UPDATED FE-CO PHASE DIAGRAM

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$Fe_{50}Co_{50}$, $Fe_{65}Co_{35}$ and $Fe_{35}Co_{65}$ alloys heat treated at temperatures from 500 to 1300°C have been studied by means of the X-ray diffraction phase analysis and transmission electron microscopy. Microstructure of phase separation has been found at 900-1300°C. That phase separation takes place in over all the surface layer to a depth of 70μm in the shape of alternating α and γ layers of width about 0.5μm each. It was shown that this surface microstructure is not a consequence of the oxidation of the surface, but is the result of the tendency towards phase separation. Phase separation in the interior of the bulk of an alloy manifests itself, for example, in the A2 region as a precipitation of the Co-enriched fcc particles occupied nothing more than 10% of the bulk. The B2 phase precipitated in the temperature region of ordering also occupies nothing more than 10% of the bulk of an alloy and is present as the disk-shaped particles of 1.0-1.5nm in thickness. Ordering and phase separation regions are divided on the Fe-Co phase diagram by the strip of a solid solution. At lowering temperature below 550°C a phase transformation accompanying by a small (about 0.00025nm) increase in the lattice parameter takes place. Comparing this phase transformation with the phase transformation in the $Fe_{60}Cr_{30}Co_{10}$ alloy at the same temperature the conclusion has been made that this is precisely the transformation which at the conditions of the existence of the $\alpha_1+\alpha_2$ cell microstructure brings about the abrupt increase of the coercive force [1]. The results obtained are shown in the updated Fe-Co phase diagram.

1. 1. Y.Ustinovshikov, B.Pushkarev, A.Ulianov, A.Saltykov, Journ. Alloys Compds. 387(2005)232.