

Magnetic behavior of iron in $\text{Er}_{1-x}\text{Zr}_x\text{Fe}_2$ compounds

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The compounds $\text{Er}_{1-x}\text{Zr}_x\text{Fe}_2$ with $x \leq 0.5$ crystallize in a cubic C15 type structure. The lattice parameters decrease slightly when Zr content increases, a fact attributed to the smaller radius of the Zr ion compared to the Er one. Magnetic measurements were performed in the temperature range 4.2-700 K in external magnetic fields up to 12 T. All the compounds are ferrimagnetically ordered, the erbium and iron magnetic moments being antiparallely oriented. The Curie temperatures and the spontaneous magnetizations, at 4.2 K, decrease when zirconium content increases. The iron magnetic moments and effective magnetic moments are little dependent on composition. The density of states (DOS) and magnetic moments are calculated using the fully relativistic Korringa-Kohn-Rostoker (KKR) band structure method. The disorder in the system has been accounted for by means of the Coherent Potential Approximation (CPA). Finally, the magnetic behaviour of iron in these compounds is analyzed.

9.7 cm

13.4 cm

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