Magnetic and electrical properties of the $Ho(Co, Si)_2$ compounds

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Abstract: The magnetization, a.c. susceptibility, resistivity and magnetoresistance have been measured for the invariable-unit-cell-parameter $Ho(Co_{1-x}Si_x)_2$ compounds. The Si substitution for Co in $HoCo_2$ yields a dramatic initial increase of T_C, whereas the 3d magnetic moment is reduced. These findings may be attributed to the strong involvement of Si p states in the hierarchy of exchange interactions. The magnetic phase transition at T_C is of first order for the compounds with $x < 0.075$. For these compounds, the coexistence of metamagnetism and the quenching of spin fluctuations at $T > T_C$ are provided.

Index Keywords: Electric conductivity measurement; Electric properties; Electrons; Magnetic moments; Magnetic permeability measurement; Magnetic properties; Magnetism; Magnetization; Magnetoresistance; Metamagnetism; Phase transitions; Temperature; Curie temperature; Exchange interactions; Spin fluctuations; Holmium compounds

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