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Electronic Supplementary Information (ESI)

Promising Thermoelectric Performance in *n*-type $AgBiSe_2$: Effect of Aliovalent Anion Doping†

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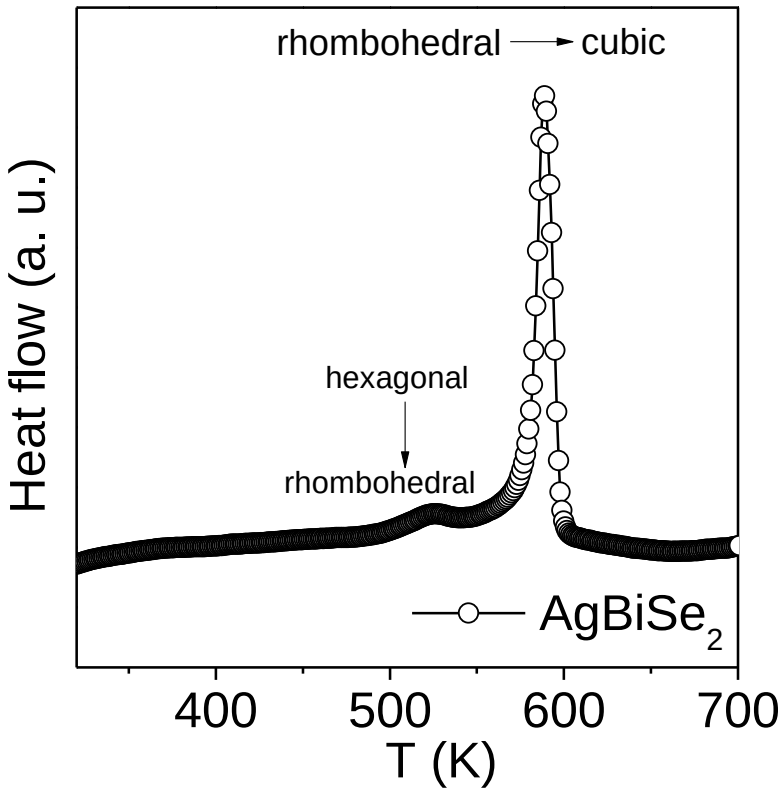

Fig.S1 DSC data for $AgBiSe_2$.

