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Enhanced Thermoelectric Property of Single Phase MnSi1.75 through Non-equilibrium Synthesis Method XIAOYA SHI, Condensed Matter Physics & Materials Science Department, Brookhaven National Laboratory, Upton, New York, 11973, IVO DIMITROV, Brookhaven National Lab, SU JUNG HAN, QIANG LI, Condensed Matter Physics & Materials Science Department, Brookhaven National Laboratory, Upton, New York, 11973, BROOKHAVEN NATIONAL LAB TEAM — We report thermoelectric properties of the single phase MnSi1.75 using a one-step non-equilibrium synthesis method. Extremely high quenching speed of melt spinning prevents the formation of the second phase MnSi, which is usually found in this class of materials made by using the conventional solid state reaction methods. We found that the phase-pure MnSi1.75 samples exhibit much higher electrical conductivity, as compared with the conventionally prepared samples. Thermal conductivity is measured and analyzed by introducing the Debye model. It is found that the reduced grain sizes after melt spinning play an important role on decreasing lattice thermal conductivity. The combination of enhanced electrical conductivity and reduced lattice thermal conductivity results in large increase of the thermoelectric figure of merit zT at room temperature.

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