UDC 669.168

USSR

GEL'D, P. V., BAUM, B. A., and PETRUSHEVSKIY, M. S.

Rasplavy Ferrosplavnogo Proizvodstva (Melts of the Ferro-Alloy Industry), Moscow, Metallurgiya, 1973, 288 pp

Translation of Annotation: Alloys of 3d transitional metals with silicon and carbon play an important role in metallurgy. Among these alloys are the following: ferrochromium, ferromanganese, ferrosilicon, silicochromium, silicomanganese, ferrosilicochromium, ferrosilicomanganese, and many other ferro-alloys and master alloys. Steels with special properties (heat-resistant, wear-resistant, and others) are also related to these groups of alloys. These alloys can be refined further from impurities and used at high temperatures in a liquid state. Therefore, study of the metallurgical problems of these alloys in a liquid state is of prime importance. Since these alloys are produced in electric furnaces, it is necessary to know their electrical resistance properties in order to calculate the furnace parameters and devices for electromagnetic mixing and transportation of metal, to define their heat balance, etc. The basic reactions in these alloys take place at the interface of liquid metal and gaseous or slag phases. Therefore, the kinetics of these reactions depends to a great extent on the surface concentration of reacting substances which is calculated from the surface tension of liquid alloys. The mass transfer

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GEL'D, P. V., et al, Rasplavy Ferrosplavnogo Proizvodstva (Melts of the Ferro-Alloy Industry), Moscow, Metallurgiya, 1973, 288 pp

rate is determined very often from viscosity and from the melt density in the case of the sinking of the drop. These properties regulate many characteristics of metallurgical processes, such as enlargement of particles, flotation of non-metallic inclusions, and many others. Knowledge regarding actual concentration and solubility of hydrogen in ferro-alloys, their emissivity, and other properties is also of importance. The nature of the interparticle interactions in melts is one of the fundamental characteristics of these alloys. All of this information is necessary for establishing the molecular kinetics nature of the alloys, the mechanisms of processes during their preparation, the crystallization kinetics of melts, and the complex genetic interactions taking place between solid and liquid phases in order to be able to control the structure of ingots. Thus, information regarding the interparticle interactions and structure of melts is necessary for defining the micro- and macroscopic characteristics of metallurgical processes, and to produce a better quality product. The main aims of the authors in writing this book were:
(1) Compilation of data regarding the properties of the mentioned alloys;
(2) Discussing the features of the interparticle interactions and structure of these alloys, using for this purpose physicochemical analysis methods, as well

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GEL'D, P. V., et al, Rasplavy Ferrosplavnogo Proizvodstva (Melts of the Ferro-Alloy Industry), Moscow, Metallurgiya, 1973, 288 pp

as utilizing information borrowed from related subjects (the theory of chemical bonds, physics of metals, molecular physics, and others); (3) Evaluation of methods and computational results regarding the thermodynamic characteristics of silicon and carbon melts.

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GEL'D, P. V., et al, Rasplavy Ferrosplavnogo Proizvodstva (Melts of the Ferro-Alloy Industry), Moscow, Metallurgiya, 1973, 288 pp

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GEL'D, P. V., et al, Rasplavy Ferrosplavnogo Proizvodstva (Melts of the Ferro-Alloy Industry), Moscow, Metallurgiya, 1973, 288 pp

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GEL'D, P. V., et al, Rasplavy Ferrosplavnogo Proizvodstva (Melts of the Ferro-Alloy Industry), Moscow, Metallurgiya, 1973, 288 pp

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USSR UDC 541.123:28

LEVIN, YE. S., KOSTINA, T. K., PETRUSHEVSKIY, M. S., GEL'D, P. V., and KUROCHKIN, K. T., Ural Polytechnic Institute

"Solubility of Hydrogen in Liquid Alloys of Cobalt and Aluminum"

Ordzhonikidze, Izvestiya Vysshikh Uchebnykh Zavedeniy, Tsvetnaya Metallurgiya No 1, 1973, pp 31-36

Abstract: The solubility of hydrogen was studied as a function of the composition of Co-Al alloys ($0 \leq x_{Al} \leq 1$) and temperature (1300-1700°C). The solubility percentage was determined from the hydrogen pressure in a closed system, with a determination error of ± 5.5%. The solubility of hydrogen in Co-Al alloys obeys the square root rule: $[H] = K\sqrt{P_{H_2}}$, where $[H]$ is the hydrogen concentration in alloy, weight percentage; P_{H_2} is the hydrogen pressure in gaseous phase, bar; and K is the hydrogen solubility in alloy (weight percentage/bar $^{\frac{1}{2}}$) which is numerically equal to its solubility in metal at P_{H_2} = 1 bar. The solubility process of hydrogen is accompanied by dissociation of H molecules into atoms (ions), and it changes according to the extremum rule with a minimum at 50-60 at% Al. The solubility process is of an endothermal nature and its dependence on temperature is described by $\log K = AT^{-1} + B$, where A and B are coefficients which depend only on

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LEVIN, YE. S., et al., Izvestiya Vysshikh Uchebnykh Zavedeniy, Tsvetnaya Metallurgiya, No 1, 1973, pp 31-36

alloy composition. Enthalpy and entropy of the solubility of atomic hydrogen in Co-Al alloys, coefficients of hydrogen activity, and interaction parameters of dissolved hydrogen indicate that the solubility of hydrogen in these alloys is determined by the structure of a shortrange order and by thepresence of microgroups in a melt of changeable composition (Co_xAl_y type). The solubility of hydrogen in Co-Al alloys also depends on Co and Al atoms which do not take part in the formation of localized bonds between Co and Al. The concentration and nature of the solvent atoms which do not participate in the formation of quasi-molecular Co_xAl_y complexes plays an important role in determining the solubility percentage of hydrogen in Co-Al alloys. The solubility of hydrogen at 1535, 1530, and 1630°C in the presence of $x_{Al} \leq 0.6$ is respectively,

$$x_{H,\ 1535^\circ C}^{Co,\ Al} = 0.00058 + 0.002056(x_{Al} - 0.6)^2$$

$$x_{H,\ 1580^\circ C}^{Co,\ Al} = 0.00069 + 0.001889(x_{Al} - 0.6)^2$$

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USSR

LEVIN, YE. S., et al., Izvestiya Vysshikh Uchebnykh Zavedeniy, Tsvetnaya Metallurgiya, No 1, 1973, pp 31-36

$$x_{H,\ 1630^{\circ}C}^{Co,\ Al} = 0.00076 + 0.001833(x_{Al} - 0.6)^2.$$

When $x_{Al} \geq 0.6$ the hydrogen solubility at the same temperatures is:

$$x_{H,\ 1535^{\circ}C}^{Co,\ Al} = 0.00058 + 0.004938(x_{Al} - 0.6)^2$$

$$x_{H,\ 1580^{\circ}C}^{Co,\ Al} = 0.00069 + 0.005312(x_{Al} - 0.6)^2$$

$$x_{H,\ 1630^{\circ}C}^{Co,\ Al} = 0.00076 + 0.006125(x_{Al} - 0.6)^2.$$

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USSR

UDC 54-162.2:546.824'26'21

ALYAMOVSKIY, S. I., ZAYNULIN, YU. G., SHVEYKIN, G. P., and GEL'D, P. V., Institute of Chemistry UNTs, Academy of Sciences USSR

"Concentration Relationship of the Degree of Filling the Unit Cell in Cubic Titanium Oxycarbide"

Moscow, Neorganicheskiye Materialy, Vol 9, No 4, Apr 73, pp 596-599

Abstract: Results are reported on a study of the effect of composition on the completeness of the TiC_xO_y lattice for $x + y = 0.7$ to $x + y = 1.2$, which practically encompasses the entire region of homogeneity for titanium oxycarbide. The characteristics of 39 samples of TiC_xO_y were used (13 from this work and 26 from previous works) to determine the equations for oxycarbides with $x + y$ equal to 0.70-1.20 using the relationship $n_{Ti} = f(x)$ and components A, B, and C yielding $n_{Ti} = Ax^2 + Bx + C$. It is noted that twinning defects exist in the lattices of oxygen-containing cubic tricomponent phases of transition metal-base oxycarbides and nitrocarbides. 1 figure, 3 tables, 22 bibliographic references.

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USSR

UDC 546.281 : 537.7

SIDORENKO, F. A., DMITRIYEV, Ye. A., and GEL'D, P. V., Ural Polytechnic Institute imeni S. M. Kirov

"Electron Energy Band in Chromium, Manganese, and Iron Monosilicides"

Tomsk, Izvestiya Vysshikh Uchebnykh Zavedeniy -- Fizika, No 8, 1972, pp 15-20

Abstract: The article describes results of measuring the dependence of the electric resistance (80-1000°K), thermoelectromotive force (80-700°K), and Hall coefficient (80-400°K) of chromium, manganese, and iron monosilicides on temperature, as well as calculations of characteristic parameters of the electron spectra of the compounds according to conventional formulas and according to narrow-band model formulas. The large effective masses, significant (10^{23} cm^{-3}) concentrations, and low charge carrier mobilities, as well as the small distances for the Fermi level (0.1-0.2 ev) from the band edges indicate a high density of states in the electron energy bands of Cr and Mn monosilicides. Transport phenomena in chromium and manganese monosilicides occur within a narrow band tenths of an electron-volt wide. At low temperatures the band can be considered relatively wide (the electron gas is degenerate), while at high temperatures it must be regarded as narrow (the degree of degeneracy of the gas declines). The only substantial difference between the bands is in the degree of fullness.

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UDC 669.715'25-537

USSR

LEVIN, Ye. S., GEL'D, P. V., and AYUSHINA, G. D., Ural Polytechnic Institute, Chair of Physics

"Electric Resistance of Liquid Alloys of Cobalt With Aluminum"

Ordzhonikidze, Izvestiya Vysshikh Uchebnykh Zavedeniy, Tsvetnaya Metallurgiya, No 5, 1972, pp 111-115

Abstract: The temperature-concentration dependences of the specific electric resistance of liquid alloys of cobalt with aluminum were experimentally investigated on specimens prepared from AV000 aluminum (99.98 %Al) and electrolytic cobalt containing less than 0.04% impurities. The investigation results are discussed by reference to diagrams showing the temperature dependence of the electroconductivity σ and the specific electric resistance ρ of aluminum, the polytherms, and the isotherm (1650°C) of ρ of liquid Al-Co alloys. The isotherm has an extreme character approximately in accordance with the equiatomic alloy. All alloys showed a notable increase of ρ when melting. A negative temperature coefficient of electric resistance was observed on liquid Al-rich alloys (81.9 and 76.5 at% Al). Alloys with high Co-content showed typical properties of metals. The peculiarities of electroconductivity of Al-Co melts are explained by the energetic non-equivalence of different interparticle actions. Three figures, three formulas, eleven bibliographic references.

USSR

NEVZOROVA, E. G., GOL'MYAKOV, B. P., RADOVSKIY, I. Z., GEL'D, P. V.

"Magnetic Susceptibility of Nickel and Iron at High Temperatures"

Moscow, Izvestiya Vysshikh Uchevnykh Zavedeniy, Chernaya Metallurgiya, No 9, 1972, pp 108-109.