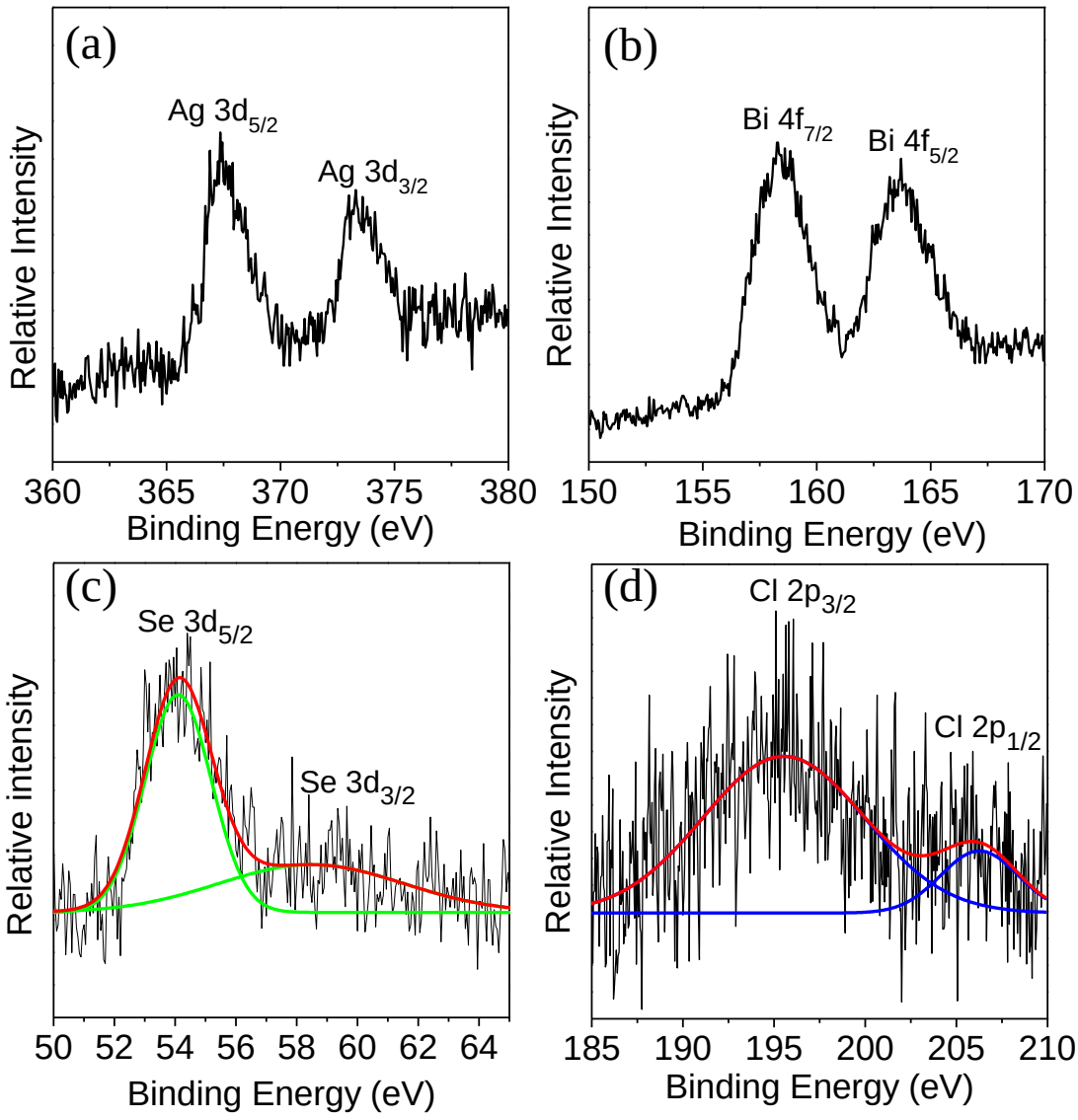

Fig. S2 XPS spectra of as prepared $AgBiSe_{1.98}Cl_{0.02}$ (a) Ag 3d, (b) Bi 4f, (c) Se 3d and (d) Cl 2p spectra.

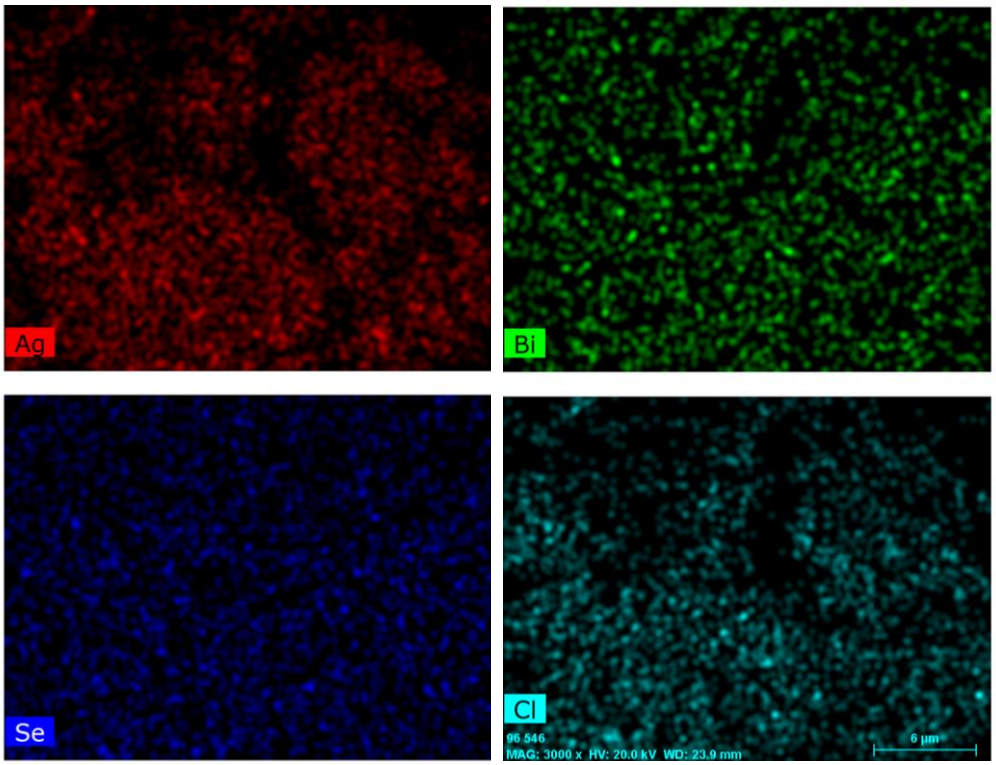

Fig. S3 EDAX elemental mapping of $AgBiSe_{1.98}Cl_{0.02}$ sample.

