MAGNETIC AND MAGETOCALORIC PROPERTIES OF (Er$_{1-x}$Y$_x$)Co$_2$ COMPOUNDS

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The (Er$_{1-x}$Y$_x$)Co$_2$ compounds with x ≤ 0.3 crystallise in a cubic MgCu$_2$-type structure. The compounds are ferromagnetically ordered. The magnetic transitions are of first order for compounds with x ≤ 0.1 – Fig.1 – and for higher Y content of second order. The reciprocal susceptibilities follow non-linear temperature dependences. The entropy changes, ∆S, have been determined from magnetizations isotherms by using Maxwell relation. High magnetocaloric effect has been observed in compounds which show first order magnetic transition. As example, Er$_{0.9}$Y$_{0.1}$Co$_2$, a value ∆S=−28 J/kg K was observed at T≈30 K, in field of 2.25 T- Fig.2.

The ∆S$_{\text{max}}$ values increase with external field, according to a H$^n$ law, in fields H > 1 T, in agreement with the prediction of mean field theory. The magnetocaloric effect is strongly diminished in compounds which show a second order magnetic transition.

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