ISSN NO: 2770-4491
Date of Publication:24-11-2021

Analysis Of Magnetic Materilas

Ataxonova Sayyora Koraboyevna
Institute of Mechanical Engineering "Senior Lecturer of the Department of Materials Science and Technology of New Materials
Abdug'aniyeva Xurshida Raximjon qizi
Institute of Mechanical Engineering "Senior Lecturer of the Department of Materials Science and Technology of New Materials
Shavkatov Ulug'bek Murodjon o'g'li
Institute of Mechanical Engineering "Senior Lecturer of the Department of Materials Science and Technology of New Materials
Nurhomidinova Nilufarxon Islomiddin qizi
Institute of Mechanical Engineering "Senior Lecturer of the Department of Materials Science and Technology of New Materials
Mo'ydinova Dilafuruz Rayimjon qizi
Institute of Mechanical Engineering "Senior Lecturer of the Department of Materials Science and Technology of New Materials

Annotation: This article gives you a brief overview on magnetic resonance imaging. The properties, mechanical properties and applications of magnetic materials are widely covered.

Keywords: Paramagnetic, thermomagnetic, manganese-zinc, nickel-zinc, ferrites, thermomagnetic, dielectrics, torque, magnetostriction, ferrites, austenite

Introduction

Experimental and theoretical approaches to the precise description of materials require the most modern atomic-scale techniques. Despite the large number of techniques, however, the experimental study of atomic-scale properties and phenomena is very difficult for ordinary solids. The problems in steels are more complex, as exemplified by the interrelationships between structural, chemical, and magnetic influences. On the other hand, it provides the need for advanced computational methods based on the functional theory of density. The platform for the study of the basic properties of steel materials from the first principles In the 1980s, the first principles of the thermodynamic properties of elemental iron were within the limits of descriptive and atomistic simulations.

References And Methods.

Elastic parameters of stainless steels. The maps show the main part. The modulus (a) and shear modulus (b) and Ni concentration (equilibrium Fe) of paramagnetic Fe-Cr-Ni alloys as a function of Cr. Magnetic metals include iron, steel, cast iron, nickel and cobolt. Special magnetic materials include thermomagnetic alloys and magneto-strain materials. Thermomagnetic alloys are used to prevent changes in the magnetic flux in the magnetic systems of devices under the influence of temperature. Using magnetic materials, electromagnetic energy is converted into mechanical energy

Natural magnetite mineral - magnetite (magnetic ironstone) has long been known. In China, 2,000 years ago, the shaft of a magnetic compass was made of it. Magnetite is a weak magnet. 19th centuryX. K. Ersted, M. Faraday, E. H. Leni, discovered the laws of electromagnetism, B. S. Jacobi created AC machines, P. N. Yablochkov created alternating current generators and transformers, M. O. Dolivo-Dobrovolsky invented three-phase current. After that, a much stronger magnet, iron, began to be used as a magnetic material. Since 1990, iron silicate steel has been widely used in electrical engineering, and iron-nickel alloys in telecommunications. [4]

ISSN NO: 2770-4491
Date of Publication:24-11-2021

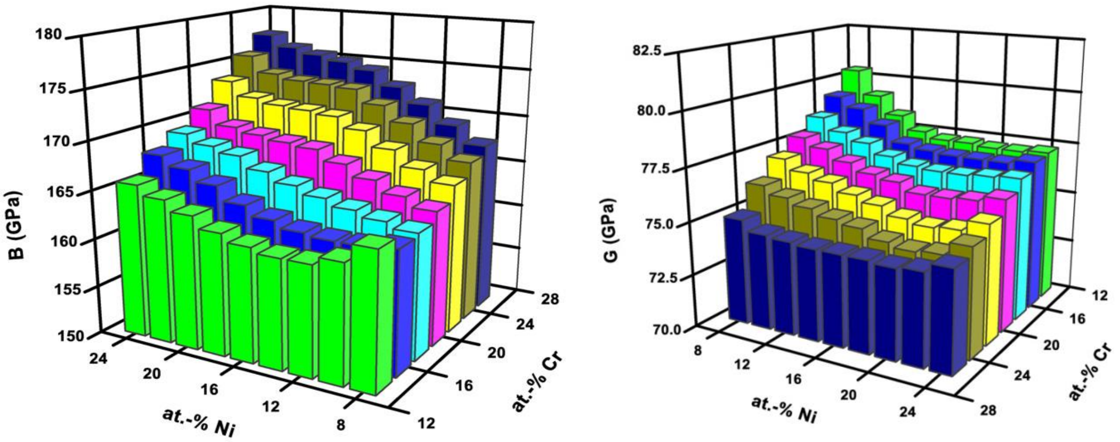

Figure 1. Elastic parameters of austenitic stainless steels. The maps show the main part