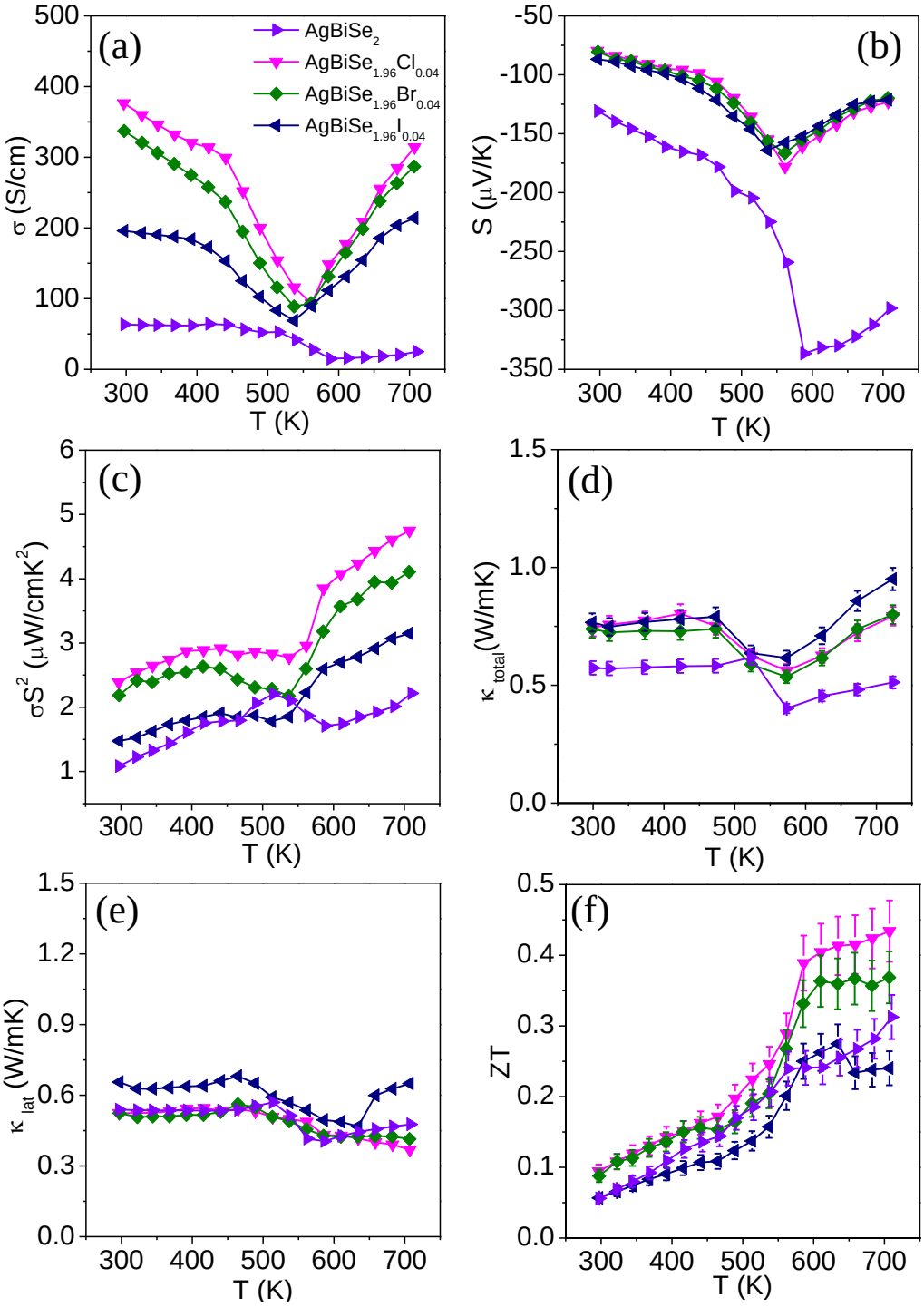

Fig. S4 Temperature-dependent (a) electrical conductivity (σ), (b) Seebeck coefficient (*S*), (c) power factor (σS^2), (d) total thermal conductivity (κ_{total}) with 5% error bar, (e) lattice thermal conductivity (κ_{lat}), and (f) thermoelectric figure of merit (*ZT*) of $AgBiSe_2$ and $AgBiSe_{1.96}X_{0.04}$ (X = Cl, Br and I) samples with 10% error bar.