Abstract: The temperature dependence of magnetic susceptibility of nickel and iron was studied by the Faraday method using a pendulum balance and a magnetic field of up to 12 koe. Electrolytic nickel (99.99% Ni) and iron of three types, carbonyl, iron type V-3, the same iron following zone purification and the same iron twice purified in an atmosphere of helium, were used. Below the melting point, the function χ^{-1} (T) is almost linear in nature. No significant change in magnetic susceptibility was found at the melting point of nickel. The characteristics of solid and liquid metal produced by calculation with the Curie-Weiss formulas are presented. The magnetic susceptibility of iron changes in a complex manner with temperature, and a graph is presented. Susceptibility changes according to the same curves during heating and during cooling. A slight anomaly in the temperature dependence of magnetic susceptibility of liquid iron is noted in all specimens in the 1,620-1,700°C temperature range.

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USSR

UDC 669.01:536.425:536.2.001.2

ZINOV'YEV, V. YE., KRENTSIS, R. P., GEL'D, P. V.

"Effect of Phase Transformation and Thermal Defects on the Thermal Conductivity and Thermal Diffusivity of Ti, Fe, Co, Ni, Pt and certain Steels at High Temperatures"

V sb. Fiz.-khim. osnovy proiz-va stali (Physical-Chemical Principles of Steel Production — collection of works), Moscow, Nauka Press, 1971, pp 91-96 (from RZh--Metrologiya i Izmeritel'naya Tekhnika, No 3, Mar 72, Abstract No 3.32.979)

Translation: The block diagram is presented for a device on which the method of plane temperature waves is used to measure the coefficient of thermal diffusivity in thin plane-parallel plates of metals and alloys at temperatures above 700° C. Results are presented for measuring the coefficients of thermal diffusivity of Ti, Fe, Co, Ni, Pt and EI929, EI826, EI47B3 and EI435 steel. The thermal conductivity of the given metals and alloys was calculated using the published data on the density and heat capacity. There are 4 illustrations and a 27-entry bibliography.

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USSR

UDC 669.24.782:537.31

BAUM, B. A., GEL'D, P. V., and TYAGUNOV, G. V., Ural Polytechnical Institute, Physics Department

"Influence of Temperature on the Electrical Resistance of Lower Silicides of Nickel"

IVUZ, Tsvetnaya Metallurgiya, No 2, 1971, pp 53-57.

Abstract: Specimens for investigation were prepared by melting electrolytic high-purity nickel and monocrystalline silicon in a high-frequency induction furnace. Resistivity was measured by a contactless method in aluminum oxide (or zirconium oxide) crucibles in an atmosphere of helium. The results indicated that liquid alloys of nickel with silicon are characterized by heterogeneous interatomic bonds and complex near order structure, which changes with composition and may differ, depending on the heating and cooling conditions of the liquid alloy.

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USSR

UDC 546.821'28:67

RABINOVICH, B. S., RADOVSKIY, I. Z., KOZLOV, F. N., SIDORENKO, F. A., and GEL'D, P. V., Ural Polytechnical Institute imeni S. M. Kirov

"Electrical and Magnetic Properties of TiSi and $TiSi_2$"

Moscow, Neorganicheskiye Materialy, Vol 6, No 12, Dec 70, pp 2202-2204

Abstract: The composition and structural characteristics of TiSi and $TiSi_2$ preparates were studied chemically, metallographically, roentgenographically, and densitometrically. The data produced confirmed the single-phase and stoichiometric nature of the silicides, as well as the great complexity of their lattices.

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USSR

UDC 669.25'71:536.722

PETRUSHEVSKIY, M. S., YESIN, Yu. O., GEL'D, P. V., and SANDAKOV, V. M.

"Effect of Short-Range Order on the Heats of Mixing of Cobalt Melts With Aluminum"

Ordzhonikidze, Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, No 2, 1972, pp 21-25

Abstract: According to earlier research by the same authors, cobalt melts with aluminum represent a system with strong interaction between the particles of dissimilar components which does not follow the regularities of the theory of regular solutions. The thermodynamic characteristics of such alloys can be described only by taking into account the effect of the short range order. This study used this approach to estimate the interatomic interaction energies in molten Co-Al alloys, calculate their heats of mixing at 1670°C, and to provide information on the temperature-concentration dependences of their kinematic viscosity and density. (3 illustrations, 6 bibliographic references). /Ural Polytechnic Institute, Department of Physics/

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USSR

UDC: 669.018.6:536.41

KREMTSIS, R. P., KALISHEVICH, G. I., GEL'D, P. V., and ANDREYEVA, L. P.

"Thermal Expansion of Chromium, Manganese, Iron, and Cobalt Silicides"

Tomsk, Izvestiya VUZ--Fizika, No 1, 1972, pp 153-155

Abstract: This brief communication gives the results of measurements made by the authors of the coefficients of linear expansion of various specimens as a function of heat in a temperature range of 100 to 1000° K. The specimens were chromium, manganese, iron, and cobalt silicides having the same cubic structure of the B20 type. The specimens were made of 99.98% Cr by weight; 99.95% Mn; 99.95% Fe; 99.98 Co; and monocrystalline silicon, 99.997% Si in an induction furnace of the MVP-3M type, in an argon atmosphere. After alloying, the specimens were sucked up in quartz capillary tubes 3-4 mm in diameter. The errors made in the measurements did not exceed 2-3%, except for the lowest temperature region of 100-200° K, when the error amounted to 4-5%. Curves are given for the expansion coefficients as functions of the temperature, and a table giving some characteristics of the four types of monosilicides is presented. The authors are connected with the S. M. Kirov Ural Polytechnical Institute.

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USSR UDC 669.295'71---176

SHISHMAKOV, A. S., ADAMESKU, R. A., and GEL'D, P. V.

"Cold Rolling Texture in Ti-Al Alloys"

Moscow, Izvestiya Akademii Nauk SSSR, Metally, No 2, Mar-Apr 72, pp 123-129

Abstract: Titanium alloyed with aluminum (0.36, 0.59, 1.04, 2.0, and 3.58% Al) was cast into 40-g ingots and hot rolled at 1100°C to a thickness of 10 mm followed by warm rolling at 800°C to a thickness of 4mm. The sheets were then anneale at 750°C for 1.5 hours. Cold rolling was performed to deformations of 20, 40, 60, and 70% in one direction on a mill with 260-mm diameter rolls. Final working of the alloys to 90% total reduction was done on a laboratory mill with 50-mm-diameter rolls. Texture was examined by x-ray diffraction.

It was ascertained that alloying titanium with aluminum alters cold rolling texture from (0001)+ ∠ NN-PN /10$\bar{1}$0/ (unalloyed titanium and alloys containing up to 1% Al) to (0001)+ ∠ NN-NP/10$\bar{1}$0/ and (0001)/10$\bar{1}$0/(alloys containing from 2 to 4% Al). /NN--direction normal to plane of the sheet; PN--transverse direction relative to direction of rolling; NP--direction of rolling/.

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USSR

SHISHMAKOV, A. S., et al., Izvestiya Akademii Nauk SSSR, No 2, Mar-Apr 72, pp 123-129

It was concluded that the texture change starts sooner in the internal layers as opposed to the external layers and that with increased aluminum content the start of texture alteration shifts to the region of minimum deformation. In alloys with 1-2% aluminum, in the region of average deformations (ε = 60 and 40% respectively), there was observed an asymmetrical distribution of basal planes relative to the transverse direction. Four figures, 1 table, 9 bibliographic references.

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USSR UDC [546.821'21'261]:536.631+536.66+536.75

CHERNYAYEV, V.S., SHVEYKIN, G.P. and GEL'D, P.V., Ural Polytechnic Institute

"Heat Capacity, Entropy, and Enthalpy of Titanium Oxycarbides at Reduced Temperatures"

Moscow, Izvestiya Akademii nauk SSSR, Neorganicheskiye materialy, Vol 8, No 3, Mar 72, pp 459-463

Abstract: Discussed here is the temperature dependence of the thermal capacity of Ti oxycarbides of a close composition to the quasi-binary section TiC-TiO (i.e. with $x + y \approx 1$). Use was made of a low-temperature adiabatic calorimeter to measure (at 55-300°K) the heat capacity of equiatomic Ti monoxide and monocarbide as well as their relative solid solutions of TiC_xO_{1-x}. The entropy, changes in the enthalpies, and the characteristic temperatures of Ti oxicarbides are calculated from the experimental

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CHERNYAYEV, V.S., et al, Izvestiya Akademii nauk SSSR, Neorganicheskiye materialy, Vol 8, No 3, Mar 72, pp 459-463

data. It has been possible to approximate the experimental data on the thermal capacity and entropy of Ti oxicarbides using the simplest rule of additivity. It is suggested that the linear nature of the relationships between the heat capacities and entropies is related with their tendency to ordering. It is noted that the regular drop in the characteristic temperatures of Ti oxycarbides with the increase of oxygen in them is caused basically by the increasing screening of M-M interactions. (3 illustr., 2 tables 16 biblio. ref).

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USSR

UDC 546.831'171.1-21

ZAYNULIN, YU. G., ALYAMOVSKIY, S. I., SHVEYKIN, G. P., GEL'D, P. V.

"Domain of Homogeneity of Zirconium Oxynitride With NaCl Structure, at 1,500°C"

Moscow, Zhurnal Neorganicheskoy Khimii, Vol 16, No 2, 1971, pp 315-317

Abstract: The binary systems Zr-N and Zr-O have been studied in detail; however, there is no information on the ternary system, and especially its cubical component (of NaCl type). Only a few papers have appeared dealing with certain characteristics of ZrN_xO_y with low oxygen content, and those dealing with partial ZrO_2-ZrN systems.

Using 99.9 percent pure ZrO_2 and oxynitrides of composition $ZrN_{0.76}O_{0.12}$ and $ZrN_{0.87}O_{0.12}$, and also 99.9 percent pure Zr powder as starting materials, the authors prepared samples for X-ray analysis and determination of Zr and N content.

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USSR

ZAYNULIN, YU. G., et al, Zhurnal Neorganicheskoy Khimii, Vol 16, No 2, 1971, pp 315-317

It was found that at 1,500°C and 10^{-5} mm pressure, the domain of homogeneity of zirconium oxynitride with NaCl structure is limited ($y_{max} \simeq \simeq 0.3$, while the lattice periods, within these limits, vary only very slightly (from 4.574 to 4.575 Å). For ZrN_xO_y, vacant points are a distinctive feature, both in the sublattice of the metal and in that of the nonmetal.

