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Spin Wave Resonance and Exchange Parameters in fcc Fe–Ni Alloys*

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Abstract

Spin wave resonance for a series of fcc Fe-Ni alloys has been measured in order to study the exchange stiffness constant $D$. In general the resonance field vs the square of the spin wave mode number $(n)$ curve is linear for high values of $n$, whereas some amount of deviation from linearity occurs for low values of $n$. This is considered to be due to the inhomogeneous demagnetizing field of the sample. We can determine the value of $D$ from the linear part of the curve, provided we have a sufficient number of observed modes. As a supplementary means, we have also made low temperature magnetization measurements from which the value of $D$ was derived. Consistency between these two kinds of measurements is ascertained. The composition dependence of $D$ is not quite coincident with that derived from the neutron small angle scattering experiments by Hatherly et al. The data are discussed both from the standpoint of localized electron model and collective electron model.

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