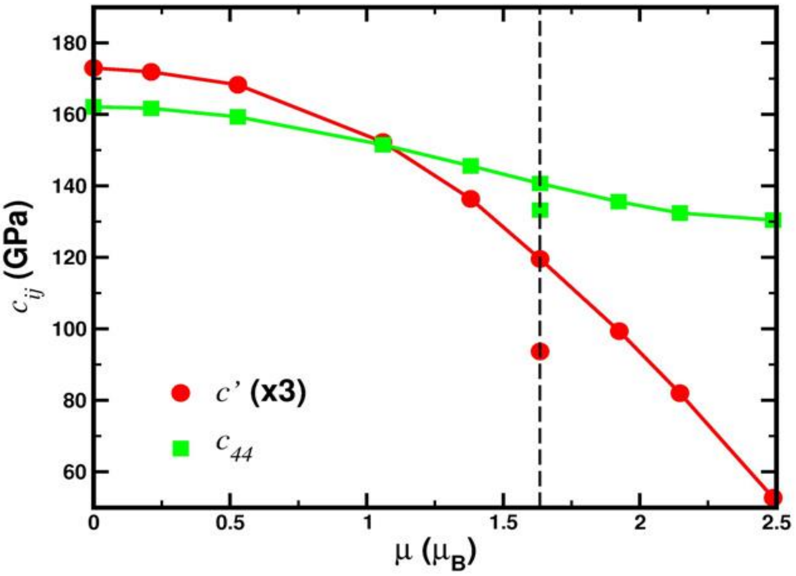

Figure 2. Paramagnetic fcc is a single crystalline elastic constant of an alloy Fe0.70Cr0.15Ni0.15.

Results:

Depending on the nature of the reaction to the external magnetic field and the internal magnetic order, all substances in nature can be divided into five groups: diamagnet, paramagnet, ferromagnet, antiferromagnet and ferrimagnet. There are five types of magnets on the list. The different types of matter have a magnetic state: diamagnetism, paramagnetism, ferromagnetism, antiferromagnetism, and ferrimagnetism. [3]

Magnets are substances that have a negative magnetic sensitivity and do not depend on the strength of the external magnetic field. Diamagnets include inert gases, hydrogen, nitrogen, many liquids (water, oil and its mixtures), a number of metals (copper, silver, gold, zinc, mercury, gallium, etc.), many semiconductors (silicon, germanium, AZ compounds). B 5, A 2 B 6) and organic compounds, alkali-halogen crystals, inorganic glasses and others. Diamagnets are covalently bonded substances and substances in the superconducting state.

Paramagnets include substances that have a positive magnetic sensitivity regardless of the strength of the external magnetic field. Paramagnets include oxygen, nitric oxide, alkali and alkaline earth metals, some transition metals, iron, cobalt, nickel, and rare earth elements. Ferromagnets include substances with high positive magnetic sensitivity (10 to 6), which is highly dependent on magnetic field strength and temperature. Antiferromagnets are substances in which the same atoms or ions of a crystal lattice form spontaneously in the antiparallel direction of the elementary magnetic moments below a certain temperature. When heated, the antiferromagnet makes a phase transition to the paramagnetic state. Antiferromagnetism is found in chromium, manganese, and a number of rare earth elements (Ce, Nd, Sm, Tm, etc.). Typically, antiferromagnets are the simplest chemical compounds based on transition metals, such as oxides, halides, sulfides, carbonates, and so on. Ferrimagnets include substances whose magnetic properties are caused by uncompensated antiferromagnetism. Like ferromagnets, they have a high magnetic sensitivity, which is significantly dependent on magnetic field strength and temperature. However, ferrimagnets differ from ferromagnetic materials by a number of significant differences. Some ordered metal alloys have the properties of ferrimagnets, but mainly various oxide compounds, among which ferrites are of the greatest practical interest. Magnetics are substances that can be magnetized in a magnetic field. Magnetic properties of matter: 1. Diamagnets. 2. Paramagnets

1. The magnetic field of a substance. Ampere's hypothesis. Experiments show that all substances placed in a magnetic field are magnetized and become additional sources of magnetic fields.

Forced force. The magnitude of the induction of the opposite field (segment) is required to eliminate the residual magnetization (OS). A ferromagnet is said to be hard with a large coercive force and soft with a small coercive force. Magnetostriction refers to the deformation of ferromagnets during this magnetization. All ferromagnets lose their special magnetic properties when heated and turn into paramagnets.