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USSR

UDC 532.13:546.76

TYAGUNOV, G. V., BAUM, B. A., and GEL'D, P. V., Urals Polytechnic Institute imeni S. N. Kirov

"Kinematic Viscosity of Liquid Alloys of Chromium With Carbon"

Tomsk, Izvestiya Vysskhik Uchebnykh Zavedeniy, Fizika, No 8(111), 1971, pp 159-160

Abstract: A study was made of the variation with temperature and concentration of the viscosity and thermodynamic characteristics of the elementary viscous flow in liquid alloys of chromium with carbon. The temperature range was 1675-1925°. The plots of the ploytherms of kinematic viscosity of liquid alloys of chromium with carbon, isotherms of viscosity, change in isobaric-isothermal potential ΔZ, entropy ΔS, and energy of activation E of the viscous flow of chromium-carbon alloys showed that at 1850° the viscosity of alloys at first decreases with increased carbon content and then, beginning with 5.45 weight % C (the carbide $Cr_{23}C_6$) increases. At higher temperatures, due to the greater energy of thermal motion of particles, microinhomogeneity is less developed and its effect on viscosity with increase in carbon concentration is compensated by the rise of energies of interparticle interaction. Beginning with 5.5% C directed

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USSR

TYAGUNOV, G. V., et al., Izvestiya Vysskhik Uchebnykh Zavedeniy, Fizika, No 8(111), 1971, pp 159-160

Cr-C bonds become so well developed that the number of microdomanins consisting only of "excess" chromium atoms is appreciably reduced and the melt becomes more homogeneous. In this case the rise in bonding energy is decisive; therefore, the viscosity and energy of activation of viscous flow are increased. The study thus indicates that in alloys of chromium with carbon the energy nonequivalence of the Cr-Cr and Cr-C bonds is maintained also in the domain of the liquid state up to temperatures of at least 1900°.

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USSR UDC 546.821'28:67

RABINOVICH, B. S., RADOVSKIY, I. Z., KOZLOV, F. N., SIDORENKO, F. A., and GEL'D, P. V., Ural Polytechnical Institute imeni S. M. Kirov

"Electrical and Magnetic Properties of TiSi and $TiSi_2$"

Moscow, Neorganicheskiye Materialy, Vol 6, No 12, Dec 70, pp 2202-2204

Abstract: The composition and structural characteristics of TiSi and $TiSi_2$ preparates were studied chemically, metallographically, roentgenographically, and densitometrically. The data produced confirmed the single-phase and stoichiometric nature of the silicides, as well as the great complexity of their lattices.

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USSR

UDC 669.24.782:537.31

BAUM, B. A., GEL'D, P. V., and TYAGUNOV, G. V., Ural Polytechnical Institute, Physics Department

"Influence of Temperature on the Electrical Resistance of Lower Silicides of Nickel"

IVUZ, Tsvetnaya Metallurgiya, No 2, 1971, pp 53-57.

Abstract: Specimens for investigation were prepared by melting electrolytic high-purity nickel and monocrystalline silicon in a high-frequency induction furnace. Resistivity was measured by a contactless method in aluminum oxide (or zirconium oxide) crucibles in an atmosphere of helium. The results indicated that liquid alloys of nickel with silicon are characterized by heterogeneous interatomic bonds and complex near order structure, which changes with composition and may differ, depending on the heating and cooling conditions of the liquid alloy.

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USSR UDC 669.24:538.27

ZELENIN, L. P., BASHKATOV, A. N., SIDORENKO, F. A., and GEL'D, P. V., Ural Polytechnical Institute imeni S. M. Kirov

"Magnetic Susceptibility of the β-Phase of the Ni-Al System"

Sverdlovsk, Fizika Metallov i Metallovedeniye, Vol 30, No 4, Oct 70, pp 740-745

Abstract: Measurements were made of β-phase specimens of the Ni-Al system to determine the magnetic susceptibility at 20-600° K and the electrical resistance at room temperature. X-ray-metallographic investigations and density measurements substantiated the results. A specific point on the composition-property diagrams is attained at 50 at. % Al. The magnetic susceptibility of β-phase specimens is related to the Pauli type. The density estimate of electronic states for the NiAl equiatomic alloy is ~0.49 1/ev·molecul.

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USSR UDC 669.15:548.526

GOL'TSOV, V. A., KOSHELEVA, V. Yu., KAGAN, G. Ye., ANDREYEVA, L. P., AINOV'YEVA, G. P., and GEL'D, P. V., Ural Polytechnical Institute imeni S. M. Kirov

"Influence of the K-State on Diffusion and Solubility of Hydrogen and Mechanical Characteristics of Kh20N80 Alloy"

Moscow, Fizika Metallov i Metallovedeniye, Vol 30, No 5, 1970, pp 957-962

Abstract: The temperature dependence of the modulus of elasticity and internal friction (300-650°), permeability, diffusion, and solubility of hydrogen (350-900°C) in Kh20N80 alloy was studied. The effects discovered were compared with results produced earlier on the influence of long- and short-range order and the K-state in alloys on the behavior of the hydrogen dissolved in them. It was determined that the modulus of elasticity and internal friction are sensitive to the formation and disruption of the K-state in nichrome. The activation energy for formation of the K-state, calculated on the basis of results of measurements of internal friction, is 42 Kcal/mol. This value agrees well with the activation energy calculated from measurement of hydrogen permeability (about 40 Kcal/mol). It was established that the atomic regroupings resulting

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GOL'TSOV, V. A., et al, Fizika Metallov i Metallovedeniye, Vol 30, No 5, 1970, pp 957-962

in formation of the K-state sharply change the diffusion coefficient D and the solubility of hydrogen S in Kh20N80 alloy. D decreases significantly, while S increases significantly, as a result of which the hydrogen permeability p = D*S is less sensitive to these changes in the structure of the alloys.

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1/2 013 UNCLASSIFIED PROCESSING DATE--16OCT70

TITLE--NEUTRON DIFFRACTION STUDY OF THE STRUCTURE OF TITANIUM OXYCARBIDES -U-

AUTHOR-(05)-ZUBKOV, V.G., MATVEYENKO, I.I., DUBROVSKAYA, L.B., BOGOKOLOV, G.D., GELD, P.V.

COUNTRY OF INFO--USSR

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PROXY REEL/FRAME--1995/1114 STEP NO--UR/0020/70/191/002/0323/0325

CIRC ACCESSION NO--AT0116580

UNCLASSIFIED

2/2 013 UNCLASSIFIED PROCESSING DATE--16OCT70

CIRC ACCESSION NO--AT0116580

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE ELEC. RESISTANCE WAS MEASURED AT 298DEGREESK FOR A SERIES OF SAMPLES OF TIC SUBX O SUBY (X PLUS Y EQUALS 1), AND TIC SUB0.44 O SUB0.57 WAS STUDIED BY NEUTRON DIFFRACTION. THE SAMPLES WERE PREPD. BY A METHOD DESCRIBED EARLIER (L. PIVOVAROV ET AL., 1967). THE CONCN. DEPENDENCE OF THE RESISTANCE IS CHARACTERISTIC FOR ORDERED SYSTEMS, AND THIS WAS SUPPORTED BY THE NEUTRON DIFFRACTION DATA. THE O AND C ATOMS ARE IN AN ORDERED POSITION IN THE NONMETALLIC SUBLATTICE. FOR COMPNS. THAT ARE NOT EQUI AT., THE ATOMS OF THE EXCESS COMPONENT OCCUPY UNIQUE POSITIONS IN THE STATISTICALLY VACANT POSITIONS FOR THE DEFICIENT COMPONENT. FACILITY: INST. KHIM., SVERDLOVSK, USSR.

UNCLASSIFIED

1/2 026 UNCLASSIFIED PROCESSING DATE--18SEP70

TITLE--ANISTROPY OF THE THERMAL EXPANSION OF IRON DIGERMANIDE -U-

AUTHOR-(03)-KRENTSIS, R.P., MIKHELSON, A.V., GELD, P.V.

COUNTRY OF INFO--USSR

SOURCE--FIZ. TVERD. TELA 1970, 12(3), 933-4

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS, PHYSICS

TOPIC TAGS--PHYSICAL CHEMISTRY PROPERTY, SINGLE CRYSTAL, IRON COMPOUND, GERMANIUM COMPOUND, IRON COMPOUND, THERMAL EXPANSION, PHASE TRANSITION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1988/0583 STEP NO--UR/0181/70/012/003/0933/0934

CIRC ACCESSION NO--AP0105566

UNCLASSIFIED

2/2 026 UNCLASSIFIED PROCESSING DATE--18SEP70

CIRC ACCESSION NO--AP0105566

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE LINEAR EXPANSION COEFF. WAS MEASURED AT 90-480DEGREES K BY USING 2 SPECIMENS CUT FROM A SINGLE CRYSTAL OF FEGE SUB2 IN THE DIRECTIONS (001) AND (100). THE DATA OBTAINED ARE GENERALIZED GRAPHICALLY AND THEY INDICATE A CONSIDERABLE ANISOTROPY OF THE PHYS. PROPERTIES OF THE COMPD. FEGE SUB2 AND SHARP ANOMALIES OF THEIR TEMP. DEPENDENCES IN THE REGION OF THE TRANSFORMATION. DIFFERENCE IN SIGN AND THE MAGNITUDE OF THE ANOMALIES ON THE CURVES ALPHA (TAU) ARE APPARENTLY RELATED TO THE DIFFERENCES IN THE CHARACTER OF THE EXCHANGE INTERACTION BETWEEN FE ATOMS LOCATED IN THE SAME AND NEIGHBORING BASIS PLANES OF THE TETRAGONAL STRUCTURE OF FEGE SUB2. THE TEMP. SHIFT OF THE NEEL TEMP. CAN BE ATTRIBUTED EITHER TO BROADENING OF THE TRANSFORMATION OR TO THE PRESENCE OF A SERIES OF SUCCESSIVE PHASE TRANSITIONS.

UNCLASSIFIED

1/2 021 UNCLASSIFIED PROCESSING DATE--11SEP70

TITLE--DIFFUSION AND SOLUBILITY OF HYDROGEN IN ORDERING ALLOYS OF THE CU
SUB3 AU TYPE -U-

AUTHOR--VYKHODETS, V.B., GOLTSOV, V.A., GELD, P.V.

COUNTRY OF INFO--USSR

SOURCE--UKRAIN. FIZ. ZHUR. JAN. 1970, 15, (1), 107-110

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--ORDERED ALLOY, COPPER ALLOY, GOLD CONTAINING ALLOY, NICKEL ALLOY, IRON CONTAINING ALLOY, DIFFUSION COEFFICIENT, HYDROGEN, SOLUBILITY, METAL CONTAINING GAS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1989/1202 STEP NO--UR/0135/70/015/001/0107/0110

CIRC ACCESSION NO--AP0107678

UNCLASSIFIED

2/2 021 UNCLASSIFIED PROCESSING DATE--11SEP70

CIRC ACCESSION NO--AP0107678

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE DIFFUSION AND DISSOLUTION OF THE CU SUB3 AU AND NI SUB3 FE TYPES ARE DISCUSSED ON THE BASIS OF EXISTING THEORETICAL MODELS AND FRESH EXPERIMENTAL DATA. THEORETICALLY PREDICTED SHARP JUMPS IN THE BROADLY BORNE OUT BY THE EXPERIMENTAL RESULTS, PARTICULARLY IN THE CASE OF NI SUB3 FE. SLIGHT DISCREPANCIES IN THE CASE OF CU SUB3 AU ARE ATTRIBUTED TO THE CONSIDERABLE DIFFERENCES IN THE SIZES OF THE ATOMS INVOLVED. 9 REF.

