



Magnetocaloric effect in the metamagnet ErRhSi compound

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The magnetocaloric effect is observed in the 1:1:1 compound ErRhSi, which is a metamagnet is reported in this paper. ErRhSi crystallizes in the orthorhombic space group $Pnma$, adopting the $TiNiSi$ structure type, with lattice parameters $a(\text{Å})=6.7903(5)$, $b(\text{Å})=4.1881(3)$, and $c(\text{Å})=7.3847(4)$. Our magnetic measurements confirm an antiferromagnetic phase transition at $T_N \approx 8.5$ K, also supported by the specific heat measurement. Crystal field effects of Er^{3+} are suggested by the inverse magnetic susceptibility data which do not conform to an ideal Curie-Weiss behaviour and also by the total entropy that attains $R \ln(2)$ at T_N . Although the magnetic hysteresis indicates ErRhSi to be a soft magnet, several clear metamagnetic features are observed at 2 K. Magnetic entropy change $\Delta S_M = -8.7$ J/kg-K is observed at about 9 K with the application of 5 T magnetic field. The corresponding adiabatic temperature change ΔT_{ad} is about 4 K. Large magnetocaloric effects suggest that this material is suitable for the low temperature magnetic refrigeration. *Published by AIP Publishing.* [<http://dx.doi.org/10.1063/1.4971959>]