Magnetism and related phenomena in $RE(Co_{1-x}Si_x)_2$ compounds

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Abstract: We report on crystal structure, magnetic, transport and dilatometric studies of the pseudobinary compounds $RE(Co_{1-x}Si_x)_2$ with RE = Nd, Ho and Er for x ?? 0.15. The lattice volume of the Ho and Er-based compounds is almost composition invariable, whereas in $Nd(Co_{1-x}Si_x)_2$ for x between 0 and 0.15 it increases by ? 7%. Already small Si substitutions for Co (x ?? 0.075) induce a dramatic increase of T_c both in the Ho and Er compounds without apparent loss of the first order character of the magnetic phase transition, whereas opposite changes of T_c are observed in Nd analogues. These results, together with variations of resistivity and magnetovolume anomalies at T_c and of the Co magnetic moment observed in all three systems is discussed in terms of expected changes of electronic structure and their influence on the hierarchy of exchange interactions and formation of the Co moment in this class of materials. ?? 1997 Elsevier Science S.A.

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