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Transport and magnetic properties of dilute rare-earth-PbSe alloys V. JOVOVIC, S. JOOTTU-THIAGARAJAN, J. WEST, J. P. HEREMANS, The Ohio State University, T. STORY, Z. GOLACKI, W. PASZKOWICZ , V. OSINNIY, Polish Academy of Sciences, Warsaw, Poland — An increase in the density of states is predicted [1] to increase the thermoelectric (TE) figure of merit, and could be induced by doping TE materials with rare-earth elements. This was attempted here: the galvanomagnetic and thermomagnetic properties of dilute alloys of PbSe and Ce, Pr, Nd, Eu, Gd and Yb were measured from 80 to 380K; magnetic susceptibilities were measured from 4 to 120K. The density of states effective mass, the relaxation time, and the carrier density and mobility are calculated from measurements of the electrical conductivity and the Hall, Seebeck and transverse Nernst-Ettingshausen coefficients. The Eu, Gd, Nd and Yb-alloyed samples are paramagnetic; the concentrations of rare-earth atoms are determined from fitting a Curie-Weiss law. The magnetic behavior of the Ce and Pr-alloyed samples is different. Ce, Pr, Nd, Gd and Yb act as donors with efficiencies that will be reported. Alloying with divalent Eu does not affect carrier density but increases the energy gap. This work suggests that the 4f orbitals preserve their atomic-like localized character and exhibit only weak sp-f hybridization. 1 G. D. Mahan and J. O. Sofo, Proc. Natl. Acad. Sci. USA 93 7436 (1996)

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