

USSR

UDC: 621.317.335.3

BARTASHEVSKIY, Ye. L., BEREZA, A. Ye., PRIVALOV, Ye. N., ABKIN, Ye. B.

"Measurement of the Permittivity of Plates Which Partially Fill the Cross Section of a Rectangular Waveguide"

Dokl. Vses. nauchno-tekhn. konferentsii po radiotekhn. izmereniyam. T. 1 (Reports of the All-Union Scientific and Technical Conference on Radio Engineering Measurements. Vol. 1), Novosibirsk, 1970, pp 77-78 (from RZh-Radiotekhnika, No 1, Jan 71, Abstract No 1A366)

Translation: A procedure is considered for determining permittivity on the basis of plotting the field structure in the longitudinal and transverse cross section of a rectangular waveguide on the H_{10} mode with a plate on the narrow wall of propagation for the case where the permittivity of the plate is a complex quantity. The fundamental relationships are presented and some computational singularities are indicated. The results of some measurements of permittivity in the 3-cm band are given. Bibliography of two titles. E. L.

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USSR

UDC: 621.317.335

BARTASHEVSKIY, Ye. L., KANUNNIKOV, V. P., SKUBITSKIY, V. N.

"Use of Dielectric Resonators With Directional Coupling Elements to Measure Relative Permittivity"

Dokl. Vses. nauchno-tekhn. konferentsii po radiotekhn. izmereniyam. T. 1 (Reports of the All-Union Scientific And Technical Conference on Radio Engineering Measurements. Vol. 1), Novosibirsk, 1970, pp 75-76 (from RZh-Radiotekhnika, No 12, Dec 70, Abstract No 12A354)

Translation: In view of the difficulties which arise when dielectric resonators in the standing-wave or traveling-wave modes are used to measure complex permittivity, new modifications of standing-wave and traveling-wave dielectric resonators are proposed with directional couplers as their coupling elements. Both resonators are based on a circular dielectric waveguide with HE_{11} wave; the standing-wave dielectric resonator is tuned by moving a reflector, while the traveling-wave unit is tuned by displacement of the waveguide. It is noted that the traveling-wave dielectric resonator has a higher Q than the standing-wave unit, which makes it preferable for use. Two illustrations, bibliography of five titles. N. S.

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USSR

UDC 681.2.084.2:541.132.3

BARTAZAROV, E. G., DEVDARIANI, I. V., KABANOV, P. S., and
MARTIROSOV, V. D.

"Input Device of pH-Meter With Unipolar Field Transistor"

Moscow, Izmeritel'naya Tekhnika, No 2, Feb 73, pp 65-66

Abstract: A study was made by the Special Design Office of Analytical Instrument Making in Tbilizi of the possibility to substitute electron tubes by field transistors with p-n transition of KP102 (TN-1) type in the input stage of pH-metrical amplifier, built according to the principle of transformation of the input signal frequency. Good results were obtained with the use of a schema with feedback servosystem in the input stage of pH-meter. The principal schema and the equivalent schema of the input device are shown and calculation formulas for determining the main parameters of the device are given. The described input device used in the laboratory pH-meter, redoximeter pH-673, works satisfactorily. The device may be used in works with different types of transducers of d-c voltage into a-c voltage. Two figures, three bibliographic references.

1/1

Glass and Ceramics

USSR

UDC 666.189.212:539.433

BARTENEV, G. M., Doctor of Chemical Sciences, and MOTORINA, L. I., Candidate of Technical Sciences, Moscow State Pedagogical Institute imeni V. I. Lenin

"The Effect of Vibration on the Strength of Glass Fiber"

Steklo i Keramika, No 3, Mar 71, pp 34-36

Abstract: Discrepancies in the results of measurements of the strength of glass fiber of the same chemical composition and even of the same fiber in different laboratories have been noted frequently. Although many factors affect the strength of glass fiber, the principal cause for the divergence of the results of strength measurements is considered to be the difference in the test methods. This article considers one such cause. It was found that small vibrations lower the strength of the tested glass fibers. The tests were conducted with vibrations of varying amplitudes in the frequency range from 15 to 3000 Hz. The strength of the fiber decreases with the increase of the amplitude of oscillations. This effect is practically independent of the frequency of vibration if the amplitude of the displacement is maintained constant. The maximum decrease in strength was observed in the tests at 110 Hz frequency, the resonance frequency for the test

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BARTENEV, G. M., and MOTORINA, L. I., Steklo i Keramika, No 3, Mar 71, pp 34-36

instrument. The vibration itself has no effect on the strength of the fiber, but rather on the test method. When the fibers are initially exposed to vibrations for 6 hours and tested on a quiescent instrument the strength is significantly higher than for the same fibers tested in the presence of vibration. In the course of stressing glass fibers vibrations accelerate the growth of defects and lead to the lowering of the strength of the fiber.

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USSR

UDC 666.117.2

PAVLUSHKIN, N. M., and ZHURAVLEV, A. K.

"Legkoplavkiye Stekla" (Low-Melting Glasses), Moscow, Izd-vo "Energiya," 1970, 144 pp

Translation of Annotation: A summary is given of the results of studies on the production of low melting glasses, methods of investigating them, and areas of their application carried out in the USSR and elsewhere. Theoretical concepts regarding the structure of low melting glass are presented and methods and results of investigations on oxide, oxygen-free, and oxychalcogenide glasses are discussed. Data on the application of low-melting glasses as sealing coatings and as solders for various electronic devices are presented.

The book is intended for scientific and engineering personnel concerned with the study and development of low-melting glasses and their applications.

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Types of Low-Melting Glasses and Methods of Producing Them	4
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1/2 036

UNCLASSIFIED

PROCESSING DATE--20NOV70

TITLE--LOW TEMPERATURE RELAXATION PHENOMENA IN RUBBER LIKE POLYMERS AT LOW DEFORMATION -U-

AUTHOR-(02)-BARTENEV, G.M., KUCHERSKIY, A.M.

B

COUNTRY OF INFO--LSSR

SOURCE--VYSOKOMOL. SOEDIN., SER. A 1970, 12(4), 794-801

DATE PUBLISHED-----70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--CHEMICAL BONDING, LOW TEMPERATURE EFFECT, ACTIVATION ENERGY, RELAXATION PROCESS, DEFORMATION RATE/(U)SKMS30 RUBBER, (U)SKN26 RUBBER

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3006/1385

STEP NO--UR/0459/70/012/004/0794/0801

CIRC ACCESSION NO--AP0135059

UNCLASSIFIED

2/2 036

UNCLASSIFIED

PROCESSING DATE--20NOV70

CIRC ACCESSION NO--AP0135059

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. STRESS STRAIN DIAGRAMS OF SKMS 30 AND SKM 20 RUBBERS REVEALED A RELAXATION PROCESS CHARACTERIZED BY A LOW ACTIVATION ENERGY AND A DEPENDENCE OF RELAXATION TIME ON STRESS. THE KINETIC STRESS WAS A FUNCTION OF TEMP. AND APPROACHED 0 AT 40-60DEGREES. THE EFFECT WAS ATTRIBUTED TO ORDERED SUPRAMOL. DOMAINS WHICH FORMED AUXILIARY NONCHEM. BONDS THAT BROKE AT A CRIT. STRESS. FACILITY: MOSK. GOS. PEDAGOG. INST. IM. LENINA, MOSCOW, USSR.

UNCLASSIFIED

1/2 021 UNCLASSIFIED PROCESSING DATE--15OCT70
TITLE--HYSTERESIS LOSSES OF CARBON BLACK REINFORCED VULCANIZATES; AT LOW
STRAINS -U-
AUTHOR--(02)-BARTENEV, G.M., KUCHERSKIY, A.M. **B**
COUNTRY OF INFO--USSR
SOURCE--KOLLOIDNYY ZHURNAL, 1970, VOL 32, NR 2, PP 171-176
DATE PUBLISHED-----70
SUBJECT AREAS--MATERIALS
TOPIC TAGS--CARBON BLACK, VULCANIZATE, MECHANICAL STRESS
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAE--1993/0393 STEP NO--UR/0069/70/032/002/0171/0176
CIRC ACCESSION NO--AP0113311
UNCLASSIFIED

2/2 021

UNCLASSIFIED

PROCESSING DATE--16OCT70

CIRC ACCESSION NO--AP0113311

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. MECHANICAL LOSSES, RELATIVE RESIDUAL STRAIN AND STRESS OF CARBON BLACK REINFORCED BUTADIENE STYRENE VULCANIZATES PASS THROUGH A MAXIMUM WHEN PLOTTED VERSUS STRESS. THIS MAXIMUM IS ASSOCIATED WITH THE BREAKDOWN OF THE CARBON BLACK STRUCTURES AND AGGREGATES. THE KELVIN VOIGT MODEL CAN BE USED FOR A QUALITATIVE DESCRIPTION OF SOME STRAIN AND HYSTERESIS PROPERTIES OF CARBON BLACK REINFORCED VULCANIZATES AT CONSTANT STRAIN RATE.

UNCLASSIFIED

Acc. Nr: **AP0036521**

B

Ref. Code: UR 0069

PRIMARY SOURCE: Kolloidnyy Zhurnal, 1970, Vol 32, Nr 1,
pp 3-9

**EFFECT OF AN ACTIVE FILLER ON THE STRAIN PROPERTIES
OF BUTADIENE-STYRENE RUBBER VULCANIZATES**

Bartenev, G. M.; Kucherskiy, A. M.

Summary

The effect of a filler on the shape of the strain curves of rubber upon elongation up to 30 % has been studied. The strain curve consists of an initial curvilinear section followed by a rectilinear one. The shape of the rectilinear section is almost independent of the filler nature, being determined by its volume fraction. The location level of the rectilinear section is determined by the carbon black bonds and structures, rising sharply when continuous carbon black structures are formed.

D. 71

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REEL/FRAME
19721369

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Acc. Nr:

AP0041407

Abstracting Service: 4-70 Ref. Code:
CHEMICAL ABST. US0000

B

79609y Thermodynamic description of relaxation phenomena in polymers. Bartenev, G. M.; Zelenev, Yu. V. (Dep. Phys. Solids, Lenin State Teachers Training Univ., Moscow, USSR). *J. Appl. Polym. Sci.* 1970, 14(2), 393-408 (Eng). The anal. of various deformations of an ordinary elastic body and a highly elastic body accompanied by temp. changes shows that under adiabatic conditions the dynamic characteristics of a polymer in a highly elastic state depend on the amplitude of the applied stress (in particular, their position on a frequency or temp. scale), which is assocd. with the entropic nature of the highly elastic deformation. When describing the relaxation phenomena caused by the response of the system of interacting kinetic units to the external perturbation, the nonequil. thermodynamics relation between the "flow" and the "generalized force" is nonlinear even at small deviations from the equil. state. Creep and stress relaxation are considered. The calcd. dependencies agree with expt.

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REEL/FRAME
19751272

Acc. Nr. **AP0045146**

Abstracting Service:
CHEMICAL ABST.

Ref. Code:
5-702 2R0138

91302a Flow of rubber mixtures through dies of varying length during extrusion. Guber, F. B.; ~~Bartenev, G. M.~~; Rozenoer, I. N.; Vershinina, O. Yu. (Nauch.-Issled. Inst. Rezin. Prom., Moscow, USSR). *Kauch. Rezina* 1970, 29(1), 26-9 (Russ). The flow of SKS-30 ARKM-15 and SKN-26M (I) rubber mixts. (contg. variable amts. of plasticizer and filler) through dies having a length-to-diam. ratio of 0.5-5.0 was studied. The flow of rubber mixts. through short dies at crit. pressures (which caused the accumulation of highly elastic deformation) was accompanied by elastic turbulence. The elastic turbulence was characterized by slippage of rubber mixts. through the extruder. The surface of the extrudate deteriorated and its diam. increased due to elastic turbulence. Increased content of carbon black (II) brought about improved surface quality and smaller extrudate diam., e.g., I filled with 40-60 parts II per 100 parts I exhibited markedly improved properties. Thus, the properties of the extrudates were mainly detd. by their elastic properties. The shrinkage of extruded mixts. was inversely proportional to the length of the extruder.

CKJR

REEL/FRAME

19780046

20

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1/2 041

UNCLASSIFIED

PROCESSING DATE--02 OCT 70

TITLE--STRESS RELAXATION IN CROSSLINKED RUBBERLIKE POLYMERS -U-

AUTHOR--(02)-BARTENEV, G.M., LYALINA, N.M.

