

## Supplementary Information

To estimate the actual stoichiometries, one must know the individual masses ( $m_i$ ) of each raw element prior to the process,  $m_{Mg}$ ,  $m_{Ag}$  and  $m_{Sb}$ , for Mg, Ag and Sb elements, respectively, their respective atomic weight,  $M_i$ , from which the number of moles  $n_i$  may be calculated ( $n_i=m_i/M_i$ ), the number of atoms in the nominal composition,  $N$ , and the final (total) mass of the sample after the melting,  $m_f$ .

Firstly, an account for the losses must be calculated using the following expression,  $\sum m_i - m_{TF}$ . As mentioned in section 3.1 of the article, these are assumed to be due to Mg evaporation/sublimation, hence the initial mass of Mg, is now  $m_{Mg}^*$ , which is the initial mass ( $m_{Mg}$ ) subtracted by the calculated losses. Finally, to estimate the stoichiometric value for each element, in a chosen composition, the following expression is used:

$$\text{Stoichiometric value} = N * \frac{n_i}{\sum n_i}$$

The following tables contain the numerical data that support the plots presented in section 3.2 *Thermoelectric Properties* of the main manuscript. The data is organized by property and is provided to ensure full transparency and reproducibility of the reported thermoelectric performance.

Table 1 - Seebeck coefficient and Electrical Resistivity, in function of the temperature, for sample  $MgAg_{0.955}Sb_{0.985}$ .

Temperature (K)	Seebeck Coefficient ( $\mu V/K$ )	Electrical Resistivity ( $\mu\Omega.m$ )
316.8131	135.9199	15.2247
318.9589	136.7908	15.3557
323.5539	136.5239	15.5397
335.4778	139.741	16.3835
340.151	140.7034	16.4769
346.1557	140.2347	16.5085
386.488	152.0712	18.8484
394.3893	154.2698	18.9237
401.9735	155.4326	18.891
437.2306	161.728	20.242
444.7216	163.1411	20.3036
452.3962	164.3574	20.3194
486.4375	160.9117	20.0036
490.508	162.8278	19.7433
497.7971	164.2464	19.5467
521.7978	157.4797	18.624
527.5313	158.1573	18.4026
532.7768	158.6346	18.3022

Table 2 - Seebeck coefficient and Electrical Resistivity, in function of the temperature, for sample  $MgAg_{0.965}Sb_{0.985}$ .

Temperature (K)	Seebeck Coefficient ( $\mu V/K$ )	Electrical Resistivity ( $\mu\Omega.m$ )
317.3788	161.2089	41.0395
322.5224	162.1353	41.7532
324.3075	161.23	41.8548

335.0974	165.3348	42.3886
339.8715	166.0145	42.5426
346.3124	165.6742	42.6898
384.9913	178.4071	46.5687
393.7075	180.3684	45.7896
397.775	179.9714	45.704
432.5175	185.3198	45.4961
442.8253	188.0555	44.4041
447.2702	187.7183	44.4119
484.2315	179.2867	39.8131
490.567	179.0172	39.0667
500.6991	180.7647	38.6474
524.7021	170.0156	35.5828
529.0847	172.3052	35.1356
532.4421	173.9629	35.1725

Table 3 - Seebeck coefficient and Electrical Resistivity, in function of the temperature, for sample MgAg<sub>0.97</sub>Sb<sub>0.995</sub>.

Temperature (K)	Seebeck Coefficient ( $\mu\text{V/K}$ )	Electrical Resistivity ( $\mu\Omega\cdot\text{m}$ )
314.7804	186.9002	49.5218
322.7474	188.7139	50.3866
327.692	191.0401	50.5168
363.8071	202.3466	56.0595
375.1434	207.4094	55.2373
380.6254	208.9063	54.9131
414.768	214.9277	55.6583
422.7926	224.0586	54.951
429.8273	222.6489	54.9812
461.2759	213.7959	50.3652
470.8576	222.8381	48.8147
475.4901	220.2442	48.947
511.6605	197.8134	43.1622
519.267	208.1363	42.4952
519.458	209.4384	42.6737

Following these data, it is presented the numerical values of the thermal diffusivities of all the three samples, in function of the temperature, which knowing their densities and specific heat capacities (at constant pressure), one may calculate the thermal conductivities. The densities of the samples MgAg<sub>0.955</sub>Sb<sub>0.985</sub>, MgAg<sub>0.965</sub>Sb<sub>0.985</sub> and MgAg<sub>0.97</sub>Sb<sub>0.995</sub> are 5.85 g.cm<sup>-3</sup>, 5.92 g.cm<sup>-3</sup> and 5.92 g.cm<sup>-3</sup>, respectively.

Table 4 - Thermal diffusivities in function of temperature, of all the samples.

MgAg <sub>0.955</sub> Sb <sub>0.985</sub>		MgAg <sub>0.965</sub> Sb <sub>0.985</sub>		MgAg <sub>0.97</sub> Sb <sub>0.995</sub>	
Temperature (K)	Thermal Diffusivity (cm <sup>2</sup> .s)	Temperature (K)	Thermal Diffusivity (cm <sup>2</sup> .s)	Temperature (K)	Thermal Diffusivity (cm <sup>2</sup> .s)
299	0.00952	297	0.00749	297	0.00651
299	0.00932	298	0.00722	298	0.00767
299	0.00948	299	0.00706	299	0.00762

319	0.00825	320	0.00787	319	0.00805
324	0.00908	324	0.00738	324	0.00744
326	0.00922	326	0.00702	326	0.00716
377	0.00854	377	0.00656	377	0.00685
378	0.0085	378	0.0066	378	0.00688
378	0.00794	378	0.00694	379	0.00669
424	0.00658	424	0.00689	428	0.00645
428	0.00753	428	0.00666	428	0.00641
428	0.00806	428	0.00664	429	0.00643
474	0.00682	474	0.007	474	0.00671
478	0.00776	478	0.00715	478	0.00668
478	0.00775	478	0.00699	479	0.00669
525	0.00738	528	0.00722	528	0.00718
528	0.00888	528	0.00729	529	0.00699
529	0.00858	528	0.00733	529	0.00722