

Magnetocaloric effect of Gd_5Si_4 – influence of mechanical milling

T. Toliński,¹ K. Synoradzki,¹ and P. Nowotny²

¹*Institute of Molecular Physics, Polish Academy of Sciences, Poznań, Poland*

²*Institute of Physics, Poznań University of Technology, Poznań, Poland*

The magnetic susceptibility, magnetization curves, heat capacity, and magnetocaloric effect (MCE) measurements are reported both for the bulk and mechanically milled Gd_5Si_4 compound. X-ray diffraction studies show that already the milling time of 10 hours is enough to destroy the crystallographic order. Simultaneously, the magnetic phase transition at 340 K is strongly suppressed implying a breaking of the long-range magnetic order. For the bulk sample the maximum isothermal magnetic entropy change is equal to $6.1 \text{ J}\cdot\text{kg}^{-1}\text{K}^{-1}$ at the magnetic field change of 9 T, whereas it is negligible after the milling. The temperature dependence of the specific heat confirms the presence of the transition at $T_C = 340 \text{ K}$ for the bulk sample.