UNCLASSIFIED

1/2 021 UNCLASSIFIED PROCESSING DATE--11SEP70

TITLE--POSSIBILITY OF ORDERED INTERMETALLIDE V SUB3 AL FORMATION -U-

AUTHOR--SHTOLTS, A.K., ZAGRYAZHSKIY, V.L., GELD, P.V., SURIKOV, V.I.

COUNTRY OF INFO--USSR

SOURCE--UKR. FIZ. ZH. (RUSS. ED.) 1970, 15(1), 118-19

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--ORDERED ALLOY, VANADIUM ALLOY, CRYSTAL STRUCTURE, ALUMINUM CONTAINING ALLOY, X RAY DIFFRACTION ANALYSIS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1989/1343 STEP NO--UR/0185/70/015/001/0118/0119

CIRC ACCESSION NO--AP0107816

ZZZZZZZZZZZ UNCLASSIFIED

2/2 021 UNCLASSIFIED PROCESSING DATE--11SEP70

CIRC ACCESSION NO--AP0107816

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE ALLOY V SUB3 AL WAS PREPD. BY MELTING THE METALS (25 AT. PERCENT V) IN PRESENCE OF AT. THE INGOT WAS ANNEALED AT 1000DEGREES FOR 80 OR 180 HR. X RAY POWDER PHOTOGRAPH REVEALED DISORDERED AL SOLID SOLN. IN V AND STRONGLY DIFFUSED LINES WHICH COULD BE DUE TO A CUBIC LATTICE OF TYPE CR SUB3 SI, A EQUALS 4.81 ANGSTROMS.

ZZZZZZZZZZZZ UNCLASSIFIED

1/2 023 UNCLASSIFIED PROCESSING DATE--18SEP70

TITLE--THERMAL CONDUCTIVITY AND THERMAL DIFFUSIVITY OF IRON MONOSILICIDE -U-

AUTHOR-(03)-KRENTSIS, R.P., OSTROVSKIY, F.I., GELD, P.V.

COUNTRY OF INFO--USSR

SOURCE--FIZ. TEKH. POLUPROV. 1970, 4(2), 403-5

DATE PUBLISHED--------70

SUBJECT AREAS--PHYSICS, CHEMISTRY

TOPIC TAGS--IRON COMPOUND, THERMAL CONDUCTIVITY, SILICON COMPOUND, ELECTRICAL CONDUCTIVITY, SILICON SEMICONDUCTOR

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1988/0573 STEP NO--UR/0449/70/004/002/0403/0405

CIRC ACCESSION NO--AP0105558

UNCLASSIFIED

2/2 023 UNCLASSIFIED PROCESSING DATE--18SEP70

CIRC ACCESSION NO--AP0105558

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. SINGLE CRYSTALS OF FESI WERE GROWN FROM THE MELT BY THE CZOCHRALSKI METHOD, THE FESI BEING PREPD. FROM CARBONYL FE AND SEMICONDUCTOR GRADE SI. THE THERMAL COND. WAS MEASURED BY USING EQUIPMENT DESCRIBED PREVIOUSLY (L. P. FILIPPOV, 1967) OVER THE TEMP. RANGE 400-900DEGREES, WHILE THE ELEC. RESISTANCE WAS MEASURED POTENTIOMETRICALLY. AN EQUATION IS GIVEN RELATING THE ELEC. RESISTANCE AND THE THERMAL COND. THIS IS THEN USED TO CALCULATE THE LORENZ NO. FOR FESI OVER THE TEMP. RANGE 1200-1600DEGREES WHERE THE ELEC. RESISTANCE IS ALMOST CONST. THE VALUES OBTAINED WERE L SUBMIN. EQUALS 3.1 TIMES 10 PRIME NEGATIVE8 V PRIME2-DEGREE PRIME2 AND L SUBMAX. EQUALS 3.4 TIMES 10 PRIME NEGATIVE8 V SUB2, DEGREE PRIME2, WHICH ARE SIGNIFICANTLY HIGHER THAN THE VALUE FOR METALS, I. E. 2.45 TIMES 10 PRIME NEGATIVE8 V PRIME2-DEGREE PRIME2.

UNCLASSIFIED

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USSR

LEVIN, Ye. S., [illegible], and [illegible] P. V., Sverdlovsk

"Viscosity of Ni-Al Melts"

Moscow, Izvestiya Akademii Nauk SSSR, Metally, No 4, Jul-Aug [illegible], pp [illegible]

Abstract: Temperature and concentration characteristics of the kinematic viscosity of Ni-Al melts were investigated on a series of samples of pure Al and pure Ni by the oscillating-torsion method on the basis of the logarithmic damping decrement. The accuracy of the determined viscosity from the formula for highly viscous liquids was 5-20%. In order to explain the characteristics of interparticle correlations in Ni-Al melts, the effect of their chemical composition on the viscosity at constant temperature was investigated. The [illegible] are discussed by reference to diagrams. It is shown that the [illegible] dependencies of the viscosity and [illegible] of the melts on the [illegible] of the viscous flow process do not comply with the additivity rule. The viscosity characteristics, the densities, and the surface energies of the investigated Ni-Al alloys are optimized by the formation of chemical [illegible] in the composition and structure of these groups refine the physico-chemical properties of the fusions.

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1/2 045 UNCLASSIFIED

TITLE--THERMOPHYSICAL AND THERMODYNAMIC CHARACTERISTICS OF MOLTEN ALLOYS OF IRON WITH CHROMIUM -U-

AUTHOR-(03)-PAVARS, I.A., BAUM, B.A., GELD, P.V.

COUNTRY OF INFO--USSR

SOURCE--TEPLOFIZ. VYS. TEMP. 1970, 8(1), 72-6

DATE PUBLISHED----------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--CHROMIUM ALLOY, HEAT OF FORMATION, ENTHALPY, ENTROPY, METAL PHASE SYSTEM, PHASE ANALYSIS, LIQUID METAL, IRON ALLOY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1994/1938 STEP NO--UR/0294/70/008/001/0072/0076

CIRC ACCESSION NO--AP0115746

UNCLASSIFIED

2/2 045 UNCLASSIFIED PROCESSING DATE--13NOV70

CIRC ACCESSION NO--AP0115746

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. VAPOR PRESSURES OF MOLTEN ALLOYS OF FE WITH CR WERE DETD. AT 1600-1700DEGREES FOR VARIOUS FRACTIONS OF CR (N SUBCR EQUALS 0-0.62) BY THE LARGE DROP METHOD. INTEGRAL HEAT OF EVAPN., ACTIVITIES OF ALL COMPONENTS, INTEGRAL FORMATION ENTHALPY, ENTROPY, AND ISOBARIC POTENTIAL OF MOLTEN ALLOYS WERE CALCD. THE SLIGHT DEVIATIONS FROM IDEALITY CAN BE EXPLAINED BY STRONG DONOR ACCEPTOR INTERACTIONS OF FE AND CR ATOMS IN A LIQ. PHASE. FACILITY: URAL. POLITEKH. INST. IM. KIROVA, SVERDLOVSK, USSR.

UNCLASSIFIED

1/2 033 UNCLASSIFIED PROCESSING DATE--04DEC70

TITLE--EFFECT OF THE STRUCTURE OF STEEL ON THE HYDROGEN DIFFUSION COEFFICIENT -U-

AUTHOR-(04)-VOLKOV, V.YE., RYABOV, R.A., KODES, YE.S., GELD, P.V.

COUNTRY OF INFO--USSR

SOURCE--FIZ. METAL METALLOVED. 1970, 29(2), 431-2

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DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--HYDROGEN, GAS DIFFUSION, METALLURGIC RESEARCH FACILITY, STEEL MICROSTRUCTURE, ALLOY DESIGNATION, DIFFUSION COEFFICIENT/(U)34KHM LOW ALLOY STEEL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3001/0338 STEP NO--UR/0126/70/029/002/0431/0432

CIRC ACCESSION NO--AP0126094

UNCLASSIFIED

2/2 033 UNCLASSIFIED PROCESSING DATE--04DEC70

CIRC ACCESSION NO--AP0126094

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE EFFECT WAS STUDIED OF THE STRUCTURE OF STEEL ON THE H DIFFUSION COEFF. UNDER GAS ELEC. DISCHARGE CONDITIONS. THE EXPTL. SETUP AND THE PROCEDURE USED HAVE BEEN DESCRIBED PREVIOUSLY. SAMPLES OF STEEL 34KHM IN THE FORM OF DISKS 37 MM IN DIAM. AND 1.0-1.6 MM THICK WERE USED. THE CHEM. COMPN. OF THE STEEL WAS: C 0.35; CR 1.10, MO 0.25, SI 0.33, AND MN 0.56 WT. PERCENT. THE STEEL HAD A PLATELETLIKE PEARLITE STRUCTURE. ON GROUP OF SAMPLES WAS VACUUM ANNEALED AT 850DEGREES FOR 1 HR, WHEREUPON IT WAS COOLED WITH THE FURNACE. THE ANNEALED SAMPLES HAD A GRANULAR PEARLITE STRUCTURE. THE 2ND GROUP OF THE SAMPLES WAS HELD IN A PB BATH AT 850DEGREES FOR 30 MIN, WHEREUPON IT WAS QUENCHED IN OIL. THE QUENCHED SAMPLES HAD THE MARTENSITIC STRUCTURE. THE LOWEST DIFFUSION COEFF. IS IN THE STRESSED MARTENSITIC STRUCTURE AND AMTS. TO 2.8 TIMES 10 PRIME NEGATIVE7 CM RPIME2-SEC; THE HIGHEST DIFFUSION COEFF. IS IN THE ANNEALED STRUCTURE OF GRANULAR PEARLITE AND AMTS. TO 6.3 TIMES 10 PRIME NEGATIVE7 CM PRIME2-SEC. THE DIFFUSION COEFF. IN THE PLATELETLIKE PEARLITE WAS 4.5 TIMES 10 PRIME NEGATIVE7 CM PRIME2-SEC. FACILITY: URAL. POLITEKH. INST. IM. KIROVA, SVERDLOVSK, USSR.

UNCLASSIFIED

1/2 028 UNCLASSIFIED PROCESSING DATE--23OCT70

TITLE--EFFECT OF THE FORMATION OF K STATE ON THE HYDROGEN PERMEABILITY OF KH2ON80 ALLOY -U-

AUTHOR-(03)-GOLTSOV, V.A., GELD, P.V., KOSHELEVA, V.YU.

