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The Magnetocaloric Effect in New Rare Earth Compounds A.L. LIMA, M.F. HUNDLEY, V. FRITSCH, LANL, S. BOBEV, University of Delaware, J.D. THOMPSON, J.L. SARRAO, LANL — The discovery of the giant magnetocaloric effect (MCE) [1] gave a new impulse towards the development of magnetic cooling and also heating technology [2], thereby renewing the interest in these compounds. Many intermetallic compounds have been revisited in the last few years in order to evaluate their magnetocaloric properties which are observed as a change in the temperature of the material under an applied magnetic field. Mixed compounds such as $\mathrm{RE}^a_{1-x}RE^b_xAl_2$ and $RE_2Al_3Si_2$ (where RE = rare earth and $a \neq b$) were experimentally and theoretically studied in this work to extract the maximum magnetocaloric potential. We measure the magnetic, magnetocaloric and transport properties and compared them to our theoretical predictions. To carry out this calculation, we have used an extended Hamiltonian [3] that takes into account crystalline eletric field (when present), exchange interactions and the Zeeman effect in a composed space for the rare earth with different angular moments. The Hamiltonian is solved exact and self-consistently. Our experimental and theoretical results indicate that the specific-heat anomalies exhibited by the Er-rich compounds show evidence for magnetoelastic interactions. [1] V.K Pecharsky and K.A. Gschneidner Jr., Phys. Rev. Lett., 78, 4494 (1997). [2] K.A. Gschneidner Jr. and V.K Pecharsky, Ann.Rev. Mater Sci. 30, 387 (2000) and references therein. [3] A.L. Lima, I.S. Oliveira, A.M. Gomes and P.J. von Ranke Phys. Rev. B, 65, 172411 (2002)

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