B

COUNTRY OF INFO--USSR

SOURCE--VYSOKOMOL. SOEDIN., SER. A 1970, 12(2) 368-75

DATE PUBLISHED-----70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--STRESS RELAXATION, POLYMER CROSSLINKING, BUTADIENE STYRENE RESIN, NATURAL RUBBER, POLYBUTADIENE, SYNTHETIC RUBBER, VISCOUS FLOW, LOW TEMPERATURE EFFECT, HIGH TEMPERATURE EFFECT

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1992/0322

STEP NO--UR/0459/70/012/002/0369/0375

CIRC ACCESSION NO--AP0111516

UNCLASSIFIED

2/2 041

UNCLASSIFIED

PROCESSING DATE--02OCT70

CIRC ACCESSION NO--AP0111516

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE EFFECTS OF THE SUPRAMOL. STRUCTURE ON THE STRESS RELAXATION OF BUTADIENE STYRENE RUBBER (UROPRENE-1500) (I), NATURAL RUBBER (II), AND CIS,1,4,POLYBUTADIENE RUBBER (UROPRENE) (III) WERE INFERRED FROM PLOTS OF RELAXATION CURVES OBTAINED BY MEANS OF A POLYMER RELAXOMETER. THE EXPTL. DATA (TREATED BY A METHOD DEVELOPED BY A. V. TOBOLSKY, 1959 AND A. V. BRYUKHANYOV, 1960) INDICATED THAT THE SLOW STAGE OF PHYS. RELAXATION CONSISTED OF 3 STEPS HAVING IDENTICAL ACTIVATION ENERGY (PROPORTIONAL TO THE MOL. INTERACTION OF POLYMER CHAINS). THE SLOW STAGE OF PHYS. RELAXATION AND THE VISCOUS FLOW OF I, II, AND III FOLLOWED THE SAME SEGMENTAL MODIFICATION OF THE SUPRAMOL. STRUCTURE. THE RELAXATION TIMES OF THE 3 ELEMENTARY STEPS OF SLOW RELAXATION WERE DIFFERENT, PRESUMABLE DUE TO DISSIMILAR DIMENSION OF THE ORDERED REGIONS IN THE POLYMERS. AT LOW TEMPS., THE RELAXATION TIME WAS MAINLY A FUNCTION OF THE ACTIVATION ENERGY, WHEREAS AT HIGH TEMPS. IT WAS A FUNCTION OF THE PREEXPONENTIAL COEFF. (IN THE FORMULA FOR THE RELAXATION TIME). III HAD A SHORTER RELAXATION TIME THAN I AT LOW TEMPS. AND A LONGER RELAXATION TIME AT HIGH TEMPS.

UNCLASSIFIED

1/2 042 UNCLASSIFIED PROCESSING DATE--02OCT70
TITLE--MODELING OF THE DYNAMIC MECHANICAL PROPERTIES OF TWO COMPONENT
HETEROGENEOUS POLYMER COMPOSITIONS BY THE TECHNIQUE OF COMPOSITE
AUTHOR--(03)-AYVAZOV, A.B., ZELENEV, YU.V., BARTENEV, G.M.
COUNTRY OF INFO--USSR
SOURCE--MEKH. POLIM. 1969, 5(6), 1119-22
DATE PUBLISHED-----70
SUBJECT AREAS--MATERIALS
TOPIC TAGS--ELASTIC MODULUS, PLASTIC MECHANICAL PROPERTY, SYNTHETIC
RUBBER, POLYSTYRENE RESIN, POLYMER BINDER, COMPOSITE MATERIAL,
MATHEMATIC MODEL
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAE--1989/0496 STEP NO--UR/0374/69/005/006/1119/0122
CIRC ACCESSION NO--AP0107101
UNCLASSIFIED

2/2 042

UNCLASSIFIED

PROCESSING DATE--020CT70

CIRC ACCESSION NO--AP0107101

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE COMPLEX DYNAMIC ELASTICITY MODULUS (E) AND TAN (MECH. LOSS ANGLE) (TAN DELTA) WERE DETD. IN THE MINUS 100 TO PLUS 100DEGREES RANGE FOR MIXTS. OF SYNTHETIC RUBBERS WITH POLYSTYRENE (I). ALSO E AND TAN DELTA WERE DETD. OF COMPOSITE SAMPLES CONSISTING OF PURE I BONDED TO PURE RUBBER. FORMULAS WERE REDUCED WHICH GIVE THE REAL (E SUB1) AND IMAGINARY (E SUB2, LESS MODULUS) COMPONENTS OF 3 IN TERMS OF E SUB1 AND E SUB2 OF THE MIXT. CONSTITUENTS. THERE IS A CLOSE CORRESPONDENCE BETWEEN THESE FORMULAS AND FORMULAS DEDUCED FOR THE MIXTS., WHICH SHOWS THAT THESE MIXTS. ARE HETEROGENEOUS AND THEREFORE THEIR MECH. DYNAMIC PROPERTIES ARE MATH. PREDICTABLE WHEN THEIR COMPN. IS KNOWN.

UNCLASSIFIED

1/2 020 UNCLASSIFIED PROCESSING DATE--18SEP70
TITLE--EFFECT OF IRON VALENCE STATE ON THE ANGULAR DISTRIBUTION OF
ANNIHILATION GAMMA QUANTA IN IRON OXIDES -U-
AUTHOR-(03)-BARTENEV, G.M., TSYGANOV, A.D., VARISOV, A.Z.
COUNTRY OF INFO--USSR
SOURCE--FIZ. TVERD. TELA 1970, 12(2), 669-70
DATE PUBLISHED-----70
SUBJECT AREAS--MATERIALS, CHEMISTRY
TOPIC TAGS--CHEMICAL BONDING, IRON, IRON OXIDE, X RAY ANALYSIS
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAE--1984/0124 STEP NO--UR/0181/70/012/002/0669/0670
CIRC ACCESSION NO--AP0054920
UNCLASSIFIED

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2/2 020

UNCLASSIFIED

PROCESSING DATE--18SEP70

CIRC ACCESSION NO--AP0054920

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE EFFECT OF THE METAL CATION VALANCE STATE IN OXIDES WAS STUDIED ON THE ANGULAR CORRELATION OF THE ANNIHILATION PAIRS OF GAMMA QUANTA. THE ANGULAR DISTRIBUTION OF THE ANNIHILATION RADIATION WAS DETD. IN THE FE OXIDES: FE₀, FE SUB₂ O SUB₃, AND FE SUB₃ O SUB₄. HALFWIDTHS OF THE CURVES AND THE EFFECTIVE CHARGES OF THE O ION AS DETD. FROM THE HALFWIDTH, ARE TABULATED. AS THE OXID. STATE OF FE INCREASES, THE SHIFT OF THE K EDGE INCREASES AND BROADENING OF THE ANGULAR CORRELATION CURVE TAKES PLACE. THE EFFECTIVE CHARGE OF THE O ION INCREASES IN THE SERIES FE₀, FE SUB₃ O SUB₄, AND FE SUB₂ O SUB₃. THE EFFECTIVE CHARGE OF THE FE ION IN THE ABOVE SERIES IS, RESP., 1.0, 1.6, AND 1.95. THUS, VARIATION OF THE VALANCE STATE OF FE CAUSES A SHIFT OF THE K EDGE OF THE X RAY ABSORPTION SPECTRUM AND BROADENING OF THE ANGULAR DISTRIBUTION OF ANNIHILATION PAIRS OF GAMMA QUANTA INDICATING A VARIATION OF THE DEGREE OF IONIC CHARACTER OF CHEM. BONDING.

UNCLASSIFIED

2/2 017

UNCLASSIFIED

PROCESSING DATE--27NOV70

CIRC ACCESSION NO--AP0134901

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE WETTING OF BUTADIENE
ACRYLONITRILE RUBBER SKN-18 IS DEPENDENT ON THE DEGREE OF STRETCHING.
THE SURFACE TENSION OF SKN-18 VARIES LINEARLY WITH THE DEGREE OF
STRETCHING AND VARIES WITH THE DIRECTION (IN RESPECT TO THE ELONGATION)
IN WHICH IT IS MEASURED. FACILITY: FILIAL NAUCH.-ISSLED. INST.
REZIN. PRDM., LENINGRAD, USSR.

UNCLASSIFIED

USSR

UDC 612.6:539.434

BARTENEV, G. M., Moscow Pedagogical Institute imeni V. I. Lenin

"Fracture of Flawless Inorganic Glasses"

L'vov, Fiziko-Khimicheskaya Mekhanika Materialov, No 3, May-June 70, pp 71-77

Abstract: It is proposed that the kinetics of thermal-fluctuation failure of flawless glasses consists of two stages. In the first stage, which primarily determines the durability of a sample, the initial submicrocrack is generated from relatively weak sections of the glass structure. In the presence of a surface-active medium, fluctuation generation of the surface alleviates submicrocracks. In the second stage, the submicrocrack grows. Thus, overstressing the tip of the crack causes the critical stress value to be reached and the submicrocrack becomes a microcrack which is propagated rapidly, causing catastrophic failure of the sample.

A comparison of theory with experimental curves on the durability of low-strength silicate glass made it possible to conclude that in the transfer of a sample from a vacuum to the atmosphere, both the energy of activation (135 down to 35 kcal/mol) and coefficient of stress concentration (25 down to 7) are decreased. In the current study of flawless quartz glass, the coefficient of concentration and fluctuation volume did not change; only the energy of activation $1/2$

USSR

UTC 612.6:539.434

BARTENEV, G. M., Fiziko-Khimicheskaya Mekhanika Materialov, No 3, May-June 70,
PP 71-77

varied.

The above discussion led to the premise that adsorption lowering of the strength in a solid can be observed not only in the presence of surface micro-cracks, as was previously believed, but also in solids which do not have surface defects. From this comes an explanation of increased strength in flawless glass and glass fibers in the transition to low temperatures (1-196°C): when the temperature is lowered the atmospheric humidity freezes and the strength of glass at low temperatures in an atmosphere coincides with the strength of glass in a vacuum.

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1/2 035 UNCLASSIFIED PROCESSING DATE--30OCT70
TITLE--MECHANISM OF STRESS RELAXATION IN RUBBER FILLED WITH CARBON BLACK
-U-
AUTHOR--(02)--BARTENEV, G.M., LYALINA, N.M. **B**
COUNTRY OF INFO--USSR
SOURCE--VYSOKOMOL. SOEDIN, SER. A 1970, 12(4), 922-31
DATE PUBLISHED-----70

SUBJECT AREAS--MATERIALS
TOPIC TAGS--STRESS RELAXATION, CARBON BLACK, BUTADIENE STYRENE RESIN,
MATERIAL DEFORMATION, ACTIVATION ENERGY, SYNTHETIC RUBBER/(U)SKS30A
BUTADIENE STYRENE RUBBER

CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRA--2000/1686 STEP NO--UR/0459/70/012/004/0922/0931
CIRC ACCESSION NO--AP0125307
UNCLASSIFIED

2/2 035

UNCLASSIFIED

PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0125307

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE STRESS RELAXATION (σ) OF CARBON BLACK FILLED SKS-30A (BUTADIENE-STYRENE RUBBER) AT 20-100 DEGREES AND 20-200 PERCENT DEFORMATION (ϵ) RANGES OBEYS A FIVE TERM EQUATION: $\sigma(t)\epsilon$ EQUALS $E_{SUB1} \exp(-t/\tau_{SUB1})$ PLUS $E_{SUB2} \exp(-t/\tau_{SUB2})$ PLUS $E_{SUB3} \exp(-t/\tau_{SUB3})$ PLUS $E_{SUB4} \exp(-t/\tau_{SUB4})$ PLUS $E_{SUB5} \exp(-t/\tau_{SUB5})$, WHERE t IS THE RELAXATION TIME, E_{SUB1} A COEFF. INDICATING THE CONTRIBUTION OF THE i TH RELAXATION PROCESS, AND τ_{SUB1} THE RELAXATION TIME OF THE i TH PROCESS. THE 1ST 3 TERMS ARE RELATED TO THE RELAXATION OF NOT FILLED RUBBER, HAVE ASSOCIATED 13 KCAL-MOLE ACTIVATION ENERGY (PER TERM), AND ARE INDEPENDENT OF ϵ . THE 4TH TERM IS DEPENDENT ON THE FILLER AMT., ϵ , AND HAS 18 KCAL-MOLE ACTIVATION ENERGY ASSOCD. WITH IT. THE 5TH TERM IS ASSOCD. WITH 38-40 KCAL-MOLE ACTIVATION ENERGY; IT EXPRESSES THE CONTRIBUTION OF 5 CROSSLINKS TO THE RELAXATION PROCESS. ONLY THE 4TH TERM IS DIFFERENT FOR THE FILLED AND UNFILLED SKS-30A; ITS PRESENCE IS NECESSITATED BY THE UNEVEN DISTRIBUTION OF STRESSES IN THE FILLED RUBBER. FACILITY: MOSK. GOS. PEDAGOG. INST. I.M. LENINA, MOSCOW, USSR.

UNCLASSIFIED

1/2 036

UNCLASSIFIED

PROCESSING DATE--16OCT70

TITLE--OBSERVATION OF MOLECULAR ORDERING IN RUBBERLIKE POLYMERS UNDER LOW STRESS BY A CREEP TECHNIQUE -U-

AUTHOR--(02)-BARTENEV, G.M., GLUKHATKINA, L.G.

