

## Supporting information:

# High thermoelectric figure of merit $ZT > 1$ in Ba heavily doped BiCuSeO oxyselenides

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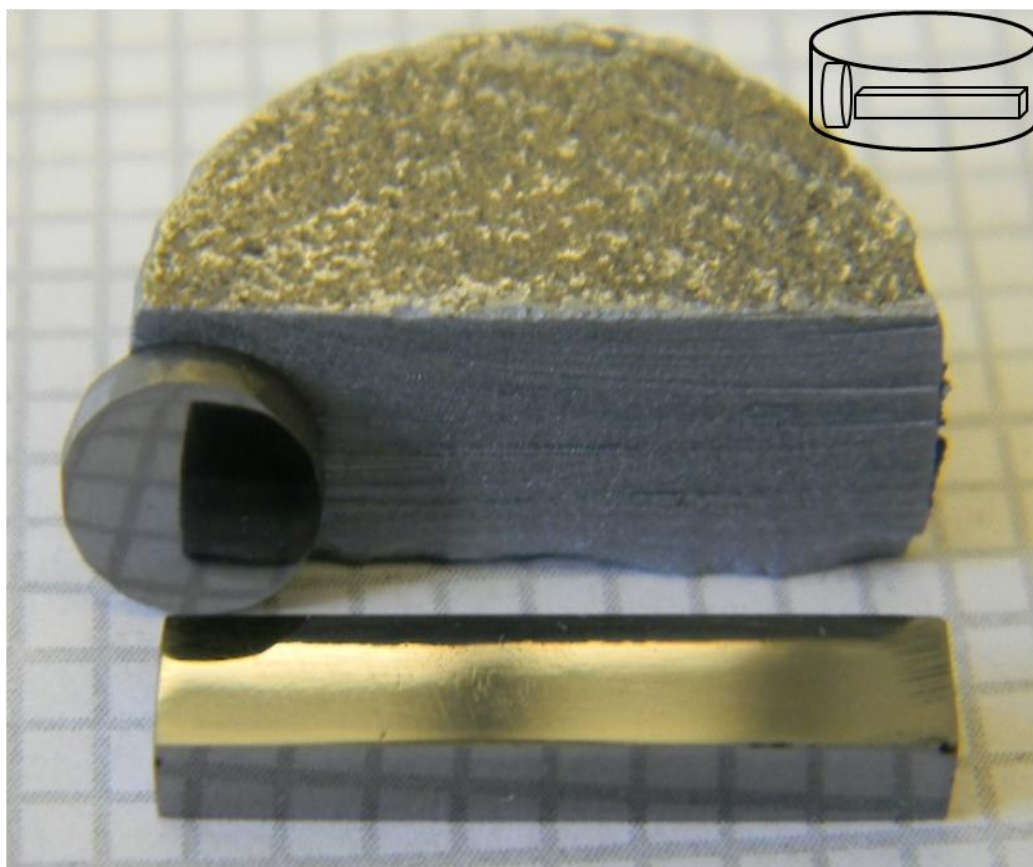
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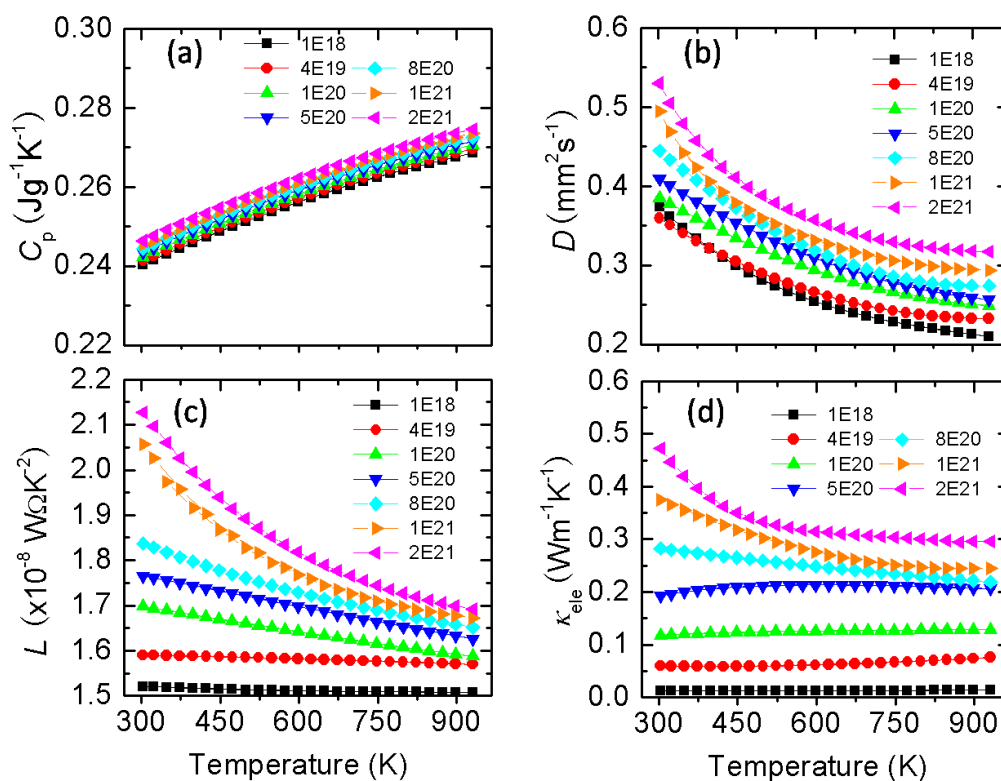
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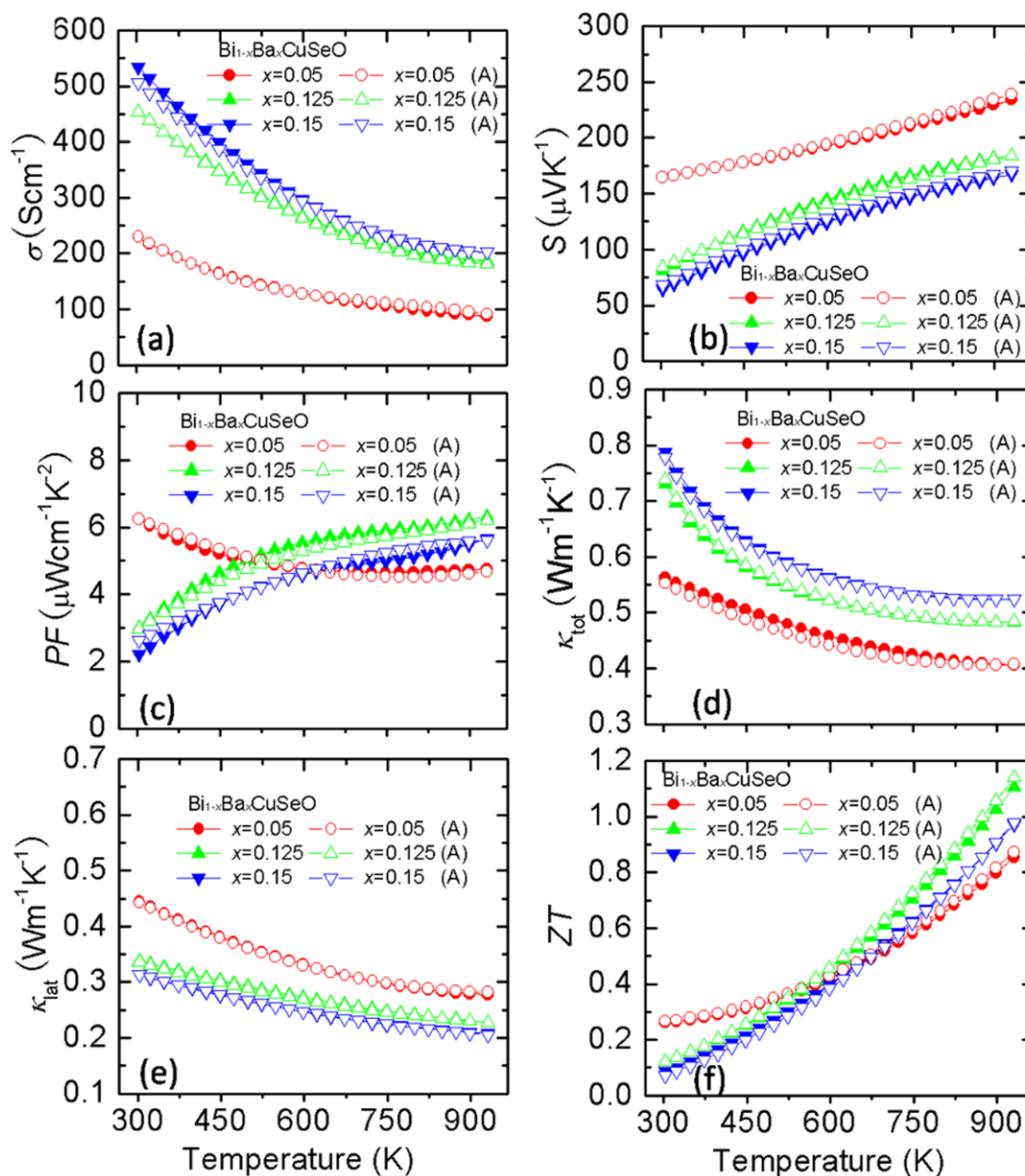
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**Figure S1:** Typical samples used in this study, bar and coin are used for electrical and thermal transport measurements, respectively. Samples are cut as indicated by schematic inset.



**Figure S2:** Thermoelectric properties as a function of temperature for Bi<sub>1-x</sub>Ba<sub>x</sub>CuSeO samples: (a) Heat capacity; (b) Thermal diffusivity; (c) Lorenz number; (d) Electronic thermal conductivity.



**Figure S3** Thermoelectric properties of  $\text{Bi}_{1-x}\text{Ba}_x\text{CuSeO}$  as a function of temperature: (a) Electrical conductivity; (b) Seebeck coefficient; (c) Power factor; (d) Total thermal conductivity; (e) Lattice thermal conductivity; (f) Figure of merit  $ZT$ . “A” presents the samples annealed at 923K for 7 days.