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Figure of Merit ZT achieved in Nanostructured Half Heusler alloys DI WU, Department of Physcis, University of Virignia, SONG ZHU, WENJIE XIE, Department of Physics and Astronomy, Clemson University, JOSEPH POON, Department of Physcis, University of Virignia, TERRY TRITT, Department of Physics and Astronomy, Clemson University, PETER THOMAS, RAMA VENKATASUBRAMANIAN, Center for Solid State Energetics, RTI International, Research Triangle Park, NC — Half-Heusler (HH) phases have recently gained attention due to their high temperature thermoelectric performance, especially in the environment of growing concern over the dependence on the limited fossil fuels for energy production. These materials are investigated from the perspective of thermal and electronic transport properties for enhancing the dimensionless figure of merit (ZT) at 800-1000 K. Refinement on grain sizes and embedment of nanoparticles in HH alloy hosts were employed to produce fine-grained as well as nanocomposites and monolithic nanostructured materials. Present experiments indicated that HH alloys and their nanoparticles-embedded phases can attain ZT$\sim$1, or slightly higher near 900-1000K. The observed ZT enhancements could be attributed to multiple origins. HH alloy hosts of nano-sized grains with/without embedment of different nanoparticles are also being investigated to further improve their thermoelectric performance.

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