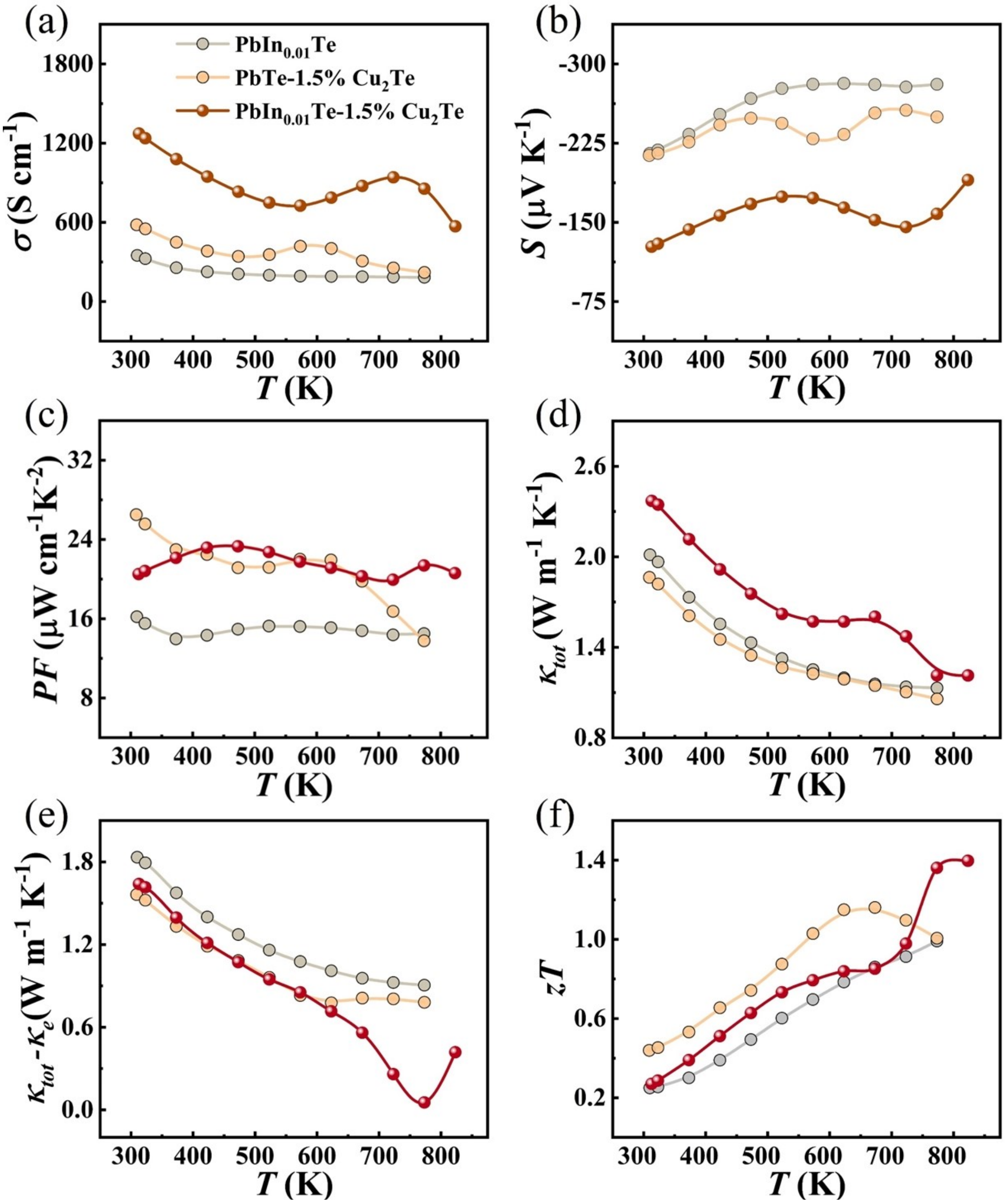

Figure S5. Temperature dependence of (a) electrical conductivity, (b) Seebeck coefficient, (c) *PF*, (d) total thermal conductivity κ_{tot}, (e) lattice thermal conductivity κ_l, and (f) figure of merit *zT* for *n*-type $PbIn_{0.01}Te$, PbTe-1.5%Cu_2Te and $PbIn_{0.01}Te$-1.5%Cu_2Te.