COUNTRY OF INFO--USSR

SOURCE--IZV. VYSSH. UCHEB. ZAVED., CHERN. MET. 1970, 13(2), 97-101

DATE PUBLISHED-------70

SUBJECT AREAS--MECH., IND., CIVIL AND MARINE ENGR

TOPIC TAGS--CHROMIUM NICKEL ALLOY, NICKEL BASE ALLOY, ALLOY DESIGNATION, HYDROGEN, PERMEABILITY, ACTIVATION ENERGY, FLUID PERMEABILITY/(U)KH2ON80 NICKEL BASE ALLOY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1996/1658 STEP NO--UR/0148/70/013/002/0097/0101

CIRC ACCESSION NO--AT0118637 UNCLASSIFIED

2/2 028 UNCLASSIFIED PROCESSING DATE--23OCT70

CIRC ACCESSION NO--AT0118637

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. TUBULAR SPECIMENS WERE STUDIED OF THE CR-NI ALLOY KH20N80 (CR 15 OR 20, C 0.08, MN 0.3, AND SI 0.5 WT. PERCENT) WITH DIAM. 20 MM AND PROVIDED WITH A MEMBRANE IN THE MIDDLE 1.5-2 MM THICK. THESE SPECIMENS WERE HEATED PRELIMINARILY IN VACUUM TO 1100DEGREES, HELD 1 HR, AND QUENCHED IN WATER. THE H PERMEABILITY OF THE ALLOY ANNEALED AT 550-850 (WHEN DETD. AT 650DEGREES) WAS A FACTOR OF SIMILAR TO 3 LESS THAN THAT OF THE SAME ALLOY AFTER ANNEALING AT 330-500DEGREES. THIS LOWERING IS ASCRIBED TO THE REDISTRIBUTION OF THE ALLOYING ELEMENTS OWING TO THE FORMATION OF THE K STATE. THE ACTIVATION ENERGY OF THE K STATE FORMATION WAS DETD. AS 40 KCAL-MOLE, WHICH IS MUCH LOWER THAN SIMILAR ACTIVATION ENERGIES DETD. FROM ELEC. COND. (57-80 KCAL-MOLE). FACILITY: URAL. POLITEKH. INST., SVERDLOVSK, USSR.

UNCLASSIFIED

1/2 033 UNCLASSIFIED PROCESSING DATE--30OCT70

TITLE--THERMAL DIFFUSIVITY AND THERMAL CONDUCTIVITY OF SOLID SOLUTIONS OF SILICON IN IRON AND COBALT -U-

AUTHOR-(04)-KRENTSIS, R.P., ZINOVYEV, V.YE., ANDREYEVA, L.P., GELD, P.V.

COUNTRY OF INFO--USSR

SOURCE--FIZ. METAL. METALLOVED. 1970, 29(1), 118-23

DATE PUBLISHED--------70

SUBJECT AREAS--MATERIALS, PHYSICS

TOPIC TAGS--THERMAL CONDUCTIVITY, SOLID SOLUTION, IRON ALLOY, COBALT ALLOY, SILICON CONTAINING ALLOY, CURIE POINT, THERMAL DIFFUSION, HIGH PURITY METAL, PHONON SCATTERING

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1998/0941 STEP NO--UR/0126/70/029/001/0118/0123

CIRC ACCESSION NO--AP0121543

UNCLASSIFIED

2/2 033 UNCLASSIFIED PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0121543

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE THERMAL DIFFUSIVITY OF A SOLID SOLN. OF SI IN FE (UP TO 8.2 WT. PERCENT SI), OF SI IN CO (UP TO 3 WT. PERCENT SI), AND OF PURE CO WAS DETD. IN THE REGION OF THE CURIE TEMP. (T SUBC). IN EACH CASE, THE POLYTHERM OF THERMAL DIFFUSIVITYS HOWS A MIN. IN THE REGION OF T SUBC. AWAY FROM T SUBC, AN APPROX. LOGARITHMIC DEPENDENCE WAS OBSD. OF THERMAL DIFFUSIVITY ON T-T SUBC. THE DEPENDENCE IS MORE COMPLEX CLOSE TO T SUBC. A MIN. IN THE THERMAL COND. POLYTHERMS AT T SUBC ARE A RESULT OF A STRONG PHONON ELECTRON AND PHONON SPIN SCATTERING. THE MECHANISM OF SCATTERING AND TRANSFER IN FERROMAGNETIC SYSTEM IS DISCUSSED. FACILITY: URAL. POLITEKH. INST.IM. KIROVA, SVERDLOVSK, USSR.

UNCLASSIFIED

USSR

UDC (546.72'28 + 546.73'28):548.55

FROLOV, A. A., KRENTSIS, R. P., and GEL'D, P. V., Ural Polytechnic Institute imeni S. M. Kirov, Sverdlovsk, Ministry of Higher and Secondary Specialized Education RSFSR

"Growth of FeSi and CoSi Single Crystals by Czochralski Method"

Moscow, Izvestiya Akademii Nauk SSSR -- Neorganicheskiye Materialy, Vol 6, No 4, Apr 70, pp 828-829

Abstract: The article describes the growth of FeSi and CoSi single crystals by the Czochralski method. The starting materials were K-0 brand cobalt, V-3 brand carbonyl iron and single-crystal silicon. Single crystals were grown from the melt on a ZhK 01.01 device (with graphite heater) in a vacuum of $5 \cdot 10^{-5}$ mm Hg. Pulling rate 0.5-0.75 mm/min. The crucible and seed rotated in opposite directions at 30 and 45 rpm respectively. In some cases the upper rod remained immobile. The crucibles were of Al_2O_3. The composition of the grown single crystals was determined by X-ray from lattice parameters. The microhard-

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USSR

FROLOV, A. A., et al., Izvestiya Akademii Nauk SSSR -- Neorganicheskiye Materialy, Vol 6, No 4, Apr 70, pp 828-829

ness of unetched sections was measured on a PMT-3 device and was found to remain constant according to ingot length, which indicates the mechanical homogeneity of the single crystal.

1/2 007 UNCLASSIFIED PROCESSING DATE--02OCT70

TITLE--SOME PROBLEMS OF STRATIGRAPHY AND COMPOSITION OF UPPER PRECAMBRIAN SEDIMENTS OF IGARSK AREA -U-

AUTHOR--GELETSYAN, G.G.

COUNTRY OF INFO--USSR

SOURCE--GEOLOGIYA I GEOFIZIKA, 1970, NR 3, PP 95-99

DATE PUBLISHED-------70

SUBJECT AREAS--EARTH SCIENCES AND OCEANOGRAPHY

TOPIC TAGS--PRECAMBRIAN TIME, STATIGRAPHY, LITHOLOGY, PETROGRAPHY, WEATHERING, VOLCANOLOGY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1991/0863 STEP NO--UR/0210/70/000/003/0095/0099

CIRC ACCESSION NO--AP0110584

UNCLASSIFIED

2/2 007 UNCLASSIFIED PROCESSING DATE--020CT70

CIRC ACCESSION NO--AP0110584

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. ON THE BASIS OF LITHOLOGICAL AND PETROGRAPHICAL STUDY THE VOLCANIC AND SEDIMENTARY FORMATIONS ARE DISTINGUISHED IN PRECAMBRIAN TERRANES OF IGARSK AREA. POSTDYAGENETIC PROCESSES, VOLCANISM EFFECT AND WEATHERING PROCESSES ARE CONSIDERED IN THE PAPER. A SEQUENCY OF SEDIMENTATION AND THE BOUNDARIES BETWEEN SEPARATE TERRANES ARE MADE MORE PRESICE. FACILITY: IGIG SO AN SSSR, NOVOSIBIRSK.

UNCLASSIFIED

USSR

UDC 62.503.53

GELEZHEVICHYUS, V. I., KEMESHIS, P. P.

"Equations of a Two-Dimensional Tracking System With Asynchronous Actuating Motors"

Vil'nyus, Nauchnyye trudy vysshikh uchbenykh zavedeniy Lit. SSR. Avtomatika i vychislitel'naya tekhnika (Scientific Works of Institutions of Higher Education of the Lithuanian SSR. Automation and Computer Technology), No 2, 1970, "Mintis", pp 19-23

Abstract: The paper presents equations for an investigated two-dimensional tracking system with asynchronous actuating motors. A block diagram of the system is set up on the basis of the resultant equations. Two illustrations, bibliography of two titles.

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USSR

UDC 532.593

GEL'FAND, B. Ye., GUBIN, S. A., KOGARKO, S. M.. Moscow

"Amplification of Shockwaves with Triangular Pressure Profile in a Hot, Two-Phase Medium"

Zhurnal Prikladnoy Mekhaniki i Tekhnicheskoy Fiziki, No 1, 1972, pp 119-122.

Abstract: Earlier works have established the parameters of compression waves with rectangular pressure-change profile beyond the leading edge of the wave necessary to produce an unstable combustion mode when these waves interact with a flammable two-phase, gas-liquid medium. The case of the interaction of arbitrary compression waves with a hot two-phase medium is more difficult to study but more interesting for practical purposes. This article presents a study of this condition, involving the interaction of shockwaves with variable parameters (pressure and velocity) behind the leading edge with a heterogeneous combustible system. The results produced in the earlier works concerning the parameters of critical perturbations of pressure are compared with those produced in the present work. It is found that amplification of compression waves with a triangular profile of pressure change is possible if the intensity of the waves is greater than a certain critical intensity.

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UDC:534.222.2

USSR

BORISOV, A. A., GEL'FAND, B. Ye., GUBIN, S. A., KLOGARKO, S. M., PODGREBENKOV, A. L., Moscow

"Reaction Zone Upon Detonation of Two-Phase Mixtures"

Novosibirsk, Fizika Goreniya i Vzryva, Vol. 6, No. 3, Sep 70, pp. 374-385

Abstract: This work presents a study of the nature of the change in thermodynamic and gas-dynamic parameters of a gas-liquid combustion mixture in the reaction zone of the detonation wave. The purpose of the investigation was estimation of the size of the zone of heat liberation beyond the wave, the criterion which determined the possibility of stable propagation of detonation. Calculation of the changes of parameters of a two-phase mixture upon heterogeneous detonation performed using two different mechanisms of transition of the liquid phase to the gas phase showed the following: 1) breakup of droplets significantly intensifies the combustion of the liquid in comparison with the evaporation process;

UDC:534.222.2

USSR

BORISOV, A. A., GEL'FAND, B. Ye., GUBIN, S. A., KLOGARKO, S. M., PODGREBENKOV, A. L., Novosibirsk, Fizika Goreniya i Vzryva, Vol. 6, No. 3, Sep 70, pp. 374-385

2) a detonation model constructed on the assumption that the rate of combustion of the two-phase mixture is determined by the rate of drop breakup apparently gives the correct value of reaction zone length; 3) the length of the reaction zone during heterogeneous detonation is decreased sharply with decreasing average liquid drop size; 4) the energy loss to drop acceleration in the reaction zone is slight; and 5) full calculation of the reaction zone with heterogeneous detonation of droplets of at least 100 μ diameter must be performed considering deformation and breakup of the droplets.

1/2 058 UNCLASSIFIED PROCESSING DATE--30OCT70

TITLE--AMPLIFICATION OF WEAK SHOCK WAVES IN A BURNING TWO PHASE LIQUID GAS SYSTEM -U-

AUTHOR-(05)-BORISOV, A.A., GELFAND, B.YE., GUBIN, S.A., KOGARKO, S.M., PODGREBENKOV, A.L.

