

Rotational magnetocaloric effect in $\text{Y}_{0.6}\text{Tb}_{0.4}\text{Co}_2$ ribbons

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In this study, we investigate the rotational magnetocaloric effect in $\text{Y}_{0.6}\text{Tb}_{0.4}\text{Co}_2$ ribbons, harnessing the influence of demagnetization effects [1]. The samples were prepared by the melt-spinning technique and crystallized as polycrystalline ribbons with a cubic MgCu_2 -type structure (space group $Fd\bar{3}m$, No. 227). The selected sample used for measurements had the shape of a rectangular prism with dimensions of approximately $a = 2$ mm, $b = 0.5$ mm, and $c \approx 40$ μm .

Magnetization measurements were performed for two sample orientations: with the long side parallel and perpendicular to the applied magnetic field. The Curie temperature of the material was determined to be $T_C = 148$ K. For the sample orientation with the long side parallel to the magnetic field, we obtained the magnetocaloric parameters including a maximum magnetic entropy change of $\Delta S_M = 5.4$ J kg^{-1} K^{-1} and a relative cooling power (RCP) of 283 J kg^{-1} , both for a magnetic field change of $\mu_0 H = 5$ T.

The rotational magnetocaloric effect parameters were evaluated by calculating the difference between the magnetocaloric parameters measured for the two sample orientations. The results obtained for the ribbon sample are compared with those for powdered ribbon samples of the same composition.

References:

[1] R. Almeida, *et al.*, J. Phys. Energy 6 (2024) 015020

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