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Magnetic Field Dependence of the Specific Heat of $\text{Pb}_{1-x}\text{Gd}_x\text{Te}$

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LUSAKOWSKI, A. JEDRZEJCZAK, Z. GOLACKI, Institute of Physics, Polish
Academy of Sciences, Warsaw, Poland — We have measured the magnetic specific heat, C_m , of $\text{Pb}_{1-x}\text{Gd}_x\text{Te}$ ($x = 0.033$ and 0.054) at magnetic fields up to 2 T at temperatures from 0.4 to 9 K. This study is complementary to our magnetization measurements on the same system. The samples were prepared as bulk single crystals by the Bridgman method and were n-type with carrier concentrations of about $1 \times 10^{19} \text{ cm}^{-3}$. The specific heat measurements were made using a Quantum Design PPMS system. We saw evidence for a maximum in C_m , which shifted to higher temperatures and became broader with increasing magnetic field. At zero magnetic field this maximum is expected to occur below 0.4 K for both samples and will be several times higher than that predicted by a model of superexchange interactions between nearest neighbors, which was based on previous experiments on $\text{Pb}_{1-x}\text{Eu}_x\text{Te}$.¹ The present data will be compared with a model that takes into account the spin splitting of the ground state of the individual Gd ions, possibly due to local lattice distortions. ¹ M. Górska, A. Lusakowski, A. Jedrzejczak, Z. Golacki, J. R. Anderson, H. Balci, Acta Phys. Pol. A **105**, 631 (2004).

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