

Abstract Submitted
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The Order Disorder phase transition in Zn_4Sb_3 S. BHATTACHARYA, R.P. HERMANN, V. KEPPENS, Department of Materials Science and Engineering, The University of Tennessee, Knoxville, TN, J. SNYDER, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, T.M. TRITT, Department of Physics, Clemson University, Clemson, SC — Zn_4Sb_3 has been widely investigated not only for its promise as a thermoelectric material, [1] but also for the unique transport properties it exhibits. Zn_4Sb_3 undergoes two distinct phase transitions (i) from α to β -phase at $T_C \approx 250$ K and (ii) from β to γ -phase at $T_C \approx 765$ K. [2] We have performed electronic and thermal transport measurements exploring the structural phase transition at $T \approx 250$ K from the ordered α , to the disordered β phase. The well-known α to β phase transition manifests itself in anomalies in the resistivity, thermopower and specific heat measurements at $T \approx 250$ K as well as a change in slope in the thermal conductivity, leading to a reduction in thermal conductivity as Zn_4Sb_3 changes phase from the ordered to the disordered state. Moreover, measurements of the elastic properties using resonant ultrasound spectroscopy (RUS) reveal dramatic changes at the order-disorder transition.

[1] Snyder *et al.*, Nature Materials **3**, 458-463, (2004)

[2] Vuillard, G. *et al.*, C.R. Seances Acad. Sci., Ser. C: Sci. Chim. **263**, 1018-1021, (1966)

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