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Large Seebeck Effect in $CrSb_2$ Single Crystals BRIAN SALES, ANDREW MAY, MICHAEL MCGUIRE, DAVID SINGH, Oak Ridge National Laboratory, DAVID MANDRUS, University of Tennessee — $CrSb_2$ is a narrow gap semiconductor (E_g = 0.14 meV) that orders antiferromagnetically at T_N = 273 K. Resistivity, Hall effect, Seebeck coefficient, thermal conductivity, heat capacity, and magnetic susceptibility data are reported for $CrSb_2$ single crystals. In spite of some unusual features in electrical transport and Hall measurements below 100 K, only one phase transition occurs (T_N) in the temperature range from 2 to 750 K. Many of the low temperature properties can be explained by the thermal depopulation of carriers from the conduction band into a low mobility impurity band about 16 meV below the conduction band edge. The Seebeck coefficient, S, is large and negative from 2 to 300 K, ranging from -70 μV/K at 300 K to -4500 μV/K at 18 K. The large magnitude of S at 18 K is likely due to phonon drag, with the large decrease in the magnitude of S below 18 K due to the thermal depopulation of the high mobility conduction band. The $CrSb_2$ Seebeck data are compared to some of the data reported for $FeSb_2$ and FeSi. This research was supported by the U. S. Department of Energy, Basic Energy Sciences, Materials Sciences and Engineering Division.

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