B

COUNTRY OF INFO--USSR

SOURCE--VYSOKOMOL. SOEDIN. SER. B 1970, 12(3), 185-7

DATE PUBLISHED-----70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--STRESS RELAXATION, POLYBUTADIENE, NITRILE RUBBER, POLYISOBUTYLENE, POLYMER STRUCTURE, DEFORMATION RATE, CREEP/(U)SKB35 POLYBUTADIENE RUBBER, (U)SKN26M BUTADIENE NITRILE RUBBER, (U)PIB85 POLYISOBUTYLENE RUBBER

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1995/1204

STEP NO--UR/0460/70/012/003/0185/0187

CIRC ACCESSION NO--AP0116669

UNCLASSIFIED

2/2 036

UNCLASSIFIED

PROCESSING DATE--16OCT70

CIRC ACCESSION NO--AP0116669

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE STRESS RELAXATION GRAPHS WERE OBTAINED FOR SKB-35 (POLYBUTADIENE), SKN-26M (BUTADIENE NITRILE RUBBER), AND PIB-85 (POLYISOBUTYLENE) IN 0-100DEGREES RANGE. EACH RUBBER AT A GIVEN TEMP. ACHIEVED AN EQUIL STRUCTURE, I. E., A STRUCTURE SUSCEPTIBLE TO AN IRREVERSIBLE ALTERATION BY APPLYING A SMALL LOAD. THE DEFORMATION RATE WHICH WAS JUST SUFFICIENT TO ALTER IRREVERSIBLY THE RUBBER STRUCTURE WAS CALLED MICROVISCOSITY. MICROVISCOSITY DEPENDED ON THE SAMPLE STORAGE TEMP. FACILITY: MOSK. GOS. PEDAGOG. INST IM. LENINA, MOSCOW, USSR.

UNCLASSIFIED

1/2 025 UNCLASSIFIED PROCESSING DATE--16OCT70
TITLE--POSITRON ANNIHILATION IN QUARTZ IRRADIATED BY FAST NEUTRONS -U-
AUTHOR-(04)-BARTENEV, G.M., TSYGANOV, A.D., VARISOV, A.Z., PROKOPYEV,
YE.P.
COUNTRY OF INFO--USSR **B**
SOURCE--FIZIKI, 1970, VOL 58, NR 6, PP 1904-1910
DATE PUBLISHED-----70
SUBJECT-AREAS--PHYSICS
TOPIC TAGS--POSITRON, PARTICLE ANNIHILATION, QUARTZ, NEUTRON IRRADIATION,
PHOTON EMISSION, ANGULAR DISTRIBUTION
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAE--1998/0029 STEP NO--UR/0056/70/058/006/1904/1910
CIRC ACCESSION NO--AP0120729
UNCLASSIFIED

2/2 025

UNCLASSIFIED

PROCESSING DATE--16OCT70

CIRC ACCESSION NO--AP0120729

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE EFFECT OF FAST NEUTRON IRRADIATION ON THE ANGULAR DISTRIBUTION OF ANNIHILATION γ QUANTUM PAIRS IN CRYSTAL AND FUSED QUARTZ IS INVESTIGATED. IT IS FOUND THAT THE HALFWIDTH OF THE CORRELATION CURVES CORRESPONDS TO THE VARIATION OF THE QUARTZ DENSITY. FROM AN ANALYSIS OF VARIOUS POSITRON STATES IN QUARTZ PRECEDING ANNIHILATION AND ON BASIS OF THE EXPERIMENTAL DATA IT IS CONCLUDED THAT VARIATION OF THE HALF WIDTH IS DUE TO THE APPEARANCE IN THE CORRELATION CURVES OF A NARROW COMPONENT WHOSE INTENSITY DEPENDS ON THE RADIATION DOSE. THE NARROW COMPONENT IS DUE TO ANNIHILATION DECAY OF PARA POSITRONIUM ATOMS PRODUCED IN IRRADIATED QUARTZ.
FACILITY: GOSUDARSTVENNY PEDAGOGICHESKIY INSTITUT IM. V.I. LENINA.

UNCLASSIFIED

USSR

UDC 621.7.029

OBUKHOV, A. P., SOKOLOVA, T. V., and BARTENEV, S. S., Physico Technical Institute imeni A. F. Ioffe, USSR Academy of Sciences

"Study of Pore Size Distribution in Sprayed Coatings"

Poroshkovaya Metallurgiya, No 4, (100), Apr 71, pp 46-49

Abstract: Pore size distribution in solids can be determined by several methods. Mercury porosimeter and metallographic analysis methods were compared as a means of determining pore size distribution in aluminum oxide coatings. The coatings were prepared by gas flame spraying or plasma spraying. Determinations of pore size by hydrostatic suspension and the mercury porosimeter agreed well with each other but did not agree with the results obtained by microphotographic methods. Gas flame-sprayed coatings showed a porosity of $12.5 \pm 0.5\%$ by either hydrostatic suspension or porosimeter methods and $11.6 \pm 0.5\%$ by the microphotographic methods. Plasma spraying gave $9.3 \pm 0.3\%$ and $7.9 \pm 0.5\%$, respectively. It was concluded that the porosimeter method measured the distribution of pore size by the "narrowing" of sizes and that analysis by microphotographic methods measured "edges." Therefore, because of the heterogeneous particle forms in the coating operation, the latter method is recommended.

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Ampl
BARTENEV, V. D.

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This document is considered pertinent to your interests.

Title: Forming in a Vacuum a Jet Target From Condensed Hydrogen
BNL-TR-465

Author: *AC* V. D. Bartenev, *AC* A. I. Valevich, *AC* Yu. K. Plipenko, *AC* V. V. Smolyanskiy
Prepared by: AEC

Country: USSR

Date of Document: 1972

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USSR

UDC 669.71:620.178.3

OK'KIN, B. I., BARTEN'EVA, G. F., and SAVOST'YANOVA, T. G.

"Investigation of the Durability of Aluminum Alloys"

Moscow, Zavodskaya Laboratoriya, No 5, 1972, pp 591-593

Abstract: Consideration is given to a procedure for testing the durability of flat specimens during the action of cyclical temperature stresses, and experimental data are presented on the durability of alloy AK4-IT specimens under the action of cyclical temperature and mechanical stresses with a supplementary static load. 4 figures. 1 table. 2 references in the form of foot notes.

1/1

USSR

UDC 620.193.47

EIKHAYLOVA, N. A., ZHUK, N. P., BARTEN'YEVA, I. A., and TURKOVSKAYA, A. V.,
Moscow Institute of Steel and Alloys

"Corrosion Mechanism of Aluminum in Acetic and Formic Acids and Their Mixtures"

Moscow, Zashchita Metallov, Vol 7, No 5, 1971, pp 575-578

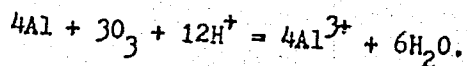
Abstract: The corrosion mechanism of aluminum in acetic and formic acids and their mixtures was investigated. Grade A97 aluminum was studied in 43% HCOOH, 50% CH₃COOH and in a ternary mixture: 33% CH₃COOH + 27% HCOOH + 40% H₂O at several temperatures. Electrochemical and corrosion characteristics were examined on aluminum specimens 20 x 20 x 2 mm in size. When the potential of aluminum is shifted from its stationary value toward the positive side, passivation of Al commences quite rapidly, a small passivity region is observed, and, finally, a region of disturbance in the passivated state. Comparison of the flows of aluminum dissolution in the region of potential-independence and for the steady-state potential permits an approximate estimate of the contribution of electrochemical and chemical mechanisms to the total rate of spontaneous corrosion of aluminum. A comparison of the three dissolution situations showed that acetic acid is the mixture component increasing the proportion of metal dissolved by the chemical mechanism. This can be explained in the lower 1/2

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USSR

MIKHAYLOVA, N. A., et al., Zashchita Metallov, Vol 7, No 5, 1971, pp 575-578

(by one order of magnitude) dissociation constant of acetic acid compared with that of formic acid. When acetic acid is diluted with water, the role of the electrochemical mechanism becomes greater. This can be related to the increased degree of acid dissociation with increased dilution of the acid. The chemical corrosion of aluminum in acetic and formic acids is suggested to be due to the interaction of metal with ambient oxygen and is not accompanied by the evolution of hydrogen:



Accordingly, when the amount of solute oxygen is reduced, the corrosion rate of aluminum decreases and in 50% CH₃COOH saturated with oxygen, air, and nitrogen is 0.300, 0.097, and 0.022 g/m².hour, respectively at 22°.

2/2

Nitrogen Compounds

USSR

UDC 547.571+547.551+666.718

STEPANOVA, G. P., BARTINIKAS, R. I., STEPANOV, B. I. Moscow Chemical-
Technological Institute imeni D. I. Mendeleev

"A Condensation of Aromatic Aldehydes with Aromatic Amides of Acetoacetic Acid
in the Presence of Hexachlorocyclophosphazatriene"

Leningrad, Zhurnal Obshchei Khimii, Vol 40, No 6, Jun 70, pp 1256-1260

Abstract: The reaction of benzaldehyde and o-nitrobenzaldehyde with the
anilide, o-chloroanilide, and o-aniside of acetoacetic acid in the presence
and in the absence of hexachlorocyclophosphazatriene (I) was studied. An
excess of the aldehyde in chloroform was used. The reaction products were
washed with water and purified by recrystallization. I acts as promoter of
the condensation reaction of aldehydes with compounds containing active
methylene groups. The proposed mechanism includes adduct formation with a
positive charge arising at the carbonyl C atom of the carbonyl group so that
the electrophilic activity of the aldehyde is enhanced. The adduct reacts
then with acetoacetic acid amide, the phosphorus moiety is eliminated and the
arylideneacetylacetamides are obtained. IR and UV spectra were obtained for
identification of the products.

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USSR

UDC: 621.397.62

ZDANYS, J., MASIULIS, F., BARTKEVIČIUS, S.

"Stabilized Power Supply for the YHT-59 Television Set"

V sb. Elektrotehnika (Electrical Engineering--collection of works), Kaunas, 1970, pp 181-182 (from RZh--Radiotekhnika, No 12, Dec 70, Abstract No 12G179)

Translation: The article is devoted to calculating the basic parameters of a ferroresonance voltage stabilizer under the condition that the load power is constant. Theoretical and experimental data are given for a stabilizer built in accordance with the given recommendations. Resumé.

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USSR

UDC: 512.25/.26+519.3:330.115

BARTKUS, A.

"Setting up Calendar Production Schedules by the Methods of Linear Programming"

V sb. Avtomatika i vychisl. tekhn. (Automation and Computer Technology-- collection of works), No 3, Vil'nyus, "Mintis", 1971, pp235-242 (from RZh-Kibernetika, No 12, Dec 71, Abstract No 12V823)

Translation: The problem of compiling a calendar schedule of work area loads reduces to a combinatorial problem in linear programming. Minimization of the overall production cycle is taken as the target function. A heuristic method of solving the problem is given together with an illustrative example. Author's abstract.

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1/2 010

UNCLASSIFIED

PROCESSING DATE—30OCT70

TITLE—1,3,DIOL CONVERSION MECHANISM IN THE PRESENCE OF ACID CATALYSTS. 1.
CONVERSION OF 1,3,PROPANEDIOL, 1,3,BUTANEDIOL AND BETA OXIDES ON CALCIUM
AUTHOR—(04)—FREYDLIN, L.KH., SHARF, V.Z., BARTOK, M., NAZARYAN, A.A.

COUNTRY OF INFO—USSR

SOURCE—IZV. AKAD. NAUK SSSR, SER. KHIM. 1970, (2), 310-14 **B**

DATE PUBLISHED—70

SUBJECT AREAS—CHEMISTRY

TOPIC TAGS—PROPANE, BUTANE, HYDROXYL RADICAL, ORGANIC OXIDE, ACID
CATALYSIS, FURAN, EPOXIDE, KETONE

CONTROL MARKING—NO RESTRICTIONS

DOCUMENT CLASS—UNCLASSIFIED

PROXY REEL/FRAME—2000/0749

STEP NO—UR/0062/70/000/002/0310/0314

CIRC ACCESSION NO—AP0124419

UNCLASSIFIED

2/2 010

UNCLASSIFIED

PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0124419

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE PRODUCTS FORMED BY PASSAGE AT 275-350DEGREES OVER CA SUB3 (PO SUB4) SUB2 OF HO(CH SUB2) SUB3 OH, TETRAHYDROFURAN, AND ALLYL ALC. WERE TABULATED FOR EACH TEMP. IN 25DEGREES STEPS. SIMILAR DATA ARE REPORTED FOR HO(CH SUB2) SUB2 CHMEOH AND 2,METHYLTETRAHYDROFURAN, BOTH RUN OVER 230-300DEGREES. THE 1,3,DIOLS ARE CONVERTED INTO A MIXT. OF SATD. AND UNSATD. ALCs., ALDEHYDES, KETONES, EPOXIDES, AND OTHER COMPS. DEHYDRATION OCCURS BY 2 PATHS TO AN UNSATD. ALC. AND TO A CYCLIC OXIDE, WITH INTRAMOL. CYCLIZATION BEING PREDOMINANT. OXIDES ARE THEN CONVERTED BY ISOMERIZATION TO UNSATD. ALCs. AND CARBONYL COMPS. MUCH OF THE SATD. ALCs. AND UNSATD. ALDEHYDES IS FORMED BY THE H TRANSFER REACTIONS. 2,2,DIETHYL,1,3,PROPANEDIOL GAVE 11PERCENT 3,3,DIETHYLTRIMETHYLENE OXIDE, 18PERCENT ISOMERIC HEPTENOLS, AND 71PERCENT MIXED PRODUCTS AT 300DEGREES; 2,BUTYL,1,3,PROPANEDIOL GAVE NO TRIMETHYLENE OXIDE DERIVS. BUT 20PERCENT ISOMERIC HEPTENOLS AND 80PERCENT MIXED PRODUCTS. 2,BUTYLTRIMETHYLENE OXIDE WAS 98PERCENT CONVERTED TO ALCs. AND OTHER PRODUCTS AT 300DEGREES. FACILITY: INST. ORG. KHIM. IM. ZELINSKOGG, MOSCOW, USSR.

