

# Magnetocaloric effect in amorphous $\text{Gd}_{65}\text{Fe}_{15-y}\text{Co}_{5+y}\text{Al}_{10}\text{X}_5$ ( $y = 0, 5, 10$ ; $\text{X} = \text{Al}, \text{Si}, \text{B}$ ) ribbons

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Magnetocaloric effect (MCE) is described as the adiabatic temperature change  $\Delta T_{ad}$  or the isothermal magnetic entropy change  $\Delta S_M$ , which is a function of temperature and magnetic field. We focus our attention on MCE in  $\text{Gd}_{65}\text{Fe}_{15-y}\text{Co}_{5+y}\text{Al}_{10}\text{X}_5$  ( $y = 0, 5, 10$ ;  $\text{X} = \text{Al}, \text{Si}, \text{B}$ ) alloys. The synthesized melt-spun materials have amorphous structure, confirmed by XRD. The  $T_C$ , determined from  $M(T)$  curves by the inflection method ranges from 145 K to 195 K. The values of  $\mu_{eff}$  for all analyzed samples are equal to about  $6 \mu_B/\text{atom}$  and are smaller than the magnetic moment of  $\text{Gd}^{3+}$  free ion, which is equal to  $7.94 \mu_B$ , mainly due to the presence of  $3d$  elements. The maximum value of magnetic entropy changes (change in the magnetic field from 0 to 5 T) is  $7.1 \text{ Jkg}^{-1}\text{K}^{-1}$  for  $\text{Gd}_{65}\text{Fe}_{10}\text{Co}_{10}\text{Al}_{10}\text{B}_5$ . The related refrigeration capacity is equal to  $748 \text{ Jkg}^{-1}$ . All ribbons exhibit second order phase transition, which is confirmed on the basis of the universal curve and field dependent critical exponent  $n$  analysis [1].

## References:

[1] V. Franco, J.S. Blázquez, A. Conde, Appl. Phys. Lett. **89** (2006) 222512