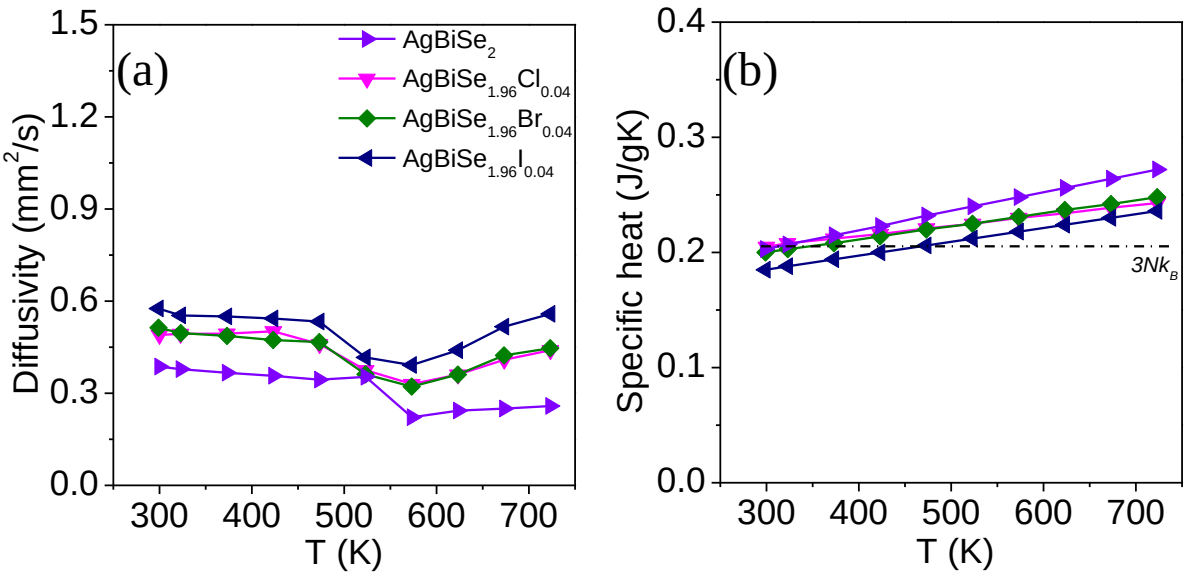

Fig. S5 Temperature dependent (a) thermal diffusivity (D) and (b) specific heat (C_p) of $AgBiSe_2$ and $AgBiSe_{1.96}X_{0.04}$ (X = Cl, Br and I) samples.

