ELECTRONIC AND MAGNETIC PROPERTIES OF $GdCo_{3-x}Si_x$ COMPOUNDS

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The $GdCo_{3-x}Si_x$ compounds crystallize in a hexagonal structure having $R\overline{3}m$ space group for x≤0.3. The lattice parameters are only little modified when cobalt is substituted by silicon. Magnetic measurements were performed in the temperature range 4.2-1000 K and external fields up to 9 T. The compounds are ferrimagnetically ordered. The mean cobalt magnetic moments determined at 4.2 K decrease when increasing silicon content. Above the Curie points the reciprocal susceptibilities show non-linear dependences, typical for ferrimagnetic systems. At higher temperatures than aproximately 700 K linear dependences were evidenced. The effective cobalt magnetic moments are little dependent on composition. Band structure calculations were also performed in order to analyse the cobalt moment in various lattice sites. The local envinronment effects are discussed. Finally we analyse the magnetic behaviour of cobalt in spin fluctuation model.

9.7 cm

13.4 cm

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