Role of the early transition elements on the intersublattice exchange coupling in the rare-earth-iron intermetallics

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Abstract: The magnetic interactions in $R(Fe,V)_{12}$ and R(Fe1Ti)2 compounds are analysed in terms of Fe-Fe and R-Fe interactions. It was found that the Gd-Fe interactions increase with increasing the V(Ti) content. The A_{GdFe} exchange constant in the different compounds is quantitatively discussed. It is suggested that its large value must be associated with the fact that hybridization between 5d(R) and 3d states is strongly reduced for early transition elements (i.e. V or Ti) as shown by the non-existence of compounds with R elements in this case. It results that more electrons can participate in 5d-3d(Fe) hybridization, thus leading to the observed increase in R-Fe coupling. ?? 1998 Elsevier Science B.V. All rights reserved.

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