

Relationship Between Resistivity and Thermal Deformation of Fe, Co and Ni above and below the Curie Temperature

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Results are given of *in situ* experimental investigations of the electrical resistance and thermal expansion coefficient of iron, nickel and cobalt in the temperature range from 300 to 1050 K. It is found that the electrical resistivity of these metals is directly proportional to the relative thermal deformation in both ordered and disordered phases. The relative thermal deformation is thermodynamically complex, related to a product of the thermal expansion coefficient and temperature. A method is given for estimating the contributions to the scattering of electrons by phonons and magnons. Simple empirical expressions for the description of the temperature dependence of the s-d-exchange interaction energy and spontaneous magnetization are given for the temperature range from temperatures close to zero up to the Curie Temperature. It is shown that a functional correlation exists between the order parameter and the relative thermal deformation of the lattice of these metals.