Rotating field entropy change in highly anisotropic magnets

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Recently, magnetic refrigeration based on the magnetocaloric effect has been regarded as an interesting and important alternative to gas compression-based refrigeration. The majority of studies performed until now in this field is focused on the magnetocaloric effect caused by the magnetic field changed near the phase transition points (usually near the vicinity of the Curie temperature). In this case direction of magnetic field is fixed. Alternatively, magnetic refrigeration can also be realized by a rotating magnetic field. In this case the magnetocaloric effect is based on changing the magnetic anisotropy energy in a constant magnetic field. In the present paper we report new method of magnetic entropy change in highly anisotropic magnetic materials such as Ising spin glasses ($YbCoGaO_4$) and ferromagnets with anisotropic Curie temperature (Fe_7Se_8). The magnetocaloric effect is obtained here by rotating the magnetic crystal with respect to the fixed direction of magnetic field near the transition temperature from the paramagnetic state to magnetically ordered one.