COUNTRY OF INFO--USSR

SOURCE--PMTF ZHURNAL PRIKLADNOI MEKHANIKI I TEKHNICHESKOI FIZIKI, JAN.-FEB. 1970, P. 168-173

DATE PUBLISHED--------70

SUBJECT AREAS--PROPULSION AND FUELS

TOPIC TAGS--SHOCK WAVE, COMBUSTION R AND D, KEROSINE, OXYGEN, COMBUSTION RATE, MACH NUMBER

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1996/1550 STEP NO--UR/0207/70/000/000/0168/0173

CIRC ACCESSION NO--AP0118533

UNCLASSIFIED

2/2 058 UNCLASSIFIED PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0118533

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. CONSIDERATION OF THE SPECIAL FEATURES OF THE INTERACTION BETWEEN WEAK SHOCK WAVES AND BURNING DROPLETS OF LIQUID FUEL (KEROSENE) IN AN ATMOSPHERE OF GASEOUS OXYGEN. IT IS FOUND THAT THE AMPLIFICATION OF WEAK SHOCK WAVES IN THE MACH NUMBER RANGE FROM 1.1 TO 1.3 IN A REACTING TWO PHASE LIQUID DROPLET GAS MIXTURE OCCURS AS A RESULT OF A SHARP INCREASE IN THE MASS COMBUSTION RATE OF THE FUEL OWING TO ATOMIZATION OF THE DROPLETS. THE INCREASE IN THE MASS COMBUSTION RATE BEHIND THE SHOCK FRONT LEADS TO AN INCREASE IN HEAT GENERATION AND TO THE FORMATION OF A COMPRESSION WAVE WHICH OVERTAKES THE LEADING EDGE OF THE SHOCK WAVE.

UNCLASSIFIED

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R002200910009-8"

Acc. Nr: AT0100174 Abstracting Service: CHEMICAL ABST. 6-70(5) Ref. Code: UR 0020

113448g Mechanism of the formation of a compression wave behind a weak shock wave front propagating in a combustible two-phase mixture. Borisov, A. A.; Gel'fand, B. E.; Gubin, S. A.; Kogarko, S. M.; Podgrebenkov, A. L. (Inst. Khim. Fiz., Moscow, USSR). *Dokl. Akad. Nauk SSSR* 1970, 190(3), 621-4 [Phys Chem] (Russ). The formation of a compression wave behind a weak shock front (Mach no. = 1.05–1.3) was studied in a shock tube contg. kerosine droplets in a N-O atm. Drop sizes of 0.5 and 2 mm were used. The gas phase varied (30–70% N) and initially was at 1 atm and 25° before introduction of the shock wave. The formation of the compression wave and its redistribution in the shock wave were followed by pressure recordings. The principal reason for the formation of a compression wave is the breaking down of the fuel droplets. This occurs in 2 stages. Initially, ~10% of the drops break into 100 μ droplets because of a collapse of the surface of the coarse drops. These fine drops quickly vaporize. The final stage is a flattening of the drops by the pressure of the gas stream, followed by a complete breakup into fine droplets. The formation of the compression wave depends primarily on the mixt. compn., the drop size of the fuel, and the intensity of the initial pressure of the shock wave.
E. E. Toops, Jr.

REEL/FRAME
19841556

USSR UDC 616.981.48-093/.98

GEL'FAND, I. B., Baranovo Municipal Sanitary Epidemiological Station

"Isolation of Pathogenic E. coli Serotype 0-124"

Minsk, Zdravookhraneniye Belorussii, No 2, 1971, pp 52-53

Abstract: Between January and September 1968, the Baranovo Bacteriological Laboratory detected 397 E. coli carriers, including 81 with the 0-124 type (20.4%). Of the 81 cultures isolated from 70 individuals, 25 were from 22 adults 17 to 58 years of age, and 56 from 48 children 1 to 7 years of age. Gastrointestinal diseases broke out in July in a group of children living in the city. Laboratory tests revealed the presence of 14 carriers of E. coli 0-124. Since the latter causes a disease resembling dysentery, it is recommended that laboratory diagnosis of coli enteritis 0-124 be made to rule out dysentery. This can be done only bacteriologically.

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USSR

BERNSHTEYN, I. N., GEL'FAND, I. M., and GEL'FAND, S. I., Moscow State University

"Schubert Cells and Cohomologies of a Flag Space"

Moscow, Funktsional'nyy Analiz i Yego Prilozheniya, Vol 7, vyp 1, Jan-Mar 73, pp 64-65

Abstract: Let G be a linear, semisimple algebraic group over C, which is assumed to be connected and simply connected. Let B be some Borel subgroup of group G, X=G/B the principal projective space of group G. There are two approaches to studying the homological properties of the space X. In the first approach the basis $\{s_\omega\}$ is introduced into the homology spaces $H_*(H,Z)$, in the second the cohomology ring $H^*(X,Q)$ is identified with the factor ring $\overline{P}=P/J$. The article establishes a connection between these two approaches, describes the action of the group W in $H_*(X,Z)$ in the basis $\{s_\omega\}$, and determines the geometrical meaning of the operations employed in terms of the correspondence ring of the space X.

1/2

USSR

BERNSHTEYN, I. N., et al., Funktsional'nyy Analiz i Yego Prilozheniya, Vol 7, vyp 1, Jan-Mar 73, pp 64-65

The authors thank B. KOSTANT, who directed their attention to these questions and acquainted them with his findings.

2/2

USSR

BERNSHTEYN, I. N., GEL'FAND, I. M., and PONOMAREV, V. A.

"Coxeter Functors and Gabriel's Theorem"

Moscow, Uspekhi Matematicheskikh Nauk, Vol 28, No 2, Mar-Apr 73, pp 19-33

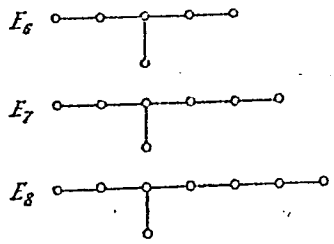
Abstract: P. GABRIEL posed and solved the following problem: finding all oriented graphs (Γ, Λ) for which there exists only a finite number of indecomposable objects $(V, f) \in \mathcal{L}(\Gamma, \Lambda)$ which are nonisomorphic among themselves. He reached the conclusion that, in order that there be a finite number of indecomposable objects in the category $\mathcal{L}(\Gamma, \Lambda)$, it is necessary and sufficient that the graph Γ coincide with one of the following graphs:

A_n o—o—o···o—o—o (n vertices), $n \geq 1$

D_n o—o—o···o—o<o (n vertices), $n \geq 4$

USSR

BERNSHTEYN, I. N., et al., Uspekhi Matematicheskikh Nauk, Vol 28, No 2, Mar-Apr 73, pp 19-33



(this fact does not depend on the orientation of Λ). What is surprising here is the fact that these graphs coincide exactly with DYNKIN's schemes for simple Lie groups. Also the indecomposable objects of the category $\mathcal{L}(\Gamma, \Lambda)$ naturally correspond to positive roots constructed according to DYNKIN's Γ scheme.

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USSR

BERNSHTEYN, I. N., et al., Uspekhi Matematicheskikh Nauk, Vol 28, No 2, Mar-Apr 73, pp 19-33

The present article "attempts to a certain extent to remove the 'mysticism' from this correspondence." While GABRIEL establishes a posteriori the relation with DYNKIN's schemes and roots, the authors of the present article give a proof of GABRIEL's theorem based on the use of the technique of roots and Weul groups. So-called Coxeter functors play an important role in this proof. Some considerations regarding GABRIEL's problem which are similar to those used in the present article were recently stated by A. V. ROYTER.

3/3

USSR

GEL'FAND, I. M., KALININ, D. I., and FUKS, D. B., Moscow State University

"On Cohomologies of a Lie Algebra of Hamiltonian Formal Vector Fields"

Moscow, Funktsional'nyy Analiz i Yego Prilozheniya, Vol 6, No 3, Jul-Sep 72, pp 25-29

Abstract: The article considers the problem of calculating the cohomologies of a Lie algebra of Hamiltonian formal vector fields, which is more difficult to do than to calculate the cohomologies of a Lie algebra of all formal vector fields. Calculations were made on a computer to test the hypothesis that the addition summand is acyclic. The result was that the hypothesis was disproved. The authors found new nontrivial classes of cohomologies of the algebra of Hamiltonian formal vector fields in R^2. An important difference between these classes and the classes of cohomologies found previously by the authors for the algebra of all formal vector fields is that they cannot be represented by cocycles which depend only on the 2-streams of their arguments.

1/1

UDC: 512.7

USSR

GEL'FAND, I. M.

"Lectures on Linear Algebra"

Moscow, "Nauka," 1971, 4th ed., enlarged, 1971, 272 pp, illustrated (from RZh--Matematika, No 4, 1972, Abstract No 4A407K)

Translation: See RZhMat, 1967, 2A251. In this edition, sections devoted to tensor products in vector space are added.

1/1

UDC 513.83+517.4

USSR

BERNSHTEYN, I. N., GEL'FAND, I. M., and GEL'FAND, S. I.

"Differential Operators on a Cubic Cone"

Moscow, Uspekhi Matematicheskikh Nauk, Vol 27, No 1, Jan-Feb 72, pp 185-190

Abstract: The article considers in the space C^3 with coordinates x_1, x_2, x_3 the surface X given by the equation $x_1^3 + x_2^3 + x_3^3 = 0$. The following theorem is proved:

Let D(X) be a ring of regular differential operators on X; D_a, a ring of small increments at the point 0, of analytic differential operators on X. Then

1^0. The rings D(X) and D_a are not Noetherian.

2^0. For any natural k the rings D(X) and D_a are not generated by subspaces D_k (or, as the case may be, D_{ak}) of operators of order no higher

USSR

BERNSHTEYN, I. N., et al., Uspekhi Matematicheskikh Nauk, Vol 27, No 1, Jan-Feb 72, pp 185-190

than k. In particular, the rings $D(X)$ and D_a do not have a finite number of generatrices.

This theorem answers questions raised in an earlier article by B. MALGRANGE, a translation of which appears in the same issue of the instant journal.

2/2

UDC 550.343.62

USSR

GEL'FAND, I. M., Corresponding Member of the USSR Academy of Sciences, GUBERMAN, SH. A., IZVEKOVA, M. A., KEYLIS-BOROK, V. I., RANTSMAN, YE. YA.

"High Seismicity Criteria"

Moscow, Doklady Akademii Nauk SSSR, Vol 202, No 6, 1972, pp 1317-1320

Abstract: A study was made of the problem of finding points in the eastern part of Central Asia where earthquakes with a magnitude of $M \geq 6.5$ are possible. A figure is presented showing that all the epicenters of the 22 such earthquakes occurring since 1885 lie at disjunctive nodes with active movements in modern times (the last ~25 million years, beginning with the Neogene). It is proposed that earthquakes with $M \geq 6.5$ can occur only at such nodes, in particular, at the 16 nodes where they have already occurred. The problem then reduces to finding at which of the remaining 25 nodes earthquakes with $M \geq 6.5$ are possible. The problem was solved by means of the KORA-3 recognition program [M. M. Bongart, et al., Geologiya i geofizika, No 6, 1966; "Complex Interpretation of Geophysical Data on Computers," Tr. Moskovsk. inst. neftekhimich. i gazovoy prom. im. I. M. Gubkina, No 62, 1965]. A table is presented showing the variation of the recognition results during the course of seismic history. The conclusion is drawn that earthquakes with $M \geq 6.5$ are possible at fixed nodes: Fayzabad, Alayskiy, Zaalayskiy, Obi-Khingou-Surkhob, Sarydzhaz and Kun'lun'. The

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USSR

GEL'FAND, I. M., et al., Doklady Akademii Nauk SSSR, Vol 202, No 6, 1972, pp 1317-1320

reliability of this conclusion was evaluated experimentally. The six nodes have one common feature -- they are all located in the zones of latest contrast movements at the boundaries of mountainous areas.

