

## Recovery of Lattice Defects in Cementite in Cold-Rolled Carbon Steels(Metallurgy)

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Above 400°C cementite fracture, caused by joining of voids, formed along an activated slip plane was frequently observed.

### **Saturation Magnetostriction and Volume Magnetostriction of Fe-Ni-Co Amorphous Ribbons**

T. JAGIELINSKI, K.I. ARAI, N. TSUYA, S. OHNUMA and T. MASUMOTO  
IEEE Trans. Mag., **MAG-13** (1977), 1553

The saturation magnetostriction and the volume magnetostriction in amorphous ribbons of Fe-Ni-Co system were measured from 77K to room temperature, by a three terminal capacitance method. The ternary diagram were given of the saturation magnetostriction and volume magnetostriction in  $(\text{Fe}_x\text{Co}_y\text{Ni}_{1-x-y})_{78}\text{Si}_8\text{B}_{14}$  system. It was found that the largest saturation magnetostriction constant is  $36 \times 10^{-6}$  for the composition  $\text{Fe}_{65}\text{Co}_{13}\text{Si}_8\text{B}_{14}$  at room temperature. The temperature dependence of the saturation magnetostriction and the volume magnetostriction in Fe-Ni-Co system were not a simple function of the temperature. The maximum value of volume magnetostriction  $\delta\omega/\delta H$  was observed for  $\text{Fe}_{78}\text{Si}_8\text{B}_{14}$  to be  $24 \times 10^{-10}$  Oe<sup>-1</sup> at room temperature.

### **High Magnetic Permeability Amorphous Alloys of the Fe-Ni-Si-B System**

T. MASUMOTO, K. WATANABE, M. MITERA and S. OHNUMA

*Amorphous Magnetism II*, ed. by R.A. Levy and R. Hasegawa, Plenum (1977), 369.

Low-field magnetic properties of the amorphous  $(\text{Fe}_{1-x}\text{Ni}_x)_{78}\text{Si}_y\text{B}_{22-y}$  alloys ( $x=0 \sim 0.7$ ;  $y=0.04 \sim 0.11$ ) produced by a roller type quenching method were measured in the as-quenched state and the annealed state. Coercivity and remanence were found to be strongly dependent upon the value of both  $x$  and  $y$ , and heat treatment. The best soft magnetic properties were obtained for the  $(\text{Fe}_{.80}\text{Ni}_{.20})_{.78}\text{Si}_{.08}\text{B}_{.14}$  alloy annealed at 380°C.

### **Recovery of Lattice Defects in Cementite in Cold-Rolled Carbon Steels**

Akihisa INOUE, Tsugio OGURA and Tsuyoshi MASUMOTO

Trans. Jap. Inst. Met., **18** (1977), 635.

Transmission electron microscopic observations were made on the recovery process of lattice defects in cementite in high carbon steels annealed after 92% cold rolling. Thermomagnetic and X-ray analyses were also performed as additional examinations.

No observable change in the defect structure of cementite occurs at temperatures below about 400°C. Annealing at higher temperatures results in the disappearance of the moiré pattern, a considerable decrease of dislocation density and the formation of well-developed subboundaries. Above about 600°C, these defects disappear gradually with the progress of spheroidization. These results suggest that the recovery of lattice defects in cementite is caused by polygonization accompanied by climbing or cross slipping of dislocations.