Temperature-Dependent Distribution of Internal Magnetic Fields at Fe^{57} Nuclei in fcc Iron-Nickel Alloys*

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Abstract

Distribution of the internal magnetic fields and its temperature dependence of Fe^{57} nuclei in fcc iron-nickel alloys with composition ranging from 31.8 to 65.6 at.% Ni have been measured by Mössbauer effect from 88°K to above Curie temperature. Distribution of the internal field has been determined from the observed Mössbauer spectra and temperature variation of the distribution has been explained by using the molecular field model which shows that iron moments on which weaker exchange field is acting from the neighbouring moments decrease more rapidly with increasing temperature than those on which stronger exchange field is acting. Distribution of the internal magnetic field has been correlated to the distribution of the exchange field. Temperature dependence of saturation magnetization and other magnetic properties of iron-nickel alloys has been discussed on the basis of local fluctuation of the exchange field.

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