USSR

KONYUKHOVSKIY, V. V.

"Arithmetic Modeling of a Poisson Process"

Sb. Rabot. Vychisl. Tsentra Mosk. Un-ta [Collected Works of Moscow University Computer Center], 1972, Vol 18, pp 125-137 (Translated from Referativnyy Zhurnal, Kibernetika, No 1, 1973, Abstract No 1 V273 by B. Granovskiy).

Translation: In solving problems by the Monte Carlo method, the trajectory of the Poisson process is generally produced as a result of transformation of a sequence of independent, evenly distributed random quantities, generated by a random number generator. This work indicates one method of direct modeling of a Poisson process. The method is based on the representation of any real number t as

$$t = \sum_{k=0}^{\infty} \frac{1}{q_0(t) q_1(t) \ldots q_k(t)},$$

where $\{q_n(t)\}_{n=0}^{\infty}$ is a nondecreasing sequence of integers, where $q_0(t) \geq 2$. It is proven, in particular, that for any $t \in [0, 1]$, sequence $\{q_n(t)\}_{n=0}^{\infty}$ produces a realization of a certain specific Markov chain.

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KONYUKHOVSKIY, V. V.

"Modeling of an Even Distribution"

Sb. Rabot. Vychisl. Tsentra Mosk. Un-ta [Collected Works of Moscow University Computer Center], 1972, Vol 18, pp 138-154 (Translated from Referativnyy Zhurnal, Kibernetika, No 1, 1973, Abstract No 1 V274 by B. Granovskiy).

Translation: A random number generator, used to model an even distribution in a computer, realizes the algorithm $z_{k+1} = \mathcal{T}(z_k)$, which should generate the realization z_0, z_1, z_2, ..., of the sequence of independent, evenly distributed random quantities X_0, X_1, X_2, ... This work shows the possibility and principle of constructing a sensor on the basis of a dynamic system, related to the following transform of T:

$$Tx = [a(x)-1][xa(x)-1],$$

where $a(x) = 1 + [1/x]$, $x \in (0,1]$. This transform leads to representation of the number $x \in (0, 1]$ as a Luroch series.

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USSR   UDC 519.21

KONYUKHOVSKIY, V. V.

"Asymptote of Moments of Number of Restorations"

Mat. Vopr. Upr. Proiz-vom. Vyp. 2 [Mathematical Problems of Production Control, No. 2 -- Collection of Works], Moscow, Moscow University Press, 1970, pp 184-198 (Translated from Referativnyy Zhurnal Kibernetika, No. 4, April, 1971, Abstract No. 4, V84 by B. Kharlamov).

Translation: A heterogeneous restoration process is studied, for which the distribution functions $F_i(x)$ $(i=1,2,...)$ of lengths of intervals of X_i between recoveries are continuous, where MX_i equal exactly $a^{-1}>0$, and there is a monotonic function $f(x)$ $(x>0)$ such that $\lim_{x \to \infty} f(x)=\infty$, and constant $C>0$, for which $MX_i f(X_i)$ $\leq C(i+1,2,...)$. It is proven that under these conditions $\lim_{t \to \infty} M \left(\frac{X_t}{t}\right)^k = a^k$, where x_t is the number of recoveries in the interval $[0,t), k=1,2,...$. Certain results of this theorem are noted.

1/1

USSR

KUZMAK, Ye. M., Doctor of Technical Sciences, and KONYIKOV, K. A., Moscow
Institute of the Petrochemical and Gas Industry imeni Academician I. M. Gubkin

"Weldability of Heat Hardened Steel with 70-80 kg/mm^2 Tensile Stress"

Abstract: The authors study the technological possibility of regulating the
properties of the heat affected zone in softening sections. Increased
resistance to brittle fracture is also studied. Two grades of heat hardened
steel were studied: A grade steel with a bainite-martensitic structure and
~ 80kg/mm^2 tensile strength and B grade steel with a bainite structure and
70kg/mm^2 tensile strength. The results show that the sections of high hard-
ness (A grade steel) formed in welding high-strength grades of steel (in the
heat affected zone) and the sections of softening (B grade steel) reduce the
strength of welded joints under conditions of biaxial stretching. The pres-
ence of large grain sections and overheating results in lower resistance to
brittle fracture. The use of the zone regulating method in conjunction with
high temperature tempering makes it possible to produce welded joints from
high-strength, heat hardened grades of steel which are as strong as the basic

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USSR

KUZMAK, Ye. M. and KONYUKOV, K. A., Svarochnoye proizvodstvo, No 5, 1971, pp 16-19

metal with respect to their resistance to brittle fracture and strength under conditions of biaxial stretching. High temperature tempering above $600^{\circ}C$ results in a secondary softening of welded joints. The value of this softening increases with temperature and tempering duration. At optimal tempering temperature the reduced strength of the welded joint (the result of secondary softening) under conditions of biaxial stretching is compensated by an increase in strength due to a rise in the deformation capacity of the welded joint. This is caused by a reduction in the hardness of the sections about the seam of the heat affected zone. Original article: three tables, six figures, one formula, and nine bibliographic entries.

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Acc. Nr.: _AP0042366_   Ref. Code: _UR0203_

JPRS 50162

Plasma Escape from the Sun

(Abstract: "The Regime of Plasma Escape from the Sun," by M. V. Konyukov,
Physics Institute Academy of Sciences USSR; Moscow, Geomagnetizm i Aero-
nomiya, Vol X, No 1, 1970, pp 13-22)
      The results of a theoretical analysis of the escape of plasma from
the sun in a hydrodynamic approximation and data from rocket observations
indicate that in describing the escape of plasma from the sun it is neces-
sary to use a dynamic model with a finite radius of the region of frequent
collisions for both components; the radius of the region of frequent col-
lisions for electrons must be less than the radius of the region of frequent
collisions for ions. For a quantitative investigation of this model it is
necessary to solve a system of kinetic equations of plasma under conditions
when the local Knudsen number is not uniformly small in the entire considered
region. Due to the absence of effective methods for solving systems of ki-
netic equations of plasma under the required conditions at the present time
there is no hope for a rigorous quantitative investigation of this model of
the escape of plasma from the sun. Analysis of the results of a theoretical
study of a model of a stationary spherically symmetrical escape of plasma in
a viscous and different-temperature approximation and observational data on
interplanetary plasma make it possible to solve the problem of the regime
                              Reel/Frame   /2-
                              19760315

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AP0042366

of plasma escape from the sun. Within the flow it is possible to define two regions with different dynamic properties. In the first region, situated between the initial level and the level of impairment of the condition of applicability of the hydrodynamic approximation for electrons, escape occurs in a hydrodynamic regime with viscosity and heat conductivity playing a significant role. In the second region, situated beyond the level of appearance of a collisionless regime for ions, the flow is collisionless. The regions are separated by a transition layer in which there is a restructuring of the distribution functions for both components. The results make it possible to draw semiquantitative conclusions concerning the mechanism of plasma acceleration. In particular, it is plasma in nature and actually represents a mechanism of transformation of the energy flux due to the heat conductivity of electrons into a jydrodynamic flux of ion energy. In the region of frequent collisions this transformation transpires in two ways: by energy transfer to the ion component due to electron collisions and the work of the forces of the ambipolar electric field. With a decrease in collision frequency there is an increase in the role of acceleration due to the forces of the ambipolar field but computation of its magnitude with impairment in the applicability of the hydrodynamic approximation requires solution of the kinetic equations of plasma in the absence of small or large Knudsen numbers.

19760316

$\mathcal{S}$

UDC: 620.193.5

TSEYTLIN, Kh. L., SOROKIN, Yu. I., BALASHOVA, A. A., BABITSKAYA, S. M.,
LEVIN, Ya. S., KONYUSHENKO, A. T., GOLDHKIN, R. V., and LADYZHINSKIY, B. S.,
Scientific Research Institute of Organic Intermediates and Dyestuffs

"High-Temperature Corrosion of Metals in Gaseous Ammonia"

Abstract: Processes involving the use of ammonia are known to cause corrosion
of equipment. The homogeneous reaction of ammonia dissociation in the gas
phase begins above 1200--1300°C. In the presence of a catalyst this tempera-
ture drops to 300--400°C. Experiments have shown that the type of metal
considerably affects the thermal dissociation of ammonia and that this effect
is a function of temperature. This study describes in detail the testing and
effects of gaseous ammonia on KhN10T steel, KhN78T, N70M27F, and Kh15N55M16V
alloys, VT-1 titanium, and MZS copper. The analysis of experimental data shows
that there is a fundamental correspondence between the effect of metals on
ammonia dissociation and their resistance. Therefore, to insure continuous
service of equipment in gaseous ammonia, it is advisable to use materials which

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TSEYTLIN, Kh. L., et al, Zashchita Metallov, Vol 6, no. 4, 70, pp 451-454

will not readily catalyze ammonia dissociation. Materials which are suitable
for service under these conditions include carbon steel and N70M27F, Kh15N5516V
alloys up 400°C; Kh18N10T steel and nickel up to 300°C; KhN78T up to 600°C;
aluminum, titanium, and copper up to 450°C. Considering the low specific gravity,
good technological properties, relative availability, and low cost of aluminum,
this metal is preferred in selecting materials for equipment operated in
gaseous ammonia at high temperatures. A table illustrating the performance of
the above metals during 400 hours of testing with gaseous ammonia at high
temperatures, including corrosion rate tensile strength, relative elongation,
% and Vickers hardness, prior to and after the experiment, is given in the
original article.

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Luminescence

USSR

UDC 537.533

KRYLOVA, I. V., and KONYUSHKINA, N. I., Moscow State University imeni M. V. Lomonosov

"The Nature of Exoelectronic Emission Produced by Crystallophosphors"

Moscow, Zhurnal Fizicheskoy Khimii, Vol 47, No 6, Jun 73, pp 1475-1478

Abstract: Single ZnS crystals containing (atomic percent) $1.2 \cdot 10^{-4}$ or $5 \cdot 10^{-3}$ Cu (ZnS·Cu), 10^{-4} Ag (ZnS·Ag), and 10^{-3} Al (ZnS·Al) were bombarded (1.5 keV) with electrons in vacuum (10^{-5} torr) in order to produce the exoemission and to learn the effect of activators (Cu, Ag, Al) on the energy spectrum. The exoemission was measured with the electronic multiplier at 20 and 300°C, first in vacuum, then in the presence of hydrogen, oxygen, water vapor, and alcohol. Curves of the heat-stimulated emission (HSE) had one main maximum at 120-130°C and two less prominent maxima at 160-180 and 210-220°C. The position and relation between these maxima indicated that they were indepanded on the nature of activators (Cu, Ag, Al). The HSE intensity decreased when samples were heated to 300°C in hydrogen. This intensity increased in the presence of water vapors, oxygen, and methanol. The obtained results showed that the emission takes place without participation of the conduction electrons and is governed only by transformation taking

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place in the sample adsorption layers. A presence of activators facilitated the adsorption of gases used in experiments, and in this respect had an indirect effect on the emission intensity. Adsorption of oxygen was higher on ZnS·Cu crystals, of oxygen on ZnS·Al and it was accompanied by the emission increases. There was no noticeable influence of oxygen on the HSE of ZnS·Ag. Single crystals of ZnS·Ag and ZnS·Al were sensitive to adsorption of water vapor. The intensity increase of the HSE was the highest from ZnS·Ag and ZnS·Cu in the presence of methanol. The low temperature emission $(20-30^{\circ}C)$ was strongest in the presence of water vapors.

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KONYUSHKOV, G. V.

Welding

VACUUM-DIFFUSION WELDING UNIT

Production of units UDS-2 and A.306.20 has been mastered