G.A Nemtsev Russia, Cheboksary
Chuvash State University

About magnetic superlattices of long-range order

It is known that the material, is highly ordered bya magnetic structure called a structure of magnetic superlattices, is magnetized by the external magnetic field along any of the two directions of spontaneous magnetization. The emergence of magnetic flux ts deviating from these areas, is excluded. If you take layers A(e.g., odd) and B (for example, even) of the multi-layered material saturated magnetization of layer A (or B) just gets the same direction, as the external magnetic field with intensity H. Therefore, the change of the magnetic induction B (H) is due to the magnetization reversal of the remaining layers B (or A). While achieving the same direction saturation magnetizations of the layers A and B, the electrical resistivity of the material across the planes of ts layers becomes minimum.

Under the guidance of the author on the basis of numerous experiments (experiments under the supervision of engineer Kazakov V.V.) it nas established: carrild out.

1. Analyzing the known effects of the oscillations of the magnetization, residual spontaneous magnetization of ferromagnetic cores, distribution and spectral splitting of spin waves and changes of properties of ferromagnetic cores in case of transverse magnetization theory of ferromagnetism is supplemented through defining hierarchical dimensions of domain groups. According to this, in case of the spontaneous magnetization of ferromagnets and their magnetization, domain groups of larger dimension are formed due to incomplete closing of magnetic flux of domain groups of previous smaller dimensions. The prevalence of domain groups of larger dimension A, more massive, but having a smaller coefficient of elasticity kA, provides higher value of relative magnetic permeability μ of the material. Creaty conditions in the ferromagnet there can be formed hierarchical domain grouping of maximum dimensions with the size of the magnetic superlattice of the nhde ferromagnetic core. The presence of hierarchical domain groups corresponds to the presence of the material ordered structures not only in the middle order, but in many ordered structures of increasing repetition period. Consequently, the structure of less rigid magnetic superlattices can be formed due to the interaction of domain groups in the core of transformer core with a thickness of ferromagnetic layers of more than 50 μm and non-ferromagnetic layers of more than 4 μm. This bar may be made in the form of foil windings of pure iron enameled calibrated tape. Famous manufacturing technology of ultra-pure iron ultra-pure iron budget foil put into production. Signs of patterns of magnetic superlattices are increasing the magnetic permeability of the core in comparison with the magnetic permeability of the ferromagnetic source and the absence of residual magnetization and the coercive force of the rod when in the magnetic system of the transformer.

2 Analysis theories, of conductivity, superconductivity and cryogenic hyperprolactinaemia ithas the concluded thof it is possible to reduce the influence of all components of the resistivity of the material due to the magnetic ordering of the electronic structure of the conductor in the form of superlattices of near and long-range order:

$$p(T) = p_0 + p(T) + p_ф(T) + p_M(T),$$

where p_0 is the residual resistivity associated with the disorder of crystal structure; $p(T)$ $p(T)$ and $p_ф(T)$are- components of the resistivity associated with the Coulomb interaction between the conduction electrons and their inter-action with the electrons of the outer shells of atoms; $p_M(T)$,is a- component of the resistivity associated with magnetic disorder of a system of conduction electrons and electrons of the outer shells of atoms. Theory of electrical conductivity reguires the formation of electromagnetic groups of conduction electrons and electrons of the outer shells of atoms, reducind the resistivity of the conductor. The construction of the structure of magnetic superlattices not only organizes the structure of the material, but also increases the temperature stability of such groups. It should show multiple decrease of resistivity in the direction along the layers of material perpendicular to the direction of magnetization M of the material. The same foil windings of enameled calibrated pure iron tape was chosen as object of research. More detailed results of the experiments can be found from [1]. The conclusions.

1. The found effect of the spontaneous magnetization with the magnetic structure of superlattices in layered ferromagnets with thick layers more than 50 μm and the thickness of non-ferromagnetic layers more than 4 μm confirms the addition of the authors to the theory of ferromagnetism. The effect can be taken into account when designing the cores of electromagnetic devices with high magnetic permeability and without hysteresis loss of magnetization reversal.

2. The effect of multiple reduction of the resistivity conneeted with the emergence of patterns of magnetic superlattices in layered ferromagnetic conductors, confirms the addition of the authors to the theory of electrical conductivity. The effect can be taken into account when designing the windings of electromagnetic devices with hypeconductivity the Curie temperature of the magnetic superlattices intheconductorused.It is planed to use this effect constructing new types of hyperproteic wires, cables, conductors of printed circuit boards, antennas.

3. The found effects prove not only an opportunity, but also a reason of the use of rod-coils as the main active elements of electromagnetic devices, replacing their traditional cores and windings.

Literature

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NEMTSZEV GENNADIY ALEKSANDROVICH - Doctor of Technical Sciences, Professor of Electric Power Industry Chair, Chuvash State University, Russia, Cheboksary