

Magnetocaloric and Thermal Properties of $\text{Ho}(\text{Co}_{1-x}\text{Si}_x)_2$ Compounds

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Dedicated to Dr. Bernard Chevalier on the occasion of his 60th birthday

The specific heat and thermal conductivity of HoCo_2 and $\text{Ho}(\text{Co}_{0.95}\text{Si}_{0.05})_2$ were measured as functions of temperature in several constant magnetic fields up to 8 T. From a specific-heat data analysis the isothermal entropy change and the magnetocaloric effect (MCE) have been evaluated in a wide temperature range for several values of the applied magnetic field. The considerable values of the magnetocaloric effect in the vicinity of the magnetic ordering transition are qualifying both compounds as suitable for magnetic refrigeration purposes. The magnetic phase transition temperature (T_C) increases from 77 K for HoCo_2 to 103 K for $\text{Ho}(\text{Co}_{0.95}\text{Si}_{0.05})_2$ while the large MCE in the vicinity of T_C is maintained, which demonstrates ways of tuning the operating temperatures of the magnetic refrigerant.

Key words: HoCo_2 , Magnetic Phase Transition, Specific Heat, Magnetocaloric Effect,
Thermal Conductivity