Effects of Alloying Elements on Strength and Thermal Stability of Amorphous Iron-Base Alloys

Abstracts of Papers on Amorphous Materials Published in Other Journals

Effects of Alloying Elements on Strength and Thermal Stability of Amorphous Iron-Base Alloys

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Proc. of 2nd Intern. Conf. of Rapidly Quenched Metals, 1975, Section I (*Rapidly Quenched Metals*, ed. by N.J. Grant and B.C. Giessen), MIT Press, (1976), 273.

The effects of alloying elements on hardness and crystallization temperature have been studied for amorphous alloys with the compositions $Fe_{80-x}M_xP_{13}C_7$, where M=Ti, V, Cr, Mn, Co, Ni and Cu. As a result, it has been found that the average outer electron concentration has a significant effect on the hardness and crystallization temperature. This suggests that the alloying elements are mainly confined to the bonding character of the outer electrons of the component elements.

Saturation Magnetostriction and Volume Magnetostriction of Amorphous Ribbons Based on Fe-Ni and Fe-Co

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Proc. of 2nd Intern. Conf. on Rapidly Quenched Metals, 1975, Section I (*Rapidly Quenched Metals*, ed. by N.J. Grant and B.C. Giessen), MIT Press (1976), 489.

The saturation magnetostriction and the forced volume magnetostriction of Fe-Ni and Fe-Co amorphous ribbons were measured from 77°K to room temperature by a three terminal capacitance method. It was found that the magnetostriction was nearly isotropic. In Fe-Ni amorphous system, the saturation λ_s and the volume magnetostriction constants $\delta\omega/\delta H$ decreased monotonously with the increase of Ni concentration from 31×10^{-6} and 21×10^{-10}/Oe respectively for $Fe_{0.80}P_{0.13}C_{0.07}$ to 15×10^{-6} and 7×10^{-10}/Oe respectively for $Fe_{0.40}Ni_{0.40}P_{0.13}C_{0.07}$. The temperature dependence of the saturation magnetostriction was not simple decreasing function of the temperature. In Fe-Co system, there was a remarkable change of the sign of the magnetostriction nearly equal to $Fe_{0.047}Co_{0.703}Si_{0.15}B_{0.10}$.

Giant ΔE Effect and Magnetomechanical Coupling Factor in Amorphous $Fe_{80}P_{13}C_7$ Ribbons

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The magnetomechanical coupling factor k, the Young's modulus E and the ΔE effect as a function of bias field were measured by a mechanical resonance method of amorphous $Fe_{80}P_{13}C_7$ ribbons which were annealed at different temperatures in a magnetic field. In the ribbon which was annealed at 350°C for 20