BaMn$_2$Sb$_2$: A New Semiconducting Ferromagnet$^1$

JIANNENG LI, S. STADLER, A. KARKI, Y. XIONG, R. JIN, Department of Physics and Astronomy, Louisiana State University, Baton Rouge, LA 70803 — We have grown high-quality single crystals of BaMn$_2$Sb$_2$, which possesses the ThCr$_2$Si$_2$ structure as determined by X-ray powder diffraction technique. Magnetization measurements indicate that BaMn$_2$Fe$_2$ is ferromagnetic below $T_C = 580$K. On the other hand, the temperature dependence of electrical resistivity shows semiconducting behavior, which can be described by thermally-activated resistivity formula with thermal activation energy about 0.25 eV. While the Hall coefficient has positive sign between 2 and 300 K, the Seebeck Coefficient undergoes sign change from positive at high temperatures to negative at low temperatures, reaching -260 $\mu$V/K at 70 K. The implication will be discussed.

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