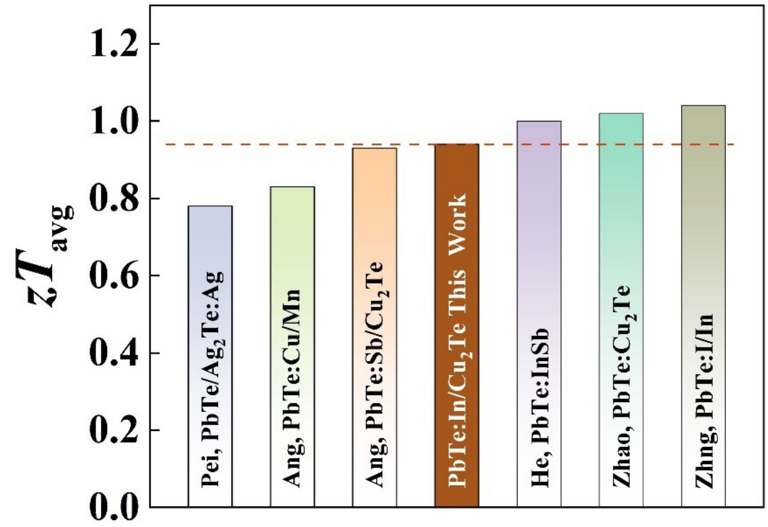

Figure S6. Compare of the corresponding zT_{avg} in this work with those of previous samples.[1-6]

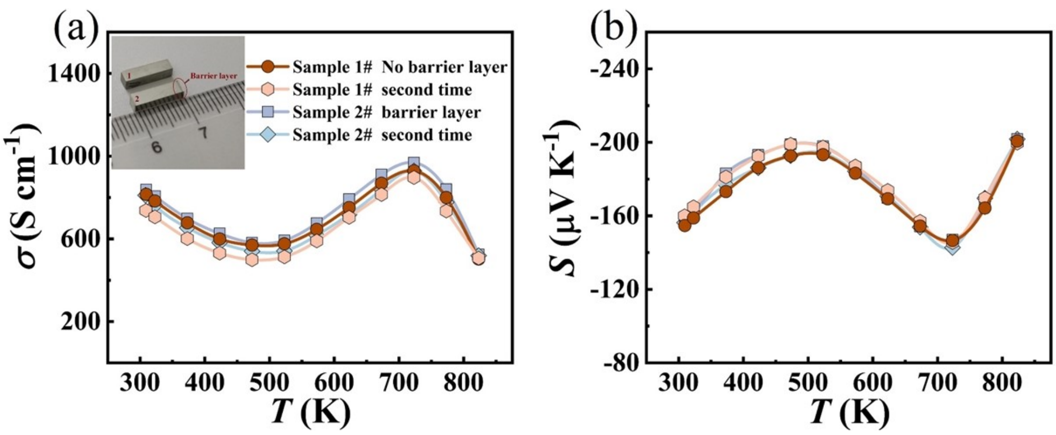

Figure S7. Temperature dependent for repeated measurements on (a) electrical conductivity, and (b) Seebeck coefficient for *n*-type $PbIn_{0.01}Te$-1%Cu_2Te.