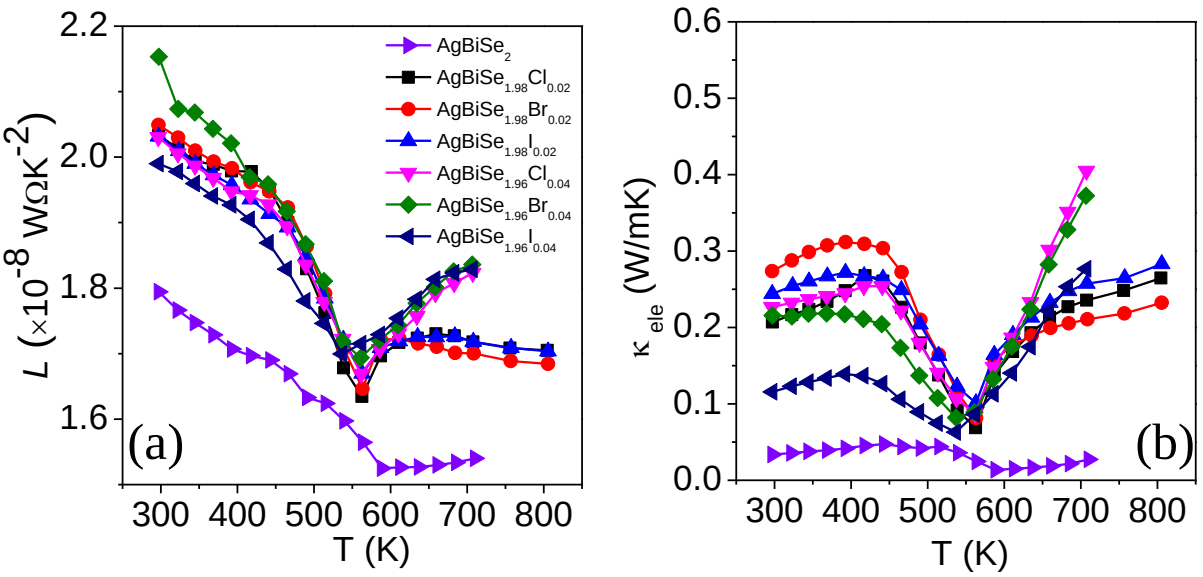

Fig. S6 Temperature dependent (a) calculated Lorenz numbers and (b) electronic thermal conductivity (κ_{lat}) for pristine and halogen doped $AgBiSe_2$ samples.

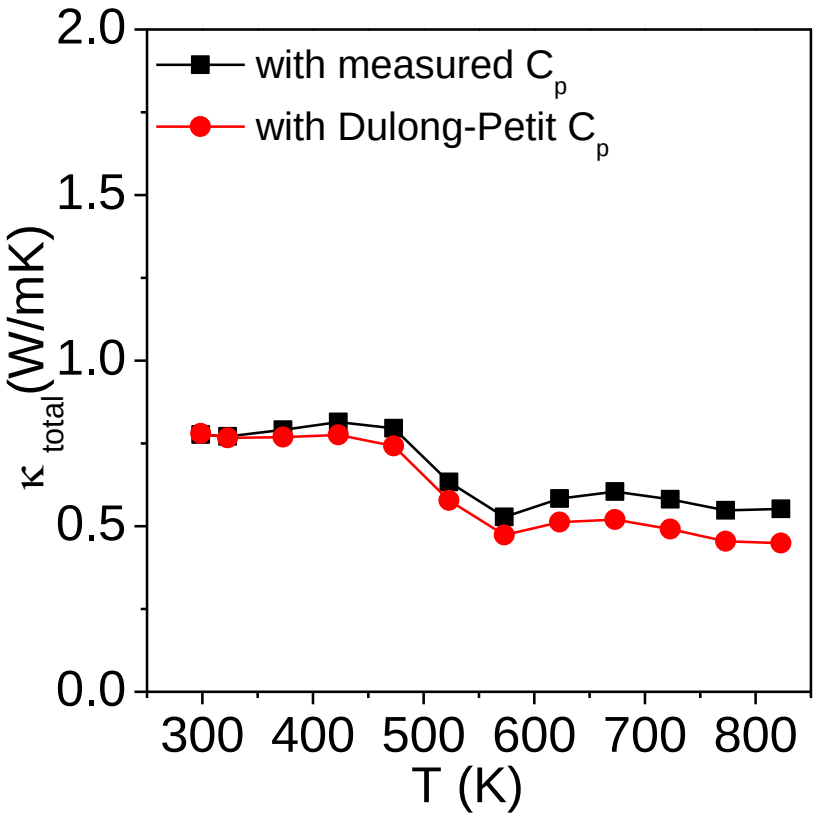

Fig. S7 Temperature-dependent total thermal conductivity (κ_{total}) of $AgBiSe_{1.98}Cl_{0.02}$ estimated using measured and Dulong- Petit C_p value.

Table S1 Measured room temperature κ_{total} and κ_{lat} value of present samples in comparison with the previously reported samples of $AgBiSe_2$

Sample	κ_{total} (W/mK) at 300 K	κ_{lat} (W/mK) at 300 K
$AgBiSe_2$ (Present work)	~0.58	~0.54
$AgBiSe_2$ (*J. Am. Chem. Soc.,* 2013, **135,** 4914)	~0.63	~0.58
$AgBiSe_2$ (*Energy Environ. Sci.* 2013, **6,** 570)	~0.6	–
$AgBiSe_{1.98}Cl_{0.02}$ (Present work)	~0.77	~0.57
$Ag_{0.98}Nb_{0.02}BiSe_2$ (*J. Am. Chem. Soc.,* 2013, **135,** 4914)	~0.70	~0.58