

Abstract Submitted
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Thermoelectric properties of some p-type half-Heusler alloys¹ V. PONNAMBALAM, T.M. TRITT, Dept. of Physics and Astronomy, Clemson University, MENG ZHU, S.J. POON, Dept. of Physics, University of Virginia — We have synthesized a series of multi-component p-type half Heusler alloys by simultaneously substituting suitable elements at different crystallographic sites. Both electrical and thermal transport properties of these alloys are studied up to 1000K to evaluate their thermoelectric potential. At 300K, typical thermopower(S) and resistivity(ρ) values are around $\sim 80 \mu\text{V}/\text{K}$ and $\sim 1\text{m}\Omega\text{-cm}$ respectively. Due to heavy substitution/doping, (ρ)-T behavior is similar to that of a degenerate semiconductor and the resistivity increases with increasing T with ρ values in the range of few $\text{m}\Omega\text{-cm}$ at 1000K. Thermopower also increases with increasing T and reaches a maximum of hundreds of $\mu\text{V}/\text{K}$ at 1000K. Room temperature thermal conductivity (κ) values are about $\sim 4.5 \text{ W}/\text{m-K}$ and these κ values are low compared to those of ternary half-Heusler alloys. In well- optimized compositions, these values could improve even further.

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