UNCLASSIFIED

USSR

UDC: [625.282:621.438]:003.1

BARTOSH, Ye. T. and MEYLIKHOV, M. Ye.

"Problems of Gas Turbine Traction"

Moscow, Izvestiya Akademii Nauk SSSR--Energetika i Transport, No. 4, 1971, pp 82-92

Abstract: Gas turbine engines, as the answer to the problem of more efficient railroad transportation for a growing national economy, are discussed. Because locomotives of this type burn relatively cheap sulphur fuels, require less lubrication, and are simpler in construction, their use throughout the world and especially in the Soviet Union is desirable. They have the additional advantage of providing higher power levels for smaller dimensions and weight. Through three experimental gas turbine locomotives, the freight G1-01 and two passenger GP1 built at the Kolomenskiy Locomotive Plant imeni V. V. Kuybyshev, Soviet engineers have gained a good deal of experience with this type of de-

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USSR

BARTOSH, YE. T., and MEYLIKHOV, M. YE. , Izvestiya Akademi Nauk SSSR - Energetika i Transport, No 4, 1971, pp 82-92

sign. The article discusses some design problems and their possible solutions. A table comparing the characteristics of this type of engine with those of diesels is presented. Among the important problems connected with the gas turbine engine are improvement in its economy, the design of simple transmissions, and adaptation to the use of heavy liquid fuels of various types.

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Acc. Nr:

AP0040958

Abstracting Service:

CHEMICAL ABST. 4/70

Ref. Code:

UR0068

B

80828a Drying and handling ammonium sulfate in a vibrating fluidized bed. Petrenko, D. S.; Bartoshevich, V. I. (Kiev. Filial GNIKhP, Kiev, USSR). *Koks Khim.* 1970, (1), 44-6 (Russ). The effectiveness of using the vibrating fluidized-bed technique in drying (from 3-4% to 0.1% humidity) of $(NH_4)_2SO_4$ (I) was investigated by means of an exptl. app. having a productivity of 60 kg/hr I. The app. is described in detail. The construction of the app. permits variation of various mech. and technological parameters, e.g., duration of the process, intensity of vibrating fluidization, etc. The optimal dynamic parameters were detd. This technique greatly improves the coeff. of heat transfer and accelerates the process 1.8 times. The drying process described can be easily modeled and automated.

I. Haiduc

ALS

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REEL/FRAME

10750207

1/2 018 UNCLASSIFIED PROCESSING DATE--04DEC70
TITLE--STRUCTURE AND INTERFACIAL SURFACE OF DISPERSED GAS, LIQUID AND
GAS, LIQUID, SOLID SYSTEMS FORMED IN FOAM APPARATUS -U-
AUTHOR--(04)-YENGIBARYAN, S.N., TARAT, E.YA., MUKHLENOV, I.P., BARTOV, A.T.
COUNTRY OF INFO--USSR
SOURCE--ZH. PRIKL. KHIM. (LENINGRAD) 1970, 43(5), 1178-82
DATE PUBLISHED-----70
SUBJECT AREAS--CHEMISTRY, MATERIALS
TOPIC TAGS--CHEMICAL ENGINEERING, COPPER SULFATE, AQUEOUS SOLUTION, PHASE
ANALYSIS, MODEL, SODIUM HYDROXIDE, FOAM
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRA--3004/0955 STEP NO--UR/0080/70/043/005/1178/1182
CIRC ACCESSION NO--AP0131540
UNCLASSIFIED

B

2/2 018

UNCLASSIFIED

PROCESSING DATE--04DEC70

CIRC ACCESSION NO--AP0131540

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. HYDRODYNAMIC STUDIES OF DISPERSED GAS LIQ. (AIR WATER, AIR SATD. CUSO SUB4 SOLN., 3PERCENT CO SUB2 IN AIR 1.8N NAOH) AND GAS LIQ. SOLID (AIR SATD. CUSO SUB4 SOLN. CUSO SUB4 CRYSTALS) SYSTEMS WERE CONDUCTED IN A PLANAR (2-DIMENSIONAL) FOAMING APP. MODEL AT GAS VELOCITIES SMALLER THAN OR EQUAL TO 2.5 M-SEC. CHANGES IN THE SURFACES OF THE CONTACTING PHASES AND CHANGES IN STRUCTURE WERE FOLLOWED CINEMATOGRAPHICALLY. THREE DISTINCT HYDRODYNAMIC REGIMES WERE IDENTIFIED WHICH VARIED WITH THE GAS VELOCITY W; AT LOW W, THE GAS WAS DISPERSED IN THE LIQ.; AT INTERMEDIATE W, AN INVERSION OF PHASES OCCURRED AND CLUSTERS OF LIQ. DROPLETS AND GAS BUBBLES (VOIDS) WERE PRESENT; AND AT HIGH W, THE LIQ. WAS FULLY DISPERSED IN THE GAS. CHANGES IN THE GAS VOL. FRACTION, SP. CONTACTING SURFACE OF THE CLUSTER, AND PRESSURE DROP CHANGES IN THE LAYERS DETD. AS A FUNCTION OF TIME ARE DISCUSSED; TWO MODES OF GAS FILLING OF THE LIQ. CLUSTERS AND OF THE VOIDS WERE OBSD. AND ARE DISCUSSED.
FACILITY: LENINGRAD. TEKHNOL. INST. IM. LENSOVETA, LENINGRAD, USSR.

UNCLASSIFIED

USSR

UDC 576.858.095.38.095.18:[615.373.6:457.962

KUL'BERG, A. Ya., PRIYMYAGI, L. S., BAPTOVA, L. M., SHMELEVA, N. Ye., and FADEYEVA, L. L., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, Academy of Medical Sciences USSR, Tallin Institute of Epidemiology, Microbiology, and Hygiene, Ministry of Health, Estonian SSR, and Institute of Virology imeni D. I. Ivanovskiy, Academy of Medical Sciences USSR

"Study of the Interferon-Inducing Activity of Gamma Globulin and Its Fab^F Fragment"

Moscow, Byulleten' Eksperimental'noy Biologii i Meditsiny, No 11, 1972, pp 63-66

Abstract: Human gamma globulin in aggregated form is capable of inducing interferon in mice. Its interferonogenic activity is higher than that of the fraction free of aggregates or that of the original gamma globulin. The difference is even more pronounced when it is heated to 63°C. The aggregate-free fraction has virtually no interferonogenic activity, whereas that of the aggregated fraction fraction is 3 to 4 orders higher than that of crude gamma globulin. To evaluate the species specificity of the proteins, the interferonogenic activity of highly purified preparations of lapine and bovine gamma globulins was investigated in experiments on rabbits. Both induced interferon but heterologous gamma globulin was more active than homologous globulin. The Fab^F fragment of gamma globulin, which constitutes only one-third of the molecule, 1/2

USSR

KUL'BERG, A. YA., Byulleten' Eksperimental'noy Biologii i Meditsiny, No 11,
1972, pp 63-66

induced as much interferon as the unsplit molecule. The authors conclude that the interferon-inducing activity is caused by the gamma globulin proper and not by any admixtures that it may contain such as viruses or polysaccharides.

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USSR

AKHIEZER, I. A.; BARTS, B. I.; LAZURIK-EL'TSUFIN, V. T. (Khar'kov State University)

"Oscillations of a Drop of Fermi Liquid and Giant Resonance in Medium and Heavy Nuclei"

Moscow, Yadernaya Fizika; May, 1972; pp 863-8

ABSTRACT: Giant resonance in nuclear reactions with medium and heavy nuclei was considered in the model of a drop of Fermi liquid. Both purely nuclear and electrical interactions between nucleons were taken into account. Within this model it is possible to describe the experimentally observed position of giant dipole resonance in photonuclear reactions with a large number of nuclei: in particular, to explain a slower decrease of the resonant energy with increasing A than according to the usual law for liquids A^{-3} . The parameters involved were taken from an analysis of data not related to giant resonance. A number of experimental points do not fall on the curve corresponding to the excitation of dipole oscillations but fall near the calculated curves corresponding to $\ell = 0$ and $\ell = 2$. Consequently, the experimental determination of the multipolarity of the corresponding levels should be of great interest.

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USSR

UDC: none

AKHIEZER, I. A. and ~~BARTS, B. I.~~

"Theory of (γ, N) Reactions at Energies Above the Pion Generation Threshold"

Moscow, Yadernaya Fizika, vol. 15, No. 2, 1972, pp 251-257

Abstract: With the recent construction of electron accelerators at energies amounting to several Gev, a number of experimental research projects in photonuclear reactions, with the release of nucleons in the higher energy regions, have been performed. This paper represents a theoretical study of such reactions in the energy area of photons exceeding the levels at which the Levinger theory is justified. This theory explains the experimental data from the angular and energy dependence of released protons and from the dependence of cross sections on the mass number. Modifying the Levinger theory, the authors begin their analysis by citing the cross section of the reaction as $\gamma + A \rightarrow A' + N + \kappa$, representing the photonuclear reaction, accompanied by the release of nucleons, likely to occur at energy levels of several hundreds of Mev. It is this reaction, as opposed to the Levinger equation of $\gamma + A \rightarrow A' + p + n$, which is basically the subject of investigation in the present paper.

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USSR .

AKHIEZER, I. A., ~~BARTS, B. I.~~, LAZURIK-EL'TSUFIN, V. T. (Kharkov State University imeni A. M. Gorkiy)

"Giant Resonance in a Model of a Fermi-Liquid Drop"

Moscow, Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki (Letters to the Journal of Experimental and Theoretical Physics), Vol 14, No 9, 5 Nov 71, pp 535-538

Abstract: Giant resonance in nuclear reactions is related to the collective (or bulk) vibrations of the surface and nuclear particles. An attempt is made to understand giant resonance in real nuclei by considering the finite dimensions of the nucleus in a Fermi-liquid drop and by comparing theoretical and experimental data on dipole resonance in photonuclear reactions. The drop is viewed as a sphere, and both nuclear and electrical forces acting between the nucleons are considered.

The model of a Fermi-liquid drop with a free boundary is shown to be a good description of giant dipole resonance for a large number of nuclei.

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USSR

AKHIEZER, I. A. et al, Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 14, No 9, 5 Nov 71, pp 535-538

The authors thank A. I. Akhiezer for his advice and I. S. Shapiro for valuable discussions. Orig. art. has 8 refs.

2/2

USSR

AKHIEZER, I. A.; BARTS, B. I. (Physics-Engineering Institute of the Ukrainian Academy of Sciences, Kharkov)

"Oscillations of a Fermi Fluid in a Gravitational Field"

Kiev, Ukrainskiy Fizicheskiy Zhurnal; October, 1970; pp 1709-20

ABSTRACT: The properties of a system of Fermi particles (Fermi fluid) are studied in a gravitational field. Apparently the substance of neutron stars may be considered as such a system. The equilibrium distribution of a Fermi fluid in a gravitational field (the barometric formula for a Fermi fluid) is found. The hydrodynamic equations describing low-frequency motions of such a system are derived.

Collective oscillations of a Fermi fluid in a gravitational field are investigated. It is shown that two zero sound modes and two ordinary sound modes may propagate in it so that under certain conditions sound waves can appear. If such an occurrence takes place in a neutron star, it must lead to turbulent phenomena in the external strata of the star.

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USSR

B

AKHIEZER, I. A.; BARFS, B. I. (Khar'kov State University)

"Theory of Fluctuations and Scattering of Slow Pions in Nuclear Matter"

Moscow, Journal of Nuclear Physics; January, 1970; pp 168-77

△ △ △

ABSTRACT: The fluctuations of "nuclear matter" in the Fermi-liquid model, taking into account the strictly nuclear as well as the electrical interaction among nucleons, are studied. It is shown that the electrical forces essentially modify the nature of long-wave fluctuations in the densities of the nuclear matter and charge. In particular, in the expressions for correlators of fluctuations of given magnitudes sharp maximums occur, caused possibly by the propagation of coupled oscillations of density and the density of the charge in the nuclear matter. The effect of electrical forces on the scattering of slow pions by nuclei is studied. In addition, the electrical interactions of incident pions with protons of the nucleus as well as the electrical interactions among the nucleons of the nuclear matter itself are studied. It is shown that the electrical forces must also be considered along with the nuclear forces if the momentum transfer does not exceed 30 Mev/c.

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USSR

AKHIEZER, I. A., et al., Journal of Nuclear Physics; January, 1970; pp 168-77

The authors express their gratitude to A. I. Akhiezer for his valuable discussion of the work.

The article includes 36 equations. There are 8 bibliographic references.

