Electronic Supplementary Information

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Figure SI1 Lattice parameters calculated from the data in Figure 1(b)

Figure SI2 MgSi-Mg2Sn pseudo-binary phase diagram, reported by E. N. Nikitin et al.1

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Figure S13 The peritectic reaction (a) at 900 K ($U_1$); (b) at 837 K ($U_2$). Reprinted from A. Kozlov et al.²

Figure S14 (a) The microstructure, (b) the nanoparticle size distribution of the sintered ingot after annealing at 773 K for 15 days (with the 2nd solid state reaction step (SSR) quenched at 1130 K).

Figure S15 Lorenz number of samples with different heat treatments.
Basic equations for calculating the Lorenz number and the reduced Fermi levels are listed below:\(^3-5:\)

\[
S = \pm \frac{k_B}{e} \left[ \eta_F - \frac{(r+5/2)F_{r+3/2}(\eta_F)}{(r+3/2)F_{r+5/2}(\eta_F)} \right] 
\]

(1)

\[
\eta_F = E_F/(k_B T) 
\]

(2)

\[
F_s(\eta_F) = \int_0^\infty \frac{x^4 \, dx}{1 + \exp(x - \eta_F)} 
\]

(3)

\[
L = \left( \frac{k_B}{e} \right)^2 \left[ \frac{3F_s(\eta_F)F_r(\eta_F) - 4F_r^2(\eta_F)}{F_0^2(\eta_F)} \right] 
\]

(4)

Here, \(\eta_F\), \(F_s(\eta_F)\), \(r\), and \(k_B\) are the reduced Fermi level, the Fermi integral, the scattering factor, and the Boltzmann constant, respectively.

References