Phase transitions induced by high pulsed magnetic fields up to 500 kOe

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Interest in the investigation of magnetic materials with phase transitions (PTs) of the first order is associated not only with the observed strong relationship between the magnetic, structural, and electronic subsystems, but also with the possibilities of practical application of the effects arising from these interactions. The most promising examples of such phenomena include the colossal magnetoresistance effect and the giant magnetocaloric effect (MCE) [1]. MCE measurements in high pulsed magnetic fields up to 500 kOe using microthermocouples (with wire thickness of 25 μ m) of type T (copper-constantan) were carried out at the Laboratory of High Magnetic Fields in the Helmholtz Center Dresden-Rossendorf, Dresden, Germany. This measurement technique was described in [2]. The investigations in high pulsed magnetic fields were carried out on samples of alloys with the first order magnetostructural PTs (composite material based on MnAs, Heusler alloys Ni₂Mn_{0.74}Cu_{0.26}Ga, $Ni_{47}Mn_{40}Sn_{12.5}Cu_{0.5}$), and an allow with metamagnetic isostructural PT (Fe₄₉Rh₅₁). The PTs were induced from a weakly magnetic to a strongly magnetic phase in all of these materials.

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[1] Lyubina J 2017 J. Phys. D: Appl. Phys. 50 053002

[2] Ghorbani Zavareh M 2015 Appl. Phys. Lett. 106 071904