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1/2 022

UNCLASSIFIED

PROCESSING DATE--16OCT70

TITLE--THEORY OF FLUCTUATIONS AND SCATTERING OF SLOW PIONS IN NUCLEAR
MATTER -U-

AUTHOR--(02)-AKHYEZER, I.A., BARTS, B.I.

B

COUNTRY OF INFO--USSR

SOURCE--YAD. FIZ. 1970, 11(1), 168-77

DATE PUBLISHED-----70

SUBJECT AREAS--PHYSICS

TOPIC TAGS--PION SCATTERING, HEAVY NUCLEUS, NUCLEAR MODEL, EXCITED
NUCLEUS, COULOMB INTERACTION, OSCILLATION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRA--1980/0186

STEP NO--UR/0367770/011/001/0168/0177

CIRC ACCESSION NO--AP0048478

UNCLASSIFIED

2/2 022

UNCLASSIFIED

PROCESSING DATE--16OCT70

CIRC ACCESSION NO--AP0048478

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. SURFACE EFFECTS CAN BE NEGLECTED IN THE STUDY OF COLLECTIVE VOL. EXCITATIONS OF SUFFICIENTLY HEAVY NUCLEI; SUCH EXCITATIONS CAN BE REGARDED AS OSCILLATIONS OF NUCLEAR MATTER. IN SUCH A MODEL, THE INTERACTION OF SLOW PIONS, π , AND OTHER PARTICLES WITH NUCLEI CAN BE CONSIDERED AS A SCATTERING OF THESE PARTICLES ON THE FLUCTUATIONS OF NUCLEAR MATTER. THESE FLUCTUATIONS ARE STUDIED IN THE FERMI LIQ. MODEL WHEREIN BOTH THE NUCLEAR AND ELECTROMAGNETIC INTERACTIONS BETWEEN THE N ARE TAKEN INTO ACCOUNT. ELEC. FORCES MODIFY, IN AN ESSENTIAL WAY, THE CHARACTERISTICS OF LONGWAVE FLUCTUATIONS OF THE NUCLEAR MATTER ρ AND CHARGE ρ_c . THE ELECTROMAGNETIC INTERACTION LEADS TO 2 EFFECTS: TO A SPLITTING OF THE MASSES OF QUASI PARTICLES, AND TO AN ADDNL. POTENTIAL INTERACTION ENERGY BETWEEN CHARGED QUASI PARTICLES. IN THE EXPRESSIONS GIVING THE CORRELATION FUNCTIONS OF THE FLUCTUATIONS, THERE ARISE SHARP MAX. FROM A PROPAGATION IN NUCLEAR MATTER OF COUPLED OSCILLATIONS OF THE ρ OF MATTER AND OF CHARGE. INFLUENCE OF THE ELEC. FORCES ON THE SCATTERING OF SLOW PIONS BY NUCLEI IS CONSIDERED. BOTH THE ELEC. INTERACTIONS OF INCIDENT PIONS WITH NUCLEAR P, AND THE INTERACTIONS BETWEEN THE N IN NUCLEAR MATTER ARE TAKEN INTO ACCOUNT. IT IS NECESSARY TO CONSIDER THE ELEC. FORCES FOR MOMENTUM TRANSFERS WHICH DO NOT EXCEED 30 MEV-C.
FACILITY: KHAR'KOV. GOS. UNIV., KHARKOV, USSR.

UNCLASSIFIED

USSR

AKHIEZER, I. A., BARTS, B. I., BOLOTIN, YU. L.

"Proton-Neutron Correlation in Medium and Heavy Nuclei"

Moscow, Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 11, No 11, 5 June 1970, pp 557-559

Abstract: In the light of possible equality of the chemical potential of neutrons and protons, it is of interest to consider the question of the consequences of proton-neutron (pn) pairing. In this paper it is demonstrated that this pairing essentially changes (by comparison with ordinary pp and nn pairing) the isotopic structure of the correlation functions of the nucleons of the nucleus. The author begins his analysis with the Hamiltonian

$$H' = -\sum I a_{p_1 s_1}^{i_1+} a_{-p_1 s_1}^{-i_1+} a_{p_2 s_2}^{-i_2} a_{p_2 s_2}^{i_2}$$

where a_{ps}^i , a_{ps}^{i+} are the operators of destruction and generation of a nucleon with the pulse p, the spin projection s, and the isospin projection i; and I is the interaction potential, which is nonzero in a narrow energy range near the Fermi range. Ho
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AKHIEZER, I. A., et al, Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 11, No 11, 5 June 1970, pp 557-559

then uses the ordinary method of superconductivity theory to obtain expressions for the Fourier components of the correlation functions of the nucleon density ($\Phi^{(0)}$) and isospin density ($\Phi^{(i)}$). It is pointed out that the isotopic structure of the correlation functions obtained differs appreciably from the isotopic structure of the correlation functions in the ordinary (two-fluid) superconducting model of the nucleus in which the correlation of the superconducting type occurs only between particles of one variety. This difference between the quasi-fluid and quasideuteron models of the nucleus can be essentially exhibited in a number of processes of interaction of particles with nuclei. Graphs are presented which clearly show that in the case of pairing of the quasideuteron type the scattering cross section has an essentially different nature than in the case of pairing of the two-fluid type.

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USSR

UDC 612.821.2.014.46:615.357.452

BARU, A. M., and BOZHKO, E. Kh., Laboratory of Biochemistry, Khar'kov Scientific Research Institute of Neurology and Psychiatry

"Effect of Some Inhibitors and Metabolites of Catecholamine Metabolism on the Processes of Fixation and Reproduction of Memory Traces

Moscow, Byulleten' Eksperimental'noy Biologii i Meditsiny, Vol 70, No 9, Sep 70, pp 45-48

Abstract: The formation and reproduction of a conditioned-defense avoidance reaction was studied in white Wistar rats after administration of substances affecting catecholamine metabolism. It was found that teturam (disulfiram) inhibits the synthesis of norepinephrine and sharply depresses the reproduction of a steadily evolved avoidance response; this effect may be prevented by preliminary introduction of monoaminooxidase inhibitor (iprazid). It was found that some animals exhibited an inability to learn and that iprazid was conducive to reinforcement of the conditioned defense avoidance reaction. Chronic introduction of 3,4-dimethoxyphenylethylamine impeded the formation of the response, while single injections resulted in inhibition of preliminary evolved reactions. The possible role of catecholamines in the processes of formation and reproduction of "memory traces" is discussed.

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USSR

UDC 669.296:620.193.41

FOKIN, M. N., BARU, R. L., and KURTEPOV, M. M.

"Corrosion of Zirconium in Hydrochloric Acid"

V sb. Korroziya i zashchita met. (Metal Corrosion and Protection -- Collection of Works), Moscow, "Nauka," 1970, pp 66-69 (from RZh-Metallurgiya, No 12, Dec 70, Abstract No 12 I834 by the authors)

Translation: Zirconium is stable in 20 and 30% solutions of HCl unless the concentration of oxidizing agents exceeds 0.01-0.5 g/l. With an increase in the concentration of oxidizing agents, pitting is observed, as well as an increase in total corrosion. The tendency toward pitting is estimated according to pitting potentials measured by the galvanostatic method. Zirconium does not undergo hydrogen embrittlement in HCl and can therefore be used to make insoluble cathodes operate in reducing media. Two illustrations. Bibliography of four titles.

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USSR

UDC 621.791.763.1.001.5

TARASOV, N. M., Candidate of Engineering Sciences, and TSEKHMISTER, I. M.,
and BARUKHA, N. A., Engineers, Kharkov Aviation Institute

"Spot Welding With Peripheral-Zone Compression"

Moscow, Svarochnoye Proizvodstvo, No 1, 1973, pp 28-30

Abstract: An improved method of spot welding has been proposed (Author's Certificate No 354956) by the Kharkov Aviation Institute. A steel die is used which is pressed by a current-conducting rod on a copper strip previously soldered or tack welded to the piece being welded. Spot welds made with this method were stronger than without compression. The dent made by the electrode is larger when using the compression method, but this is the result of metal shrinkage during solidification and not electrode pressure. Thus, for spot welding of steels with compression of the peripheral zone of the spot the dent from the electrode is significantly diminished, joint deformation decreased, and decorative appearance improved. Welding with compression increases the weld zone in the plastic state and increases joint strength and its stability. Welding with compression requires increased electrode pressure, more careful placement of the electrodes, and their centering and alignment. Six figures, 3 bibliographic references.

1/1

USSR

UDC: 536.24:532.54

BARULIN, Yu. D., VIKHREV, Yu. V., DYADYAKIN, B. V., KOBLYAKOV, A. N., KON'KOV, A., LOKSHIN, V. A., SINITSYN, I. T., Editorial Staff of Inzh. fiz. zh., Academy of Sciences of the Belorussian SSR

"Heat Exchange During Turbulent Flow of Water With Supercritical Parameters of State in Vertical and Horizontal Pipes"

Teplootdacha pri turbulentnom techenii v vertikal'nykh i gorizontal'nykh trubakh vody sverkhkriticheskikh parametrov sostovaniya (cf. English above), Minsk, 1970, 16 pp, ill. (No 2315-70 Dep.) (from RZh-Mekhanika, No 4, Apr 71, Abstract No 4B739 DEP)

Translation: The paper presents the results of an experimental study of heat transfer during rising, descending and horizontal flow of water with supercritical parameters of state in circular tubes. The experimental values of the coefficients of heat transfer were found in the following ranges of working parameters: pressure 225-265 bars; mass flowrates 480-5000 kg/cm²·s; Reynolds number (12.5-450)·10³; specific thermal load 0.2-6.5 MW/m²; flow temperature +50-500°C; wall temperature +60-750°C; inside

1/2

- 60 -

BARULIN, Yu. D. et al., Teplootdacha pri turbulentnom techenii v vertikal'nykh i gorizonta'nykh trubakh vody sverkhkritichskikh parametrov sostoyaniya, Minsk, 1970 (No 2315-70 Dep.)

diameter of the tubes $(3, 8, 20) \cdot 10^{-3}$ m; relative length up to 300. Experimental data are obtained on the effect which the direction of motion of the liquid flow has on heat exchange in the supercritical region. A study is made of the nature of the change in the coefficient of heat exchange on the initial section and around the perimeter of horizontal tubes. Bibliography of twelve titles. Authors' abstract.

2/2

USSR

UDC: 621.376.56(088.8)

POPOV, S. G., BARUZDIN, V. I.

"A Magnetic Pulse Duration Modulator"

USSR Author's Certificate No 264449, filed 25 May 67, published 17 Jun 70
(from RZh-Radiotekhnika, No 11, Nov 70, Abstract No 11D473 P)

Translation: This Author's Certificate introduces a magnetic pulse duration modulator for controlling a thyristor current regulator. The device contains a transformer with leads of a two-section winding connected through resistors, saturation chokes and diodes to the controlling electrodes of the thyristors, and the common tap from the transformer sections connected to the negative lead of the thyristor current regulator. To increase the steepness of the leading edges of the output pulses, a switching element such as a dynistor is connected between the common tap of the transformer secondary and the negative lead of the thyristors in the current regulator in series with a resistor. V. P.

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Reliability

USSR

UDC 621.396.6.019.3

BARVINSKIY, L. L., DEM'YANCHUK, V. S., MEDVEDEV, K. I.

"Availability of Certain Repairable and Maintainable Redundant Systems"

Sb. nauch. tr. Kiev. in-t inzh. grazhd. aviatsii (Collected Scientific Works of Kiev Institute of Civil Aviation Engineering), 1970, vyp. 3, pp 25-29 (from RZh-Radiotekhnika, No 5, May 72, Abstract No 5V292)

Translation: Expressions were obtained for evaluating the idle time factor of a complex comprising redundant subsystems and subjected to repair and preventive maintenance. It is proposed that all modules of the system are equally reliable and that their repair time is distributed by an exponential law. The repair time for a failed module and the switching time to a reserve unit in a state of good repair are distributed by a power law. The time to ready the redundant unit for operation is taken into account. There is 1 illustration and a 1-entry bibliography.

1/1

1/2 024 UNCLASSIFIED PROCESSING DATE--13NOV70
TITLE--OPTIMAL REDUNDANCY WITH COST AS CRITERION -U-

AUTHOR--(02)-BARVINSKIY, L.L., DEMYANCHUK, V.S.

COUNTRY OF INFO--USSR

SOURCE--IZV. VUZ RADIOELEKTRONIKA (USSR), VOL. 13, NO. 1, P. 97-9 (JAN. 1970)

DATE PUBLISHED----JAN70

SUBJECT AREAS--BEHAVIORAL AND SOCIAL SCIENCES, NAVIGATION

TOPIC TAGS--COST ESTIMATE, COMMUNICATION CHANNEL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3005/1805

STEP NO--UR/0452/70/013/001/0097/0099

CIRC ACCESSION NO--AP0133710

UNCLASSIFIED

2/2 024

UNCLASSIFIED

PROCESSING DATE--13NOV70

CIRC ACCESSION NO--AP0133710

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. A MULTICHANNEL SYSTEM, CONSISTING OF M MAIN AND N REDUNDANT CHANNELS IS ANALYSED WITH A VIEW TO DETERMINING THE OPTIMUM NUMBER N SUBO OF REDUNDANT CHANNELS, TAKING THE LEAST OVERALL COST OF THE SYSTEM AS CRITERION. AN EXPRESSION IS DERIVED FOR N SUBO. TABULATED RESULTS SHOW THAT THE LOSS PER HOUR VERSUS IDLE TIME OF THE SYSTEM DECREASES RAPIDLY AS THE NUMBER OF REDUNDANT CHANNELS INCREASES; AT THE SAME TIME THE RUNNING AND SERVICING COSTS RISE LINEARLY.