2/2

USSR

BERNSHTEYN, I. N., GEL'FAND, I. M., and GEL'FAND, S. I.

"Structure of Representations Generated by Vectors of Higher Weight"

Moscow, Funktsional'nyy Analiz i Yego Prilozheniya, Vol 5, Vyp 1, 1971, pp 1-9

Abstract: This article is concerned with the study of M_χ, which is an elementary unit of the semi-simple Lie algebra δ. The results permit understanding the majority of classical results from the theory of finite-dimensional representations of complex semi-simple Lie algebra, particularly the Kostant theory or the equivalent Weyl formula, the Borel-Weyl theory, etc.

The authors give the symbols and definitions used throughout the article and then proceed to define and prove the modulae M_χ by the use of theorems.

A detailed account is given of the processes involved in proving the necessity and sufficiency of condition (A), which may be either C or O.
1/2

USSR

BERNSHTEYN, I. N., et al., Funktsional'nyy Analiz i Yego Prilozheniya, Vol 5, Vyp 1, 1971, pp 1-9

In the last section of the article the authors discuss the multiplicity of the weight of a finite-dimensional representation and offer proof thereof. In conclusion, an example is given of the submodulus M in M_χ which does not have the form UM_{χ_i}.

The article cites 12 literature references.

2/2

Higher Algebra & Geometry and Topology

UDC: 519.46

USSR

BERNSHTEYN, I.N., Corresponding Member, Academy of Sciences, USSR, GEL'FAND, I.M., GEL'FAND, S.I., Moscow State University imeni M.V. Lomonosov

"Differential Operators on a Base Affine Space"

Moscow, Doklady Akademii Nauk SSSR, Vol 195, No 6, 21 December 1970, pp 1255-1258

Abstract: A fundamental role in representation theory is played by the basic affine space A of group G -- a connected, semisimple, r-rank, algebraic Lie group above the algebraically closed zero-characteristic field K. A is an algebraic set. A study is made of a differential-operator space with regular coefficients on A. A regular differential operator is defined in a cited work. 2 bibliographic entries.

1/1

USSR

GEL'FAND, I. M., and FUKS, D. B., Moscow State University

"Upper Limits for Cohomologies of Infinite-Dimensional Lie Algebras"

Moscow, Funktsional'nyy Analiz i Yego Prilozheniya, Vol 4, No 4, Oct-Dec 70, pp 70-71

Abstract: In a previous article the authors studied cohomologies, with real coefficients, of a Lie algebra of smooth vector-fields on a smooth manifold. The finite-dimensionality of these cohomologies was proved, subject to certain limitations. One of the intermediate assertions concerned the finite-dimensionality of a complete cohomology space of a Lie algebra of formal vector-fields. The purpose of the present article is to formalize and generalize the method used by the authors to prove this assertion.

1/1

USSR G UDC 513.83

GEL'FAND, I. M., Corresponding Member of the Academy of Sciences USSR, and FUKS, D. B., Moscow State University imeni M. V. Lomonosov

"Cohomologies of Lie Algebra of Smooth Vector Fields"

Moscow, Doklady Akademii Nauk SSSR, Vol 190, No 6, 1970, pp 1267-1270

Abstract: In a previous article the authors began the study of cohomologies of a Lie topological algebra of smooth vector fields on a connected, compact, orientable smooth manifold. The present article contains several new facts about these conomologies. The central result is a full description of cohomologies of a Lie algebra on tori of arbitrary dimensionality, as well as on two-dimensional manifolds.

1/1

Functional Analysis

USSR G

GEL'FAND, I. M., GRAYEV, M. I, and SHAPIRO, Z. YA. (Institute of Applied Mathematics, Academy of Sciences USSR; Moscow State University)

"Integral Geometry in Projective Space"

Moscow, Funktsional'nyy Analiz I Yego Prilozheniya (Functional Analysis and Its Application), Vol 4, No 1, 1970, pp 14-32

Abstract: The methodology incident to the statement of the integral geometry problem in projective space and its solution is related to a unique differential geometry on Grassman manifolds. Although the authors are at a loss to find practical application for the methodology to other problems, the beauty and nature of the calculation lead them to believe that it will find usefulness elsewhere.

The methodology is described on the basis of a manifold $G_{n+1, k+1}$ of oriented $(k+1)$-dimensional subspaces of space R^{n+1}.

Six theorems are given and proved for differential forms and integral functions $\phi(u)$. Orig. art. has 2 refs.
1/1

1/2 CCE UNCLASSIFIED PROCESSING DATE--20NOV70

TITLE--COHOMOLOGIES OF LIE ALGEBRA OF SMOOTH VECTOR FIELDS -U-

AUTHOR-(02)-GELFAND, I.M., FUKS, D.B.

COUNTRY OF INFO--USSR

SOURCE--MOSCOW, DOKLADY AKADEMII NAUK SSSR, VOL 190, NO 6, 1970, PP 1267-1270

DATE PUBLISHED--------70

SUBJECT AREAS--MATHEMATICAL SCIENCES

TOPIC TAGS--LIE GROUP, ALGEBRAIC GEOMETRY, VECTOR ANALYSIS, MANIFOLD

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1993/0490 STEP NO--UR/0020/70/190/006/1267/1270

CIRC ACCESSION NO--AT0113381

UNCLASSIFIED

2/2 008 UNCLASSIFIED PROCESSING DATE--20NOV70

CIRC ACCESSION NO--AT0113381

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. IN A PREVIOUS ARTICLE THE AUTHORS BEGAN THE STUDY OF COHOMOLOGIES OF A LIE TOPOLOGICAL ALGEBRA OF SMOOTH VECTOR FIELDS ON A CONNECTED, COMPACT, ORIENTABLE SMOOTH MANIFOLD. THE PRESENT ARTICLE CONTAINS SEVERAL NEW FACTS ABOUT THESE COHOMOLOGIES. THE CENTRAL RESULT IS A FULL DESCRIPTION OF COHOMOLOGIES OF A LIE ALGEBRA ON TORI OF ARBITRARY DIMENSIONALITY, AS WELL AS ON TWO DIMENSIONAL MANIFOLDS. FACILITY: MOSCOW STATE UNIVERSITY IMENI M. V. LOMONOSOV,

UNCLASSIFIED

1/2 006 UNCLASSIFIED PROCESSING DATE--27NOV70
TITLE--INTEGRAL GEOMETRY IN PROJECTIVE SPACE -U-

AUTHOR-(03)-GELFAND, I.M., GRAYEV, M.I., SHAPIRO, Z.YA.

COUNTRY OF INFO--USSR

SOURCE--MOSCOW, FUNKSTIONAL'NYY ANALIZ I YEGO PRILOZHENIYA (FUNCTIONAL ANALYSIS AND ITS APPLICATION), VOL 4, NO 1, 1970, PP 14-32
DATE PUBLISHED-------70

SUBJECT AREAS--MATHEMATICAL SCIENCES

TOPIC TAGS--INTEGRAL RELATION, MATHEMATIC SPACE, PROJECTIVE GEOMETRY, DIFFERENTIAL GEOMETRY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--2000/1433 STEP NO--UR/0461/70/004/001/0014/0032

CIRC ACCESSION NO--AP0125067
UNCLASSIFIED

2/2 006 UNCLASSIFIED PROCESSING DATE--27NOV70

CIRC ACCESSION NO--AP0125067

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE METHODOLOGY INCIDENT TO THE STATEMENT OF THE INTEGRAL GEOMETRY PROBLEM IN PROJECTIVE SPACE AND ITS SOLUTION IS RELATED TO A UNIQUE DIFFERENTIAL GEOMETRY ON GRASSMAN MANIFOLDS. ALTHOUGH THE AUTHORS ARE AT A LOSS TO FIND PRACTICAL APPLICATION FOR THE METHODOLOGY TO OTHER PROBLEMS, THE BEAUTY AND NATURE OF THE CALCULATION LEAD THEM TO BELIEVE THAT IT WILL FIND USEFULNESS ELSEWHERE. THE METHODOLOGY IS DESCRIBED ON THE BASIS OF A MANIFOLD G SUBN PLUS 1, K PLUS 1 OF ORIENTED (K PLUS 1) DIMENSIONAL SUBSPACES OF SPACE R PRIMEN PLUS 1. SIX THEOREMS ARE GIVEN AND PROVED FOR DIFFERENTIAL FORMS AND INTEGRAL FUNCTIONS PHI (U). FACILITY: INSTITUTE OF APPLIED MATHEMATICS, ACADEMY OF SCIENCES USSR, MOSCOW STATE UNIVERSITY.

UNCLASSIFIED

USSR

GEL'FAND, I. M., and FUKS, D. B., Moscow State University

"Cohomologies of Lie Algebras of Tangent Vector Fields of a Smooth Manifold. II"

Moscow, Funktsional'nyy Analiz i Yego Prilozheniya, Vol 4, No 2, Apr/ Jun 70, pp 23-31

Abstract: This article is a continuation of a previous article by the same title in this journal (Vol 3, No 3, 1969, pp 32-52). The first article studied cohomologies of a Lie algebra U(M) of smooth tangent vector fields of a smooth, compact, oriented manifold M with coefficients in a trivial, real representation. The fundamental result of the article was a theorem on the finite dimensionality of these cohomologies in each dimensionality. During the proof a subcomplex $C_1(M) = \{C_1^q(M), d^q\}$ was identified in a standard complex $C(M) = \{C^q(M), d^q\}$ of the Lie algebra U(M) which the authors called "diagonal," the spectral sequence

$$E = \{E_r^{u,v}, \delta_r^{u,v} = E_r^{u,v} \to E_r^{u+r,\ v-r+1}\}$$

convergence to homologies of the diagonal complex was constructed, and an expression was found for its initial (second) term. In the first part of this

USSR

GEL'FAND, I. M., and FUKS, D. B., Funktsional'nyy Analiz i Yego Prilozheniya, Vol 4, No 2, Apr/Jun 70, pp 23-31

article a new interpretation is given to the second term of the spectral sequence E which makes it possible to show in particular the triviality of certain of its differentials. The second part of the article discusses the relationship between the last term of the spectral sequence E (i.e., homologies of the diagonal complex) and cohomologies of the algebra U(M). The most complete information is obtained for the case in which the spectral sequence E is trivial (i.e., when $E_2 = E_\infty$). The results of these sections are used to obtain a description of a ring connected to a ring of cohomologies of the Lie algebra of tangent vector fields for certain manifolds, particularly for toruses of arbitrary dimensionality and for all oriented two-dimensional manifolds.

