Magnetocaloric effects in RCo_2 compounds

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Abstract: Magnetisation isotherms were measured for a number of (R, R′)Co_2 and (R, Y)Co_2 (R, R′ = rare earths) compounds. A metamagnetic transition is observed just above the Curie temperature (T_C) of compounds having a first-order phase transition, i.e. $ErCo_2$, $HoCo_2$ and (Dy, Y)Co_2. The magnetic entropy change ΔS_m shows a largest value of -11.8 J/mol K at 35 K for $ErCo_2$ and it decreases exponentially with increasing temperature. The obtained thermal variation of ΔS_m is compared to that of RAl_2 and other intermetallic compounds. Giant magnetocaloric effects observed in RCo_2-based compounds are discussed in terms of the 4f(R)-localised spin, 3d(Co)-spin fluctuations as well as nature of the phase transition.
Author Keywords: Magnetocaloric effects; Metamagnetic transition; Rare earth-transition metal compounds
Index Keywords: Magnetic hysteresis; Magnetization; Metamagnetism; Phase transitions; Transition metal compounds; Magnetocaloric effects; Rare earth compounds

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