UNCLASSIFIED

USSR

62-531.6

BARYAKH, B. M. and GRANBERG, G. Ya. /"Tyazhpromavtomatika" Ukrainian State design Institute/

"Device for Reversible Control of a Single-Phase Condenser Motor"

USSR Author's Certificate No 294217, filed 13 Jan 69, published 21 May 71 (from RZh-Avtomatika, telemekhanika i vychislitel'naya tekhnika, No 12, 1971, Abstract No 12A174P)

Translation: A known device for reversible control of a single-phase condenser motor with two unconnected windings contains a flip-flop with two oppositely connected thyristors. The invention can be used as an automatic control element and a remote transmitter. The proposed device provides a reduction in the distortion of the shape of the voltage applied to the control winding of the motor and, consequently, results in an increase in efficiency. This is achieved by equipping the secondary winding of the flip-flop with a center tap, with one of the motor windings connected between the tap and the thyristor cathodes. Each of the thyristors is connected in antiparallel to a diode, and other free taps on the secondary winding of the flip-flop are connected to the outputs of the generated power unit through capacitors. Resume.

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USSR

UDC: 658.562.012.7

BARYAKH, B. M., GRANBERG, G. Ya., LERNER, I. U., SLOTSNIK, Ya. Yu., TSIV'YAN, B. Kh.,
CHERNKOV, V. V.

"Device for Centralized Testing of Parameters of an Object"

USSR Author's Certificate Number 308433, filed 16/03/70, published 12/08/71 (translated from Referativnyy Zhurnal Avtomatika, Telemekhanika i Vychislitel'naya Tekhnika, No 3, 1972, Abstract No 3 A371 P)

Translation: A device is suggested for centralized testing of the parameters of an object, containing a unit for selection of parameters, an autocompensator with a servo system, a rotation-digital converter, a unit for checking the accuracy of the servo system of the autocompensator, a defect indicator, a counter unit, and a recorder. In order to increase the speed and reliability of testing, the device contains a threshold unit connected to the input of the rotation-digital converter and a self-testing unit in the servo system, and the output of the threshold unit is connected to one input of the self-testing unit of the servo system, the second input of which is connected to an additional output of the unit for selection of parameters; the output of the counting control is connected

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USSR

BARYAKH, B. M., GRANBERG, G. Ya., LERNER, I. U., SLOTSNIK, Ya. Yu., TSIY'YAN, B. Kh.,
CHERNKOV, V. V., USSR Author's Certificate Number 308433, filed 16/03/70,
published 12/08/71 (translated from Referativnyy Zhurnal Avtomatika, Telemekhanika
i Vychislitel'naya Tekhnika, No 3, 1972, Abstract No 3 A371 P)

to the input of the counting unit, the output of the false balance checking unit is
connected to the controlling input of the servo system balancing element, while
the output of the signalling unit is connected to the additional inputs of the
defect indicator and recorder. 2 figures.

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USSR

UDC: 669.25:539.67

BAR'YAKHTAR, F. G., DATSKO, O. I., KUSHNÉREV, V. I., PILIPENKO, N. P.,
POGORELOV, V. A. and YABLUKOV, B. G., Donetsk Physicotechnical Institute.

"Study of the Internal Friction of Cobalt Near 300°C"

Sverdlovsk, Fizika metallov i metallovedeniye, Vol 32, No 5, Nov 71,
pp 1101-1104

Abstract: Earlier research indicates the 300°C region as the position of low-frequency maximum internal friction for cobalt. Described here is an attempt to explain its nature and properties. The experiment involved machined specimens of 99.98% pure Co measuring 3x40 mm and specimens additionally deformed by drawing (by 8%). The specimens were gradually annealed at 300, 600 and 900°C and cooled down to room temperature. The measurements included internal friction (150-350°C), oscillation frequency (7 cps) and maximal shearing strains ($2 \cdot 10^{-6}$). Interrupted anneal of the material appears to lower the maximum friction temperature position which is most pronounced at 900°C and particularly manifest on the drawn specimen. The relationship between the temperature position of maximum internal

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USSR

BAR'YAKHTAR, F. G., et al, Fizika metallov i metallovedeniye, Vol 32, No 5,
Nov 71, pp 1101-1104

friction of Co, the thermomechanical treatment of the material and the conditions of polymorphous transformation indicate its close association with crystal lattice defects, i.e., the maximum internal friction of Co at 300°C is of deformational nature. It is most likely to be caused by the plastic deformation of the material, including polymorphous transformation of Co. (2 illustrations, 3 bibliographic references).

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USSR

AKHIYEZER, A. I., AKHIYEZER, I. A., BAR'YAKHTAR, V. G. (Physicotechnical Institute of the Ukrainian Academy of Sciences)

"Electron-Electron Collisions and Electrical Conductivity of Metals at Low Temperatures"

Moscow, Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, July 1973, pp 342-345

Abstract: The contribution of electron-electron collisions to the resistance of pure metals at low temperatures is determined. It is shown that due to compensation of coulomb repulsion of electrons and their attraction due to virtual phonon exchange, the effective interaction between the electrons is appreciably decreased. Consequently, the contribution of electron-electron collisions to the resistance of a number of metals is proportional to T^6 in a broad temperature range (and not to T^2 as predicted by the Landau-Pomeranchouk theory; T is the metal temperature).

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USSR

UDC:

AKHIYEZER, A. I., BAR'YAKHTAR, V. G., and KVIRIKADZE, A. G., Kharkov State University imeni A.M. Gor'kij

"Parametric Excitation of Hypersound in Ferromagnetics"

Leningrad, Fizika Tverdogo Tela, Vol 14, No 3, Mar 1972, pp 889-891

Abstract: The authors calculate the increment of hypersound which is caused by the oscillations of a magnetic moment of large amplitude. It is shown that in a temperature range one order of magnitude less than the Debye temperatures the increment can exceed the sound damping constant. Original article: 11 formulas and seven bibliographic entries.

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USSR

UDC: None

BAR'YAKHTAR, V. G., BOROVIK, A. Ye., and POPOV, V. A.

"Theory of the Intermediate State of Antiferromagnetic Objects"

Moscow, Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, vol 62, No 6, 1972, pp 2233-2242

Abstract: The theory of the intermediate state of antiferromagnetics in an external field is given in this article. Beginning their analysis with an expression for the various phases that can occur in antiferromagnetics, depending on the direction and magnitude of the external magnetic field, the authors develop a theory of perturbations through which the magnetic moment distribution in the intermediate state can be found with any degree of accuracy. Results of the theory for the case in which the antiferromagnetics has the form of an ellipsoid are given under the assumption that the magnetic moment and antiferromagnetism vectors are in uniform distribution. Also considered is the nonuniform distribution of these vectors in a plate, where the free antiferromagnetic energy is varied with respect to the vectors. Expressions are obtained for the energy of the intermediate state and for the domain dimensions. The authors thank A. I. Akhiezer and V. V. Yeremenko for their comments; they are associated with the Physico-Technical Institute for Low Temperatures, Ukrainian Academy of Sciences.

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USSR

BAR'YAKHTAR, V. G., KLEPIKOV, V. F., and SOBOLEV, V. L. (Khar'kov State University)

"Ground States and Nuclear Magnetic Resonance in Thin Magnetically Ordered Films"

Leningrad, Fizika Tverdogo Tela, May 1971, pp 1454-1462

Abstract: The ground state of a thin magnetically ordered film in which the character of the surface magnetic anisotropy is different from the character of the voluminal magnetic anisotropy was studied. The distributions of the magnetic intensity of a ferromagnetic film as well as the vectors of the anti-ferromagnetism and magnetic intensity of an antiferromagnetic film in the ground state was determined. These distributions are described by Jacobian elliptic functions. The static local and integral magnetic susceptibility of a film were calculated, and it was shown that for given thicknesses of the film a phase magnetic transition of the second kind occurs, during which the components of the tensor of magnetic susceptibility undergo an abrupt change. The amplification factors of the nuclear magnetic resonance were calculated.

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USSR

BAR'YAKHTAR, V. G., BOROVIK, A. YE., POPOV, V. A., and STEFANOVSKIY, YE. P., Physicochemical Institute of the Academy of Sciences Ukrainian SSR

"The Domain Structure of an Antiferromagnet Resulting From Variations in the Character of the Magnetic Anisotropy"

Moscow, Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 59, No 4, Oct 70, pp 1299-1306

Abstract: The article considers the case of the phase transition (with respect to temperature) of the first kind $\Phi_{\parallel} \rightleftharpoons \Phi_{\perp}$.

Distributions are obtained for antiferromagnet sublattice magnetic moments at the interfaces of phases Φ_{\parallel} and Φ_{\perp} (90° boundary), as well as 180° domain boundaries in antiferromagnets with weak ferromagnetism. The surface energies of the 90 and 180° domain walls are calculated, and the domain structures for a plane-parallel plate are determined and domain sizes estimated. It is shown that a thermo-

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USSR

BAR'YAKHTAR, V. G., et al., Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 59, No 4, Oct 70, pp 1299-1306

dynamically stable domain structure may occur in the phase transition due to weak ferromagnetism of the phase with magnetic anisotropy of the "easy plane" type. The surface energy of the 90° domain boundary is significantly less than that of the 180° domain boundary. However, the surface energy of the 180° interface declines significantly as the phase transition temperature is approached and becomes on the order of the 90° interface.

The authors thank A. I. AKHIYEZER, A. S. BOROVNIK-ROMANOV and V. V. YEREMENKO for discussing the results.

2/2

Acc. Nr: **AP0043583**

BARYAKHTAR V.G.

Ref. Code: UR 0056

PRIMARY SOURCE: Zhurnal Eksperimental'noy i Teoreticheskoy
Fiziki, 1970, Vol 58, Nr 2, pp 494-506

LOW FREQUENCY ANTIFERROMAGNETIC RESONANCE IN COPPER
CHLORIDE DIHYDRATE AND PHASE TRANSITIONS

V. G. Baryakhtar, A. A. Galkin, S. N. Kovner, V. A. Popov

Antiferromagnetic resonance in a $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$ single crystal is investigated at frequencies of 5.2, 3.0, 1.1 and 0.65 Gc/s. The dependence of resonance fields corresponding to frequencies 3 and 0.65 Gc/s on temperature is measured at temperatures between 1.52 and 4.2° K. The resonance field corresponding to the frequency 0.65 Gc/s and the larger of the resonance fields corresponding to the frequency 3 Gc/s within the experimental errors vary with temperature just as the overturning field of the sublattice magnetic moments does. The magnetic moment homogeneous oscillation frequencies in an antiferromagnet separated into domains are calculated. A phase equilibrium diagram is proposed for $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$ in a magnetic field parallel to the «easy» axis. The temperature dependence of the lability fields is calculated in the spin wave theory approximation.

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REEL/FRAME
19762055

18 DI

1/2 025 UNCLASSIFIED PROCESSING DATE--20NOV70
TITLE--DENSITY OF SPIN WAVE STATES IN AN ANTIFERROMAGNET -U-
AUTHOR--(03)-BARYAKHTAR, V.G., POPOV, V.A., KVIRIKADZE, A.G.
COUNTRY OF INFO--USSR **B**
SOURCE--UKR. FIZ. ZH. (RUSS. ED.) 1970, 15(1), 167-9
DATE PUBLISHED--70
SUBJECT AREAS--PHYSICS
TOPIC TAGS--ANTIFERROMAGNETIC MATERIAL, ANTIFERROMAGNETIC THEORY, SPIN
WAVE, SPIN WAVE THEORY, EXTERNAL MAGNETIC FIELD, CHARGE DENSITY, LIGHT
ABSORPTION, LIGHT SCATTERING
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1992/1449 STEP NO--UK/0185/70/015/001/0167/0169
CIRC ACCESSION NO--AP0112443
UNCLASSIFIED

2/2 025

UNCLASSIFIED

PROCESSING DATE--20NOV70

CIRC ACCESSION NO--AP0112443

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE EFFECT WAS STUDIED OF AN EXTERNAL MAGNETIC FIELD ON THE D. OF STATES FOR SPIN WAVES IN ANTIFERROMAGNETS. THE D. OF STATES CHANGES IN FIELDS OF THE ORDER OF THE EXCHANGE INTEGRAL. THIS CHANGE CAN BE OBSD, EXPTL. BY STUDYING THE ABSORPTION AND SCATTERING OF LIGHT OR OF SLOW NEUTRONS.
FACILITY: FIZ.-TEKH. INST., KHARKOV, USSR.

