THE LOCAL MAGNETIC MOMENTS AND HYPERFINE MAGNETIC FIELDS IN DISORDERED METAL-METALLOID ALLOYS

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9.7 cm

The local magnetic moments and hyperfine magnetic fields (HFF) in the ordered alloys $Fe_{15}Sn$ and $Fe_{15}Si$ are calculated with the first-principles full-potential linear augmented plane wave (FP LAPW) method. The results are compared with the experimental data on $Fe - M$ ($M = Si$, Sn) disordered alloys for small metalloid concentration. The relaxation of the lattice around the impurity and its influence on the quantities under consideration are studied. The mechanism of the local magnetic moment formation is described. It is proved that the main distinction between these alloys is connected with the different lattice parameters. Three contributions to the HFF are discussed: the contributions of the core and valence electron polarization to the Fermi-contact part, and the contibution from the orbital magnetic moment. It is shown that the HFF is essentially affected by the RKKY polarization and the orbital magnetic moment which depend on the concentration and the distance to the impurity.

13.4 cm

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