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Synthesis and characterization of high temperature thermoelectric nanocomposites based on $Si_{0.855}Ge_{0.12}P_{0.025}$ and $Mg_{1.95}SiBi_{0.05}$ NIKHIL SATYALA, DARYOOSH VASHAEE, Oklahoma State University — In thermoelectric (TE) compounds, the techniques to simultaneously attain a high Seebeck coefficient and a low thermal conductivity could be concurrently realized via nanocomposite materials systems formed by intermixing of nanostructured thermoelectric materials. These nanocomposite structures offer advantages such as low thermal conductivity (κ) via grain boundary scattering and a high Seebeck coefficient (S) by virtue of carrier filtering. We present the synthesis and characterization of a high performance nanocomposite thermoelectric based on intermixing of highly conductive n-type nanostructured $Si_{0.855}Ge_{0.12}P_{0.025}$ and $Mg_{1.95}SiBi_{0.05}$ in the wt(%) ratio of 95:05. TE samples were prepared by hot-pressing the powders at 1473 K under various conditions of pressure and holding time. The samples were characterized via microstructure analysis and measurement of thermoelectric properties over the temperature range of 300 K-250 K. Power factors of greater than 4×10^{-3} W/mK^2 were consistently obtained by the optimization of the sintering conditions. Pertaining to the enhancement in power factor, the nanocomposite samples showed higher ZT than the nanostructured single component TE compound of $Si_{0.855}Ge_{0.12}P_{0.025}$.

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