UNCLASSIFIED

1/2 039 UNCLASSIFIED PROCESSING DATE--30OCT70
TITLE--PARAMETRIC EXCITATION OF SOUND BY A UNIFORM MAGNETIC FIELD IN
FERROMAGNETIC SAMPLES -U-
AUTHOR--(02)--BAKAY, A.S., BARYAKHTAR, V.G. **B**
COUNTRY OF INFO--USSR
SOURCE--ZHURNAL EKSPERIMENTAL'NOY I TEORETICHESKOY FIZIKI, 1970, VOL 58,
NR 4, PP 1342-1347
DATE PUBLISHED-----70
SUBJECT AREAS--PHYSICS
TOPIC TAGS--FERROMAGNETIC MATERIAL, PARAMETRIC OSCILLATOR, ALTERNATING
MAGNETIC FIELD, HIGH FREQUENCY, EXCITATION SPECTRUM, ACOUSTIC VIBRATION,
MAGNETIC FIELD EFFECT
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAE--1988/1569 STEP NO--UR/0056/70/058/004/1342/1347
CIRC ACCESSION NO--AP0106315
UNCLASSIFIED

2/2 039

UNCLASSIFIED

PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0106315

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. PARAMETRIC EXCITATION OF SOUND BY A HIGH FREQUENCY UNIFORM FIELD IN A FERROMAGNET IS INVESTIGATED. THE SOUND PARAMETRIC EXCITATION THRESHOLD, STATIONARY CONDITIONS BEHIND THE THRESHOLD AND THEIR TRANSIENT PERIOD ARE FOUND. THE DEPENDENCE OF THE MAGNETIC MOMENT OSCILLATION FREQUENCIES ON AMPLITUDE ARE TAKEN INTO ACCOUNT. A COMPARISON WITH THE EXPERIMENTAL DATA IS MADE.
FACILITY: FIZIKO TEKHNIЧЕСКИЙ INST. AN UKR. SSR.

UNCLASSIFIED

1/2 019

UNCLASSIFIED

PROCESSING DATE--13NOV70

TITLE--PRODUCTION OF NEW BRANDS OF VERY FINE TRANSFORMER STEEL -U-

AUTHOR--(05)-AFANASYEV, S.V., BARYATINSKIY, V.P., GORBACHEV, V.N., YELTSIN, YU.V., KOVALEV, P.M.

COUNTRY OF INFO--USSR

B

SOURCE--IZV. AKAD. NAUK SSSR, SER. FIZ. 1970, 34(2), 272-5

DATE PUBLISHED-----70

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

TOPIC TAGS--TRANSFORMER STEEL, METAL ROLLING, ELECTRICAL PROPERTY, STEEL MANUFACTURE PROCESS, STEEL SHEET, ANNEALING

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRA--1994/1936

STEP NO--UR/0048/70/034/002/0272/0275

CIRC ACCESSION NO--AP0115745

UNCLASSIFIED

2/2 019

UNCLASSIFIED

PROCESSING DATE--13NOV70

CIRC ACCESSION NO--AP0115745

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE TECHNOLOGY USED IN MANUFG. VERY FINE, ORIENTED TRANSFORMER STEEL SHEET (0.05-0.15 MM THICK) FOR INSTRUMENTS AND APP. UTILIZING A WIDE RANGE OF FREQUENCIES IS GREATER THAN OR EQUAL TO 400 HZ DIFFERS IN MANY ASPECTS FROM THE CONVENTIONAL TECHNOLOGY USED FOR HEAVIER GAGE SHEET (0.2-0.5 MM), AS THE FINE SHEET IS MADE GENERALLY FROM HEAVIER GAGE, COLD ROLLED SHEET OF AN ORIENTED TEXTURE RATHER THAN FROM NONORIENTED MATERIAL. IN THE COURSE OF MANUFG. THE FINE SHEET, THE (110) (001) TEXTURE OF THE THICKER TRANSFORMER SHEET IS TRANSFORMED BY COLD ROLLING INTO A DEFORMATION TEXTURE (111) MEAN VALUE OF 112 WHICH AGAIN IS CHANGED TO 1K0 MEAN VALUE OF 001 BY SUBSEQUENT ANNEALING, K DEPENDING ON THE DEFORMATION RATIO AND THE TEMP. OF THE ISOTHERMAL ANNEAL. THUS, THE FINAL TEXTURE IS THAT FORMED BY PRIMARY RECRYSTN.; ITS DEGREE OF PERFECTION (WHICH DETS. THE MAGNETIC PROPERTIES OF THE MATERIAL) DEPENDS ON THE INITIAL TEXTURE AND GRAIN SIZE (BEFORE ROLLING), THE DEFORMATION RATIO APPLIED, AND THE TEMP. AND DURATION OF FINISH ANNEALING. SECONDARY RECRYSTN. IS SUPPRESSED SINCE IT WOULD BRING ABOUT TEXTURE DETERIORATION. ANNEALING AT 950-1000DEGREES FOR A PERIOD OF TIME NOT EXCEEDING THE INCUBATION PERIOD OF SECONDARY RECRYSTN. (20 SEC) OR CONTROLLED ANNEALING PERMITTING LONGER EXPOSURES TO HIGH TEMPS. IS RECOMMENDED; THE FORMER TREATMENT MAY NOT BE FOLLOWED BY A SECONDARY ANNEAL. THE TECHNOLOGICAL GUIDELINES GIVEN PERMIT THE MANUF. OF FINE SHEET EXHIBITING SP. CORE LOSSES OF SIMILIAR TO 12W-KG. USSR.

FACILITY: TSHIICHM IM BARDINA, MOSCOW,

UNCLASSIFIED

1/2 019 UNCLASSIFIED PROCESSING DATE--09OCT70
TITLE--SECONDARY RECRYSTALLIZATION IN COLD ROLLED SILICON STEEL ALLOYED IN
THE ANNEALING PROCESS -U-
AUTHOR--(05)-AFANASYEV, S.V., BARYATINSKIY, V.P., GORBACHEV, V.N.,
KRYZHANOVSKIY, V.V., MOLOTILOV, B.V. **B**
COUNTRY OF INFO--USSR
SOURCE--IZV. AKAD. NAUK SSSR, SER. FIZ. 1970, 34(2), 276-80
DATE PUBLISHED-----70

SUBJECT AREAS--MATERIALS, MECH., IND., CIVIL AND MARINE ENGR
TOPIC TAGS--SILICON STEEL, METAL RECRYSTALLIZATION, COLD ROLLING,
TRANSFORMER STEEL, ALLOY COMPOSITION, METAL TEXTURE, HIGH QUALITY STEEL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRA--1995/0190

STEP NO--UR/0048/70/034/002/0276/0280

CIRC ACCESSION NO--AP0115894

UNCLASSIFIED

2/2 019

UNCLASSIFIED

PROCESSING DATE--09OCT70

CIRC ACCESSION NU--AP0115894

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE PROCESS OF SECONDARY RECRYSTN. IN THE PRESENCE OF S WAS STUDIED ON COLD ROLLED, HIGH PURITY TRANSFORMER STEEL SHEET 0.05, 0.08, AND 0.10 MM THICK TO DET. THE EFFECTS OF THE PRIMARY STRUCTURE, HEAT TREATMENT CONDITIONS, AND THE S CONTENT ON THE FINAL PRODUCT. THE STEEL CONTAINED C 0.007, MN 0.08, SI 3.05, P 0.006, S 0.0025, NI 0.04, CR 0.01, CU 0.05, AL 0.01, AND N 0.0107PERCENT. ALLOYING THE THIN SHEET IN THE ANNEALING PROCESS MADE IT POSSIBLE TO CONTROL THE SECONDARY RECRYSTN. THE STRUCTURE AND TEXTURE OF THE SECONDARY MATRIX DEPENDED ON BOTH THE INITIAL STRUCTURE AND THE AMT. OF S INTRODUCED BY DIFFUSION. AT RELATIVELY LOW S CONCNS. THE SECONDARY RECRYSTN. DEVELOPED A RIBBED TEXTURE WHEREAS AT HIGHER S CONCNS. IT RESULTED IN AN ORIENTATION NEAR (111) (110). A PRELIMINARY RECRYSTN. OWING TO HEAT TREATMENT AND A SUBSEQUENT STABILIZATION OF THE PRIMARY MATRIX BROUGHT ABOUT THE FORMATION OF A MORE PERFECT TEXTURE IN SECONDARY RECRYSTN. FACILITY: TSNIICHM IM. BARDINA, MOSCOW, USSR.

UNCLASSIFIED

BARYBIN, A.A.

SPS 59208
6-73

5

K-8. EXPERIMENTAL STUDY OF THE DISTRIBUTION OF THE ADMIXTURES IN MULTILAYERED FILM STRUCTURES OF GALLIUM ARSENIDE GROWN BY THE METHOD OF LIQUID EPITAXY
Article by A. A. Barybin, A. A. Zakharev, I. V. Kostyrenko, N. K. Nedev, V. H. Paskovskiy, Leningrad; Novosibirsk, III Sibirskiy nauchnyy tsentr, Novosibirsk; Institut Fiziki Tverdogo Tela, Ruzhitskoye, Leningrad, 1972, p 130

This paper contains a discussion of the results of an experimental study of the admixture distribution in film structures of GaAs of the n-n₁, n-n₂, p-n₁-l type and others grown from the melt-solutions using forced cooling and using a temperature gradient. The conditions of epitaxial growth of the films are the following: the maturation temperature of the solution is 800° to 900°C, the cooling rate is 1-5 deg/min, the temperature gradient is 2-10 deg/cm. Tin, germanium and zinc were used as the alloying admixtures. The distribution of the admixtures in the structures obtained was investigated by the known volt-fized and sonde methods and also using the chemical analysis procedure developed for gallium arsenide. The research demonstrated that depending on the conditions and the growth regime, sharp transitions of the admixture concentration are obtained between the layers and also structures with intermediate high-resistance and low-resistance layers. It was discovered that when using the temperature gradient method, a more uniform distribution of the admixtures is obtained with respect to the thickness of the layers. The measurement results obtained by different methods agree quite well with each other.

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UDC 537:226:537:311:33]:538

BARYBIN, A. A.

"Interaction of Helicon and Spin Waves With Ferromagnetic Semiconductors"

Vzaimodeystviye gelikonnykh i spinovykh voln v ferromagnitnykh poluprovodnikakh, [English version above] (Editors of Radiotekhn. i elektronika [Radio Engineering and Electronics], Academy of Sciences, USSR), Moscow, 1970, 13 pages, (Translated from Referativnyy Zhurnal Fizika, No 10, 1970, Abstract No 10 Ye 1170 DEP by the author).

Translation: The method of coupled waves is used to study the interaction of helicon and spin waves. For this, the fields and currents of each of the interacting systems are represented as sums of internal and external fields and currents, allowing the derivation of excitation equations for the helicon and spin waves by external sources. By means of the small-signal energy theorem proved earlier, the powers carried by the helicon and spin waves are calculated, and it is determined that the coupling between these waves, expressed as a periodic interchange in power between the interacting waves, is passive in nature and does not lead to amplification of the spin waves.

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BARYBIN, A. A.

"Effect of Diffusions and Collisions on Longitudinal Waves in Drifting Flows of Charge Carriers"

Vliyaniye diffuziy i stolknoventiy na prodol'nyye volny v dreyfovykh potokakh nositeley zaryada (cf. English above. Editorial Board of the Journal "Radiotekhn. i elektronika," AS, USSR), Moscow, 1970, 15 pp (from RZh-- Elektronika i yeye primeneniye, No 5, May 1971, Abstract No 5B13 DEP)

Translation: Equations of a quasihydrodynamic approximation are used for a study of longitudinal waves in nondegenerate semiconductor plasma. On the basis of a small signal energy theorem demonstrated earlier, the accumulated energy and power transmitted by the longitudinal waves are calculated. The energy characteristics and dispersion equation obtained are studied for individual special cases with the object of clarification of the role of diffusion and collisions of carriers with the lattice, in the process of propagation of longitudinal waves in plasma. Author's Abstract.

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BARYBIN, A. A.

"Small-Signal Energy Theorem for Movement of Carriers in a Solid Plasma"

Malosignal'naya energeticheskaya teorema dlya dvizheniya nositeley v plazme tverdogo tela., [English version above] (Editors of Radiotekhn. i elektronika [Radio Engineering and Electronics], Academy of Sciences, USSR, Moscow, 1970, 16 pages, (Translated from Referativnyy Zhurnal Fizika, No 10, 1970, Abstract No 10 Ye 1013 DEP by the author).

