Magnetocaloric effect in binary Gd-Pb alloys
Piotr Gębara,¹ Jozef Kovac,² Michal Rajnak,² and Mariusz Hasia³

¹Department of Physics, Czestochowa University of Technology,
Armii Krajowej 19, 42-200 Czestochowa, Poland
²Institute of Experimental Physics, Slovak Academy of Sciences,
Watsonova 47, 040 01 Kosice, Slovakia
³Department of Mechanical, Materials and Biomedical Engineering,
Wroclaw University of Science and Technology,
Łukasiewicza 5, 50-371 Wroclaw, Poland

The aim of present work was to study the phase composition, microstructure and magnetocaloric effect of binary Gd-Pb alloys. Samples were prepared by arc-melting of high purity constituent elements. The XRD studies were carried out using a Bruker D8 Advance diffractometer with Cu-Kα radiation and semiconductor detector LynxEye. The microstructure and chemical composition of the samples were studied by scanning electron microscopy (SEM) using JEOL JSM 6610LV, equipped with an energy dispersive X-ray spectrometer (EDX). The XRD and SEM studies revealed biphasic structure built by pure Gd and secondary phase Gd-Pb. The magnetocaloric measurements revealed two maxima corresponding to two phases, which caused an increase of half width at half maximum of $\Delta S_M$ vs. $T$ curve. The analysis of the temperature dependence of magnetic entropy change allowed to construct temperature dependence of exponent $n$. 