Curie temperature The transition temperature from a ferromagnetic state to a paramagnetic one.

Curie temperature: 770 º Dan (iron);

1150 º Dan (cobalt);

360 º Dan (nickel).

Ferromagnets below the Curie temperature have all the magnetic regions - the domains, the size of which.

The external magnetic field acting on the ferromagnets directs the magnetic moments of the domains.

Discussion.

The development of the theory of ferromagnetism has greatly accelerated the production of new magnetic materials. In the middle of the 20th century, ferrite oxides appeared. Depending on the properties of magnetization and re-magnetization, magnetic materials are divided into ferromagnets, ferrites, magnetically soft and magnetically hard materials. High initial and maximum magnetic permeability of magnetically soft materials; saturation magnetic induction - 0.2 - 2.4 T, coercive power - 0.5 - 10 A / m, specific electrical resistance 10 ~ 7 - 10 ~ 8 Ohm-m. These include molybdenum alloyed iron, iron-nickel alloys, vanadium-alloyed iron-cobalt alloys, iron-nickel-cobalt alloys, manganese-zinc-nickel-ferrite, electrical steel, as well as magnetic dielectrics, magnetostrictive materials, and more. They are used to make magnetic conductors, chokes, electromagnetic relays, transformer cores, ferrite magnetic antennas and more. [1]

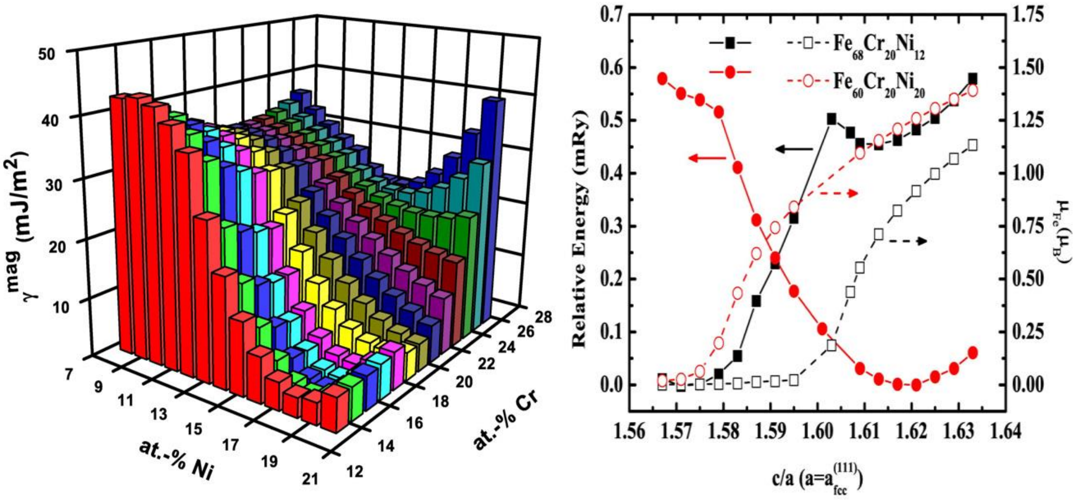

Figure 3. Left panel: Single crystal elastic constants of paramagnetic fcc Fe0.70Cr0.15Ni0.15 alloy

ISSN NO: 2770-4491
Date of Publication:24-11-2021

Conclusion

Magneto-elastic phenomena have long been known in magnetic materials, especially alloy steels. At the same time, it has a magnetic effect on the energy of series cracking.And there are elastic constants of magnetic materials in the paramagnetic state. Using the first principles of calculation here, we find that the chemical, magnetic, and structural effects at the atomic scale are behind the elastic properties and provide the cracking energy of the paramagnetic Fe-Cr-Ni alloys. May explain the existence of large disordered magnetic moments in the paramagnetic state [2]

Variety of properties of stainless steels.

Cr-rich Fe-Cr alloys have interacting energies between phases. For the ferromagnetic state, ~ 0.02 to ~ 0.33 Jm-2 and ~ 0.02 are considered. ~ 0.27 Jm-2 for the paramagnetic state. The ferromagnetic energy exhibits, along with the paramagnetic interacting energy, track the dependence of the nonlinear concentration on the smooth composition. This determines the grain size, which is important for phase separation. [4]

References:

1. O'zME. The first volume. Tashkent, 2000
2. Wikipedia, the free encyclopedia Jump to navigationJump to search
3. Litvinenko R.V. abstract. "Magnetic properties of matter"
4. Alloy Steel - Properties and Use Edited by Eduardo Valencia Morales