Translation: A system of small-signal equations consisting of the Maxwell equations; equations describing the movement of carriers in polarization variables considering collisions, diffusion, and recombination, the equations of motion of magnetization in a ferromagnetic, and equations describing the motion of an elastic piezoelectric medium are used to derive an energy theorem. The energy theorem concerns the mean stored energy, consisting of the electrical magnetic energy, electrokinetic energy of carriers; the energy stored in acoustical oscillations of the elastic medium and in spin oscillations of magnetization of the medium; the coupling energy of carriers with external fields; the coupling energy of acoustical oscillations with electrical fields and spin oscillations with magnetic fields; the average power carried, consisting of the electromagnetic power, the electrokinetic

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BARYBIN, A. A., *Malosignal'naya energeticheskaya teorema dlya dvizheniya nositeley v plazme tverdogo tela.*, [English version above], (Editors of *Radiotekhn. i elektronika* [Radio Engineering and Electronics], Academy of Sciences, USSR, Moscow, 1970, 16 pages.

power carried by charge carriers, the power carried by acoustical and spin waves, the power resulting from coupling of carriers with external fields; the average loss power, consisting of the power of losses resulting from collisions of carriers with the lattice and current losses resulting from processes of recombination, the power of magnetic losses related to relaxation processes in the ferromagnetic crystal. The small-signal energy theorem proven allows investigations to be performed into the energy characteristics of waves in various systems and can be used as a basis for energy analysis of coupled waves in the design of various SHF devices using solid state plasmas.

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BARYBIN, A.A.

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11-3. STUDY OF THE THERMODYNAMIC CONDITIONS OF GROWTH OF EPITAXIAL FILMS OF GALLIUM ARSENIDE IN THE $CaAs-H_2O-H_2$ SYSTEM (1)

Article by A. A. Barybin, A. A. Zakharev, N. K. Nedev, Leningrad; Novobitarsk, III Simposium po Protekamaa Rosta i Dvazh. Poluprovodnikovykh Kristallov i Plazma, Krasnodar, 13-17 June, 1972, p 13

The thermodynamics of the process of growth of seltium arsenide films in the $CaAs-H_2O-H_2$ system were studied in papers by Micheltsech [1] and Gortilsh [2]. In the given paper a study has been made of the thermodynamic analysis of the chemical transport of seltium arsenide by water vapor in order to select the optimal conditions of growth of epitaxial films. For this purpose, along with the basic chemical reaction proceeding with the formation of the volatile oxide Ca_2O , a study was made of two competing reactions disturbing the stoichiometric gas composition: one is with the formation of the nonvolatile oxide Ca_2O_3 and the other, with the formation of liquid gallium. The calculation results on a computer permitted the selection of the range of stoichiometric compositions of the gas phase bounded by the operating temperature range of 650-900°C and the partial pressure of water from 0.1 to 20 mm Hg. Outside the indicated region at low temperatures, Ca_2O_3 is formed, and at high temperatures, liquid gallium. The experimental studies confirmed the calculation results. The application of exact calculation of the gas phase considering the competing reactions permitted the selection of the optimal conditions of the epitaxial process.

BIBLIOGRAPHY

1. M. Micheltsech, et al.; J. Electrochem. Soc., No 111, 1248, 1964 (Russian translation in the collection Metallurgiya v elektronike [Metallurgy in Electronics], Izd-vo Metallurgiya, Moscow, 199, 1970).
2. O. E. Gortilsh, J. Electrochem. Soc., No 112, 192, 1965.

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SPRS 59208
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V-10. STUDY OF THE KINETICS OF CHEMICAL TRANSPORT OF CALCIUM ACESLIMIDE IN THE GAS-H₂O-H₂ (II) SYSTEM

Article by A. A. Barybin, A. A. Zakharov, N. K. Nedev, Leningrad; *Khimiya*, II Sbornik po Protsessam Rosta i Stetsii Poluprovodnikov, Kriestallov i Plesok, Russian, 13-17 June, 1972, p 611

Calculation of the composition of the gas phase and selection of the thermodynamic conditions of the epitaxial growth of CaAs films offered the possibility of defining the diffusion mass transfer rate by the Leverhulst theory. The experimental study of the growth rate of CaAs films and comparison of it with the calculated values permitted us to find the growth resistance of the crystal caused by the finite rate of the heterogeneous processes on the surface of the source and the substrate. It turned out that under actual conditions the rate of the heterogeneous surface reactions is on the same order as the rate of diffusion mass transport. The measurements of the growth rates on the substrates with different orientation -- (111), (110), (100) -- gave the range of operating supersaturations $\Delta C = (0.5-3) \times 10^{-3}$ kcal/mole. The greatest growth rate and the least operating supersaturations were observed on substrates with (111) orientation, and the least rate and greatest supersaturation, on substrates with (100) orientation.

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JPRS 59308
6-73 3

V-15. EXPERIMENTAL STUDY OF THE HETEROPHASE GROWTH CONDITIONS OF GALLIUM
ARSENIDE FILMS ON DIELECTRIC SUBSTRATES

Article by A. A. Barybin, A. A. Zakharenko, N. K. Nefed, Leningrad; Novosibirsk,
Ili Sibirskiy po Protsessam Rosta i Sirovitsy Poluprovodnikov Khimicheskoy
Fiziki, Sverdlovsk, 13-17 June, 1977, p 60

In this paper the results of an experimental study of the growth of GaAs
films on monocrystalline substrates of Al_2O_3 , MgO and YAl_2O_7 are discussed.
The films were grown by the chemical transport method in the $GaAs-H_2-O_2$ system
on substrates with the following orientation: $0-Al_2O_3$ (0001), (1120), (1122);
 MgO (001); YAl_2O_7 (100), (110), (111). The different methods and conditions
of chemical treatment of the dielectric substrates were tested and processed.
In the experiment it was discovered that the higher quality films were obtained
on substrates with advance application of a thin layer (0.3-0.5 microns) of
GaIn alloy (9:1). The optimal results were obtained at substrate temperature
of 630° to 730°C, a source temperature 10-50 degrees higher and a partial vapor
pressure of water (4-20) mm Hg. The x-ray diffraction and electron diffraction
analysis demonstrated that the GaAs films had in the majority of cases non-
crystalline or lump structure. The best film structures are obtained on the
substrate planes indicated below with the following crystallographic correspondences:
(0001). Al_2O_3 || (111)GaAs, (110) Al_2O_3 || (100)GaAs, (001) MgO || (001)GaAs, (100)
 YAl_2O_7 || (100)GaAs, (111) YAl_2O_7 || (111)GaAs. The electrophysical parameters
of the films are the following: n-type is $(10^{15}-10^{16})cm^{-3}$, $\mu_n \leq (2000-3500)$
 $cm^2/v-sec$.

USSR

UDC 631.542.25

BAR'YETAS P. K., OTEMISOV, T., Institute of Experimental Plant Biology of the
Uzbek SSR Academy of Sciences

"Penetration of Defoliants into Cotton Seed"

Moscow, Khimiya v sel'skom Khozyaystva, No 8, 1972, pp 43-46

Abstract: A study was made of the residual amounts of defoliants in cotton seed. Magnesium chlorate and butylcaptax, defoliants with a contact action, penetrate into the kernel of the cotton seed. The penetration rate of these compounds depends on the physiological state (age) of the bolls and also on the dosage of the compound and the air temperature. During manifestation of protective properties of the plant, the quantity of defoliants in the seeds gradually drops apparently as a result of its detoxication. Detoxication is accelerated at high temperatures. Butylcaptax was detected in the cotton seed kernels primarily in metabolized form. About 5-10% of the radioactivity of a ³⁵S tag was in the aliphatic fraction (ether extract) -- a lipophilic product of conversion of butylcaptax. The primary radioactivity (90-95%) was distributed among the remaining three fractions of the kernels: water-soluble metabolites (35-40%), water soluble proteins (20%) and dry solid residue (30-35%). In the experiments magnesium chlorate [$Mg(ClO_3)_2 \cdot 6H_2O$] was used in the 1/2

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BAR'YETAS, P. K. and OTEMISOV, T., Khimiya v sel'skom Khozyaystva, No 8, 1972,
pp 43-46

amounts of 12 and 30 kg/hectare, and butylcaptax (2-butylthiobenzothiazol)
was used in the amount of 10 kg/hectare.

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BARYKIN, K., and TUNKEL', I., Special Ogonek Correspondents

"A Second Birth?"

Moscow, Ogonek, No 50, Dec 71, p 11

Translation: This is a severe disease. It attacks the newborn baby, the tiny defenseless person, and does not let go. "The treatment is ineffective," prominent physician note. Yes, up till now this disease could not be arrested. The first successful steps in the fight against it have been made only now in the department of the academician of the Academy of Medical Sciences USSR Yuriy Mikhaylovich Lopukhin...

The 5-year old Petya was brought to Professor Lopukhin's clinic from the Pediatric Neurological Department of the Second Moscow Medical Institute. The instability in the boy's walking began to progress rapidly from the age of 3½. He had barely learned to walk, but his relatives were not able to rejoice at his first steps. It seemed that only yesterday his grandmother said: "Look, look, he is walking!" But today the boy did not get up from his bed,

With every passing day his motor coordination became increasingly impaired and his slow speech became more slurred. This was terrible. A human being was just beginning to live, but even happy children's games were not accessible to him...

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Petya did not complain and only looked at the world with puzzled, sad eyes. The entire arsenal of weapons available to today's therapy was put in motion. "Without effect" was the sharp verdict entered in the unimpassioned case history. Behind these two words there was the family's grief, the tragedy of the boy himself.

...Yuriy Mikhaylovich Lopukhin headed the group of surgeons. The operation was entrusted to Yuriy Ivanovich Morozov. Having taken the scalpel, Morozov was sure of himself. He had occasion to perform many operations, which were not merely complicated, but often very rare and experimental. He is referred to as the "golden scalpel." Yuriy Ivanovich more than once boldly engaged in a personal combat against diseases and conquered them. His boldness came from experience. Morozov remembered the words he had once heard from A. A. Vishnevskiy: "A surgeon's boldness should not exceed his skill." Yuriy Ivanovich now thought out the entire operation in his mind, i.e., from the first superficial incision to the concluding suture.

...Morozov once again examined the thymus prepared for transplantation. To this day far from everything is known about the thymus. "This gland is a puzzle," one of the professors told us. It had already been proved, however, that the first days and months of man's life are the periods of its

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BARYKIN, and TUNKEL', I., Ogonek, No 50, Dec 71, p 11

greatest activity. The thymus is a unique starter, which includes many life-support systems. It adjusts them and gives them a definite tone.

As a rule, a man with a normal thymus is prepared for a fight against many diseases, i.e., he has a reliable immunity. But diseases do not leave the man whose thymus is underdeveloped in peace.

... In the history of this disease, which goes back many centuries, the year 1941 was marked by an important circumstance. The French physician Louis-Bar described this disease for the first time. Prior to that date the Louis-Bar syndrome had not been recorded by physicians, remained unidentified, and had not been diagnosed. ("Encephalitis," some said. "Something unexplainable," others shrugged their shoulders.) Alas, they knew very well that there was a disease that caused a child to be bedridden at about the age of 5, a disease in which progressive ataxia, i.e., failure of motor coordination, began. Ataxia was the second symptom in the description of this disease. Louis-Bar was the first to note the inevitably frequent, incessant infectious diseases.

In the Louis-Bar syndrome the tiny patient loses his strength slowly with an ominous consistency, and not only physical strength. Physicians note that even the child's mental development remains retarded. He sharply lags behind children his own age. The gap between age and maturation increases every year.

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Another landmark, i.e., the year 1971, has now appeared in the history of this disease. This date is connected with the work of Soviet physicians, primarily with the names of the academicians of the Academy of Medical Sciences USSR Yuriy Mikhaylovich Lopukhin and Candidate of Medical Sciences Yuriy Ivanovich Morozov.

Yu. I. Morozov was the first in the world to perform such an operation. He implanted a healthy thymus with the bone marrow contained in the breast bone in a child born with an underdeveloped thymus. Later on, when this and subsequent operations were evaluated, the following was noted: "The immediate and remote results proved to be good..." Particular emphasis was placed on the great scientific value of the work on thymus transplantation, which is now being successfully conducted at the Department of Clinical and Experimental Surgery at the Second Moscow Medical Institute of the Ministry of Health RSFSR.

"The problem has now expanded and many researchers have begun to work on its solution. Obviously, only collective efforts can bring success," Yu. M. Lopukhin says. Talented professors, i.e., the immunologist R. V. Petrov and the biophysicist S. S. Vasileyskiy, are conducting research that has yielded important results. Our young colleagues are also helping a great deal. This enables us to organize our work broadly and systematically... The thymus is now being thoroughly investigated in the clinic. Lectures

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in immunology are given for the first time to students in senior courses. "Exemption from taxes," this is the literal translation of the word "immunity." But in what does this "exemption" lie? After all, the thymus -- the switch of the immune systems -- is active only during the first years of life. Some believe that cells together with the blood stream enter the thymus, take a "course in immunological sciences" here, and, after completing their education, return to their places to resist a possible attack of microbes and to free man from the heavy taxes that microbes impose on him. Other think that the thymus sends its "teachers" all over the organism and they develop the immunological capabilities of the cells on the spot. Still others say that the thymus is simply a gland that produces a hormone and, after developing and sending its "agents," it dies away.

Whatever the explanation, the role of the thymus is an important one. The knowledge and experience of Lopukhin, Petrov, Morozov, Vasilyevskiy, and of their colleagues and assistants are directed toward revealing all the secrets and capabilities of the thymus and toward finding the method of controlling the host of diseases described by Louis-Bar.

"A great deal depends on age. If the disease can be discovered at its early stage, when the child is 1 or 2-years old, one can speak with a great degree of assurance of the probability of an almost complete recovery,"

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