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Entropy changes and caloric effects in RAl_2 single crystals[1] NILSON ANTUNES DE OLIVEIRA, JULIETH CARO PATIÑO, PEDRO J. VON RANKE, Universidade do Estado do Rio de Janeiro — In this work we theoretically discuss the entropy changes and the caloric effects in RAl2 single crystals, which crystalize in the cubic symmetry and have large magneto crystalline anisotropy due to the crystal electric field. For this purpose, we use a model of interacting magnetic moments including a term to account for the crystal electric field. We apply the model to calculate the entropy changes and the magnetocaloric quantities in TmAl2 and NdAl2 by applying magnetic field variations in different crystallographic directions. Our calculations for the entropy changes in these compounds are in a reasonable agreement with the available experimental data for $\Delta B = 7\ T$. Further experimental data are necessary to compare with our theoretical predictions for the adiabatic temperature change. We also calculate the caloric quantities by fixing the magnitude of the magnetic field and rotating its direction. In this case, our calculations predict an anomaly (i.e. a change of sign) in the caloric quantities of TmAl2 when a magnetic field of 3 T rotates from $< 100 >$ to $< 110 >$ direction. A similar behavior is also observed in NdAl2. This very interesting fact, which is basically due to the magneto crystalline anisotropy, needs experimental data to be confirmed

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