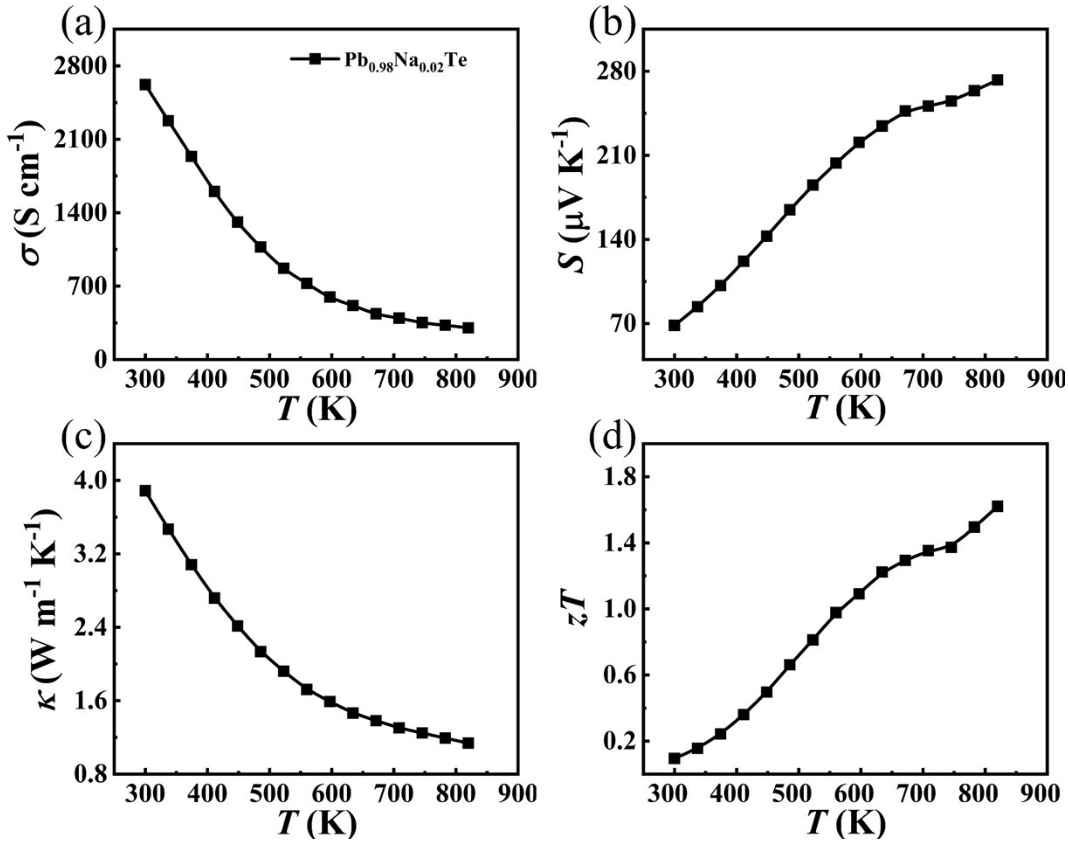

Figure S8. Temperature dependence of (a) electrical conductivity, (b) Seebeck coefficient, (c) total thermal conductivity and (d) figure of merit *zT* for *p*-type $Pb_{0.98}Na_{0.02}Te$.

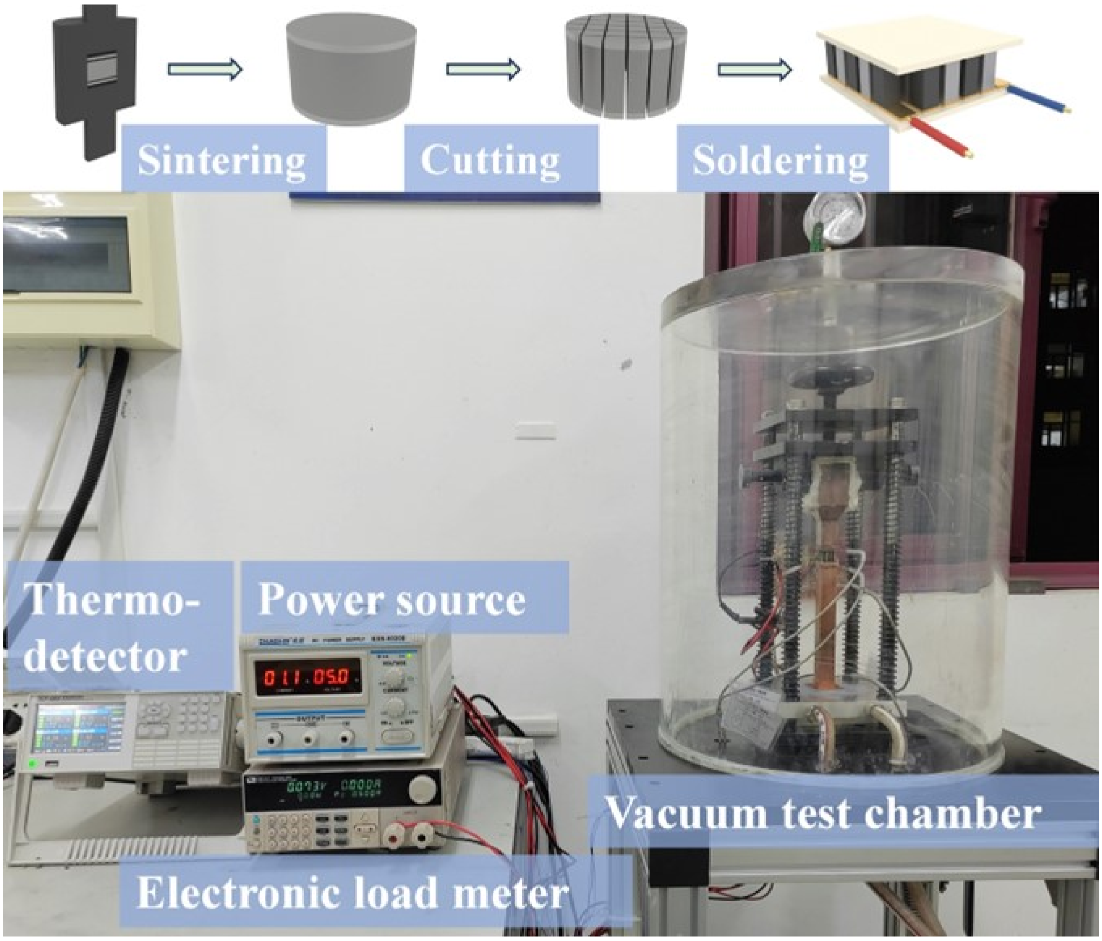

Figure S9. The flowchart of thermoelectric device preparation and home-built testing system for the thermoelectric device conversion efficiency η measurement.

Table S1 The temperature difference between the cold and hot ends of the device

T_h (K)	T_c (K)	ΔT (K)
385.6	285.26	100.34
490.34	291.09	199.25
601.18	301.55	299.63
698.56	299.5	399.06
751.94	301.64	450.30
804.15	303.55	500.60
825.81	305.78	520.03

Reference

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