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On the Magnetic and Electric Properties of
 $(\text{Fe}_{1-x}\text{Co}_x)_{0.89}\text{Cr}_{0.11}$ Alloys*

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Abstract

To make clear the mechanism of the appearance of large spontaneous volume magnetostriction of *fcc* $(\text{Fe}_{1-x}\text{Co}_x)_{0.89}\text{Cr}_{0.11}$ alloys, their magnetization and electrical resistivity were measured and the following results were obtained:

(1) The dependences of the mean magnetic moments and the Curie point on the concentration, x , and the outer electron concentration, n , of the alloys were similar to those in the Fe-Ni and Fe-Pd Invar alloy systems. That is, the alloys in these three systems are ferromagnetic on the Co- and Ni-rich sides and their ferromagnetic moments disappeared at the n of about 8.2~8.4 which corresponds to the concentration containing Fe more than it in Invar alloys.

(2) The magnetization-temperature curve of the Invar alloys mentioned above did not follow Brillouin's function.

(3) The electrical resistivity-temperature curves of the Invar alloys showed an anomalous broad maximum near the Curie point. And the residual resistivity were very large. These phenomena may be explained by the co-existence of the ferromagnetic and antiferromagnetic states. It may be considered that the co-existence of the two magnetic states is closely connected with the sharp drop of the ferromagnetic moments near the concentration of Invar type alloys.

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