USSR

UDC 517.948.5

GEL'FAND, I. M., Corresponding Member of the Academy of Sciences USSR, GRAYEV, M. I., and SHAPIRO, Z. Ya., Institute of Applied Mathematics, Academy of Sciences USSR, Moscow

"Integral Geometry Problem Connected With a Pair of Grassmann's Manifolds"

Moscow, Doklady Akademii Nauk SSSR, Vol 193, No 2, 1970, pp 259-262

Abstract: The purpose of the article is to formulate and solve an integral problem for a pair of manifolds -- the manifold $G_{n,k}$ of k-dimensional oriented subspaces in R^n and the manifold $G_{n,l}$ of l-dimensional oriented subspaces in R^n. It is assumed that $l < k$, $l + k \leqslant n$, as well as that $k - l$ is an even number. The results are applied without significant changes to the case of complex Grassmann's manifolds.

1/1

Acc. Nr: AP0047163 Ref. Code: UR 0246

PRIMARY SOURCE: Zhurnal Nevropatologii i Psikhiatrii, 1970, Vol 70, Nr 2, pp 177-181

MATHEMATICAL PROGNOSIS OF OUTCOMES IN HEMORRHAGIC STROKES WITH THE PURPOSE OF DETERMINING INDICATIONS TO SURGICAL TREATMENT

Gelfand, I. M.; Guberman, S. A.; Izvekova, M. L.; Kandel', E. I.; Lebedeva, N. V.; Lunev, D. K.; Nikolayeva, I. F.; Chebotareva, N. M.

The purpose of the convened study was to elaborate methods of mathematical prognosis in hemorrhagic strokes to define the indications to surgical treatment. The authors analyzed 124 case histories (52 case histories of living patients and 72 case histories of deceased) with hemorrhages into the brain hemisphere, following hypertensive disease and atherosclerosis. In such cases 56 items were considered which were the most significat for prognosing hemorrhagic strokes. Among them were different clinical symptoms and their development during 12 hours after admission to hospitals. An analysis of these items permitted to establish a correct prognosis in relation to survival during the first 5 days with exactness to 95%. The next stage of the study presumes an elaboration of methods for prognosi 5 of hemorrhagic strokes in surgical treatment. This may be of aid in deciding the expediency of operations in each separate case.

REEL/FRAME
19790657

USSR

BERNSHTEYN, I. N., GEL'FAND, I. M., and GEL'FAND, S. I., Moscow State University

"Schubert Cells and Cohomologies of a Flag Space"

Moscow, Funktsional'nyy Analiz i Yego Prilozheniya, Vol 7, vyp 1, Jan-Mar 73, pp 64-65

Abstract: Let G be a linear, semisimple algebraic group over C, which is assumed to be connected and simply connected. Let B be some Borel subgroup of group G, X=G/B the principal projective space of group G. There are two approaches to studying the homological properties of the space X. In the first approach the basis $\{s_\omega\}$ is introduced into the homology spaces $H_*(X,Z)$, in the second the cohomology ring $H^*(X,Q)$ is identified with the factor ring $\overline{P}=P/J$. The article establishes a connection between these two approaches, describes the action of the group W in $H_*(X,Z)$ in the basis $\{s_\omega\}$, and determines the geometrical meaning of the operations employed in terms of the correspondence ring of the space X.

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USSR

BERNSHTEYN, I. N., et al., Funktsional'nyy Analiz i Yego Prilozheniya, Vol 7, vyp 1, Jan-Mar 73, pp 64-65

The authors thank B. KOSTANT, who directed their attention to these questions and acquainted them with his findings.

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USSR

UDC 513.83+517.4

BERNSHTEYN, I. N., GEL'FAND, I. M., and GEL'FAND, S. I.

"Differential Operators on a Cubic Cone"

Moscow, Uspekhi Matematicheskikh Nauk, Vol 27, No 1, Jan-Feb 72, pp 185-190

Abstract: The article considers in the space C^3 with coordinates x_1, x_2, x_3 the surface X given by the equation $x_1^3 + x_2^3 + x_3^3 = 0$. The following theorem is proved:

Let D(X) be a ring of regular differential operators on X; D_a, a ring of small increments at the point 0, of analytic differential operators on X. Then

1^o. The rings D(X) and D_a are not Noetherian.

2^o. For any natural k the rings D(X) and D_a are not generated by subspaces D_k (or, as the case may be, D_{ak}) of operators of order no higher

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USSR

BERNSHTEYN, I. N., et al., Uspekhi Matematicheskikh Nauk, Vol 27, No 1, Jan-Feb 72, pp 185-190

than k. In particular, the rings $D(X)$ and D_a do not have a finite number of generatrices.

This theorem answers questions raised in an earlier article by B. MALGRANGE, a translation of which appears in the same issue of the instant journal.

2/2

Higher Algebra & Geometry and Topology

USSR

UDC: 519.46

BERNSHTEYN, I.N., Corresponding Member, Academy of Sciences, USSR, GEL'FAND, I.M., GEL'FAND, S.I., Moscow State University imeni M.V. Lomonosov

"Differential Operators on a Base Affine Space"

Moscow, Doklady Akademii Nauk SSSR, Vol 195, No 6, 21 December 1970, pp 1255-1258

Abstract: A fundamental role in representation theory is played by the basic affine space A of group G -- a connected, semisimple, r-rank, algebraic Lie group above the algebraically closed zero-characteristic field K. A is an algebraic set. A study is made of a differential-operator space with regular coefficients on A. A regular differential operator is defined in a cited work. 2 bibliographic entries.

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USSR

BERNSHTEYN, I. N., GEL'FAND, I. M., and GEL'FAND, S. I.

"Structure of Representations Generated by Vectors of Higher Weight"

Moscow, Funktsional'nyy Analiz i Yego Prilozheniya, Vol 5, Vyp 1, 1971, pp 1-9

Abstract: This article is concerned with the study of M_χ, which is an elementary unit of the semi-simple Lie algebra δ. The results permit understanding the majority of classical results from the theory of finite-dimensional representations of complex semi-simple Lie algebra, particularly the Kostant theory or the equivalent Weyl formula, the Borel-Weyl theory, etc.

The authors give the symbols and definitions used throughout the article and then proceed to define and prove the modulae M_χ by the use of theorems.

A detailed account is given of the processes involved in proving the necessity and sufficiency of condition (A), which may be either C or O.
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USSR

BERNSHTEYN, I. N., et al., Funktsional'nyy Analiz i Yego Prilozheniya, Vol 5, Vyp 1, 1971, pp 1-9

In the last section of the article the authors discuss the multiplicity of the weight of a finite-dimensional representation and offer proof thereof. In conclusion, an example is given of the submodulus M in M_χ which does not have the form $\cup M_{\chi_i}$.

The article cites 12 literature references.

2/2

Television

USSR UDC: 681.14.523.8

BRAUDE, G. V., BONCH-BRUYEVICH, A. M., GEL'FANDBEYN, Ye. A., GULIN, I. N., KRIVOSHEYEV, M. I., MIRSKIY, G. Ya., TISHCHENKO, I. M., TEL'NYKH, O. A., KHESIN, A. Ya.

"A Television Device for Determining the Coordinates of Point Objects"

Moscow, Otkrytiya, Izobreteniya, Promyshlennyye Obraztsy, Tovarnyye Znaki, No 26, Sep 71, Author's Certificate No 313210, p 165

Translation: This Author's Certificate introduces a television device for determining the coordinates of point objects. The device contains a television transmitting tube with memory, an output scanning unit, a video signal processing unit, an erasure unit, a synchronizing unit, a cadence pulse generator, an optical shutter, and a data input module. As a distinguishing feature of the patent, the accuracy of coordinate determination is improved by tying series-connected horizontal and vertical interrogation counters to the output of the cadence pulse generator. The counter outputs are connected through shaping matrixes for horizontal and vertical deflection to the input of the output scanning unit. At the same time, a second output of the vertical interrogation counter is connected through a decoder to the data input module.

1/1

USSR

UDC 621.373.43

GEL'FANDBEYN, Ya. A., VASILENKO, V. M.

"A Complex Signal Oscillator"

Moscow, Otkrytiya, Izobreteniya, Promyshlennyye Obraztsy, Tovarnyye Znaki, No 5, Feb 72, Author's Certificate No 327564, Division H, filed 19 May 70, published 26 Jan 72, p 160

Translation: This Author's Certificate introduces a complex signal oscillator which contains a unit signal generator and an adder. As a distinguishing feature of the patent, the device is designed to keep the frequency, amplitude and phase of the signal components independent of the frequency, amplitude and phase of the main signal. The output of the unit signal generator is connected to the inputs of linear vibrators through parallel-connected voltage dividers with corresponding division coefficients. The outputs of the vibrators are connected through the corresponding phase shifters to the corresponding inputs of the adder.

1/1

USSR

UDC 519.281

GEL'FANDBEYN, Ya. A., KOLOSOV, L. V., YUSUPOV, R. M.

"Estimate of Statistical Characteristics of External Perturbations and Internal Noise in Functioning Dynamic Systems"

Identifikatsiya [Identification -- Collection of Works], Moscow, Nauka Press, 1970, pp 24-35 (Translated from Referativnyy Zhurnal Kibernetika, No 3, 1971, Abstract No 3 V141 by V. Noskov).

Translation: A multivariate dynamic system with n inputs x_i, i = 1, 2, ..., n and p outputs y_ν, ν = 1,2, ..., p it studied. The signals

$$\varphi_i = x_i(t) + \mu_i(t),$$
$$S_\nu = N_\nu(t) + y_\nu(t) + \psi_\nu(t),$$

are accessible to observation where μ_i and ψ_ν are measurement noises, not correlated with signals, and N_ν are perturbations. The results of observations (ϕ_i, S_ν) must be used to determine the perturbation N_ν.

1/2

USSR

UDC 519.281

GEL'FANDBEYN, Ya. A., KOLOSOV, L. V., YUSUPOV, R. M., Identifikatsiya, Moscow, Nauka Press, 1970, pp 24-35.

It is demonstrated that under certain conditions, solution of the integral equation can be used to find the impulse transient functions of the system and then the perturbations can be determined by the method of least squares.

2/2

1/2 029 UNCLASSIFIED PROCESSING DATE--04DEC70

TITLE--MOLD LININGS -U-

AUTHOR-(05)-NIZKOVSKIKH, V.M., KURUKLIS, G.L., GELFENBEIN, E.YU., TARLINSKIY, I.V., KHOREV, V.N.

COUNTRY OF INFO--USSR

SOURCE--GER. 1,558,150

DATE PUBLISHED--14MAY70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--CHEMICAL PATENT, MOLD LUBRICANT, EPOXY RESIN, MOLYBDENUM DISULFIDE, TOLUENE, BUTANOL, ETHANOL, KETONE, ETHYLENE GLYCOL, ACETATE, PETROLEUM PRODUCT, ORGANIC SOLVENT, METAL CASTING, MOLDING MATERIAL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3004/0838 STEP NO--GY/0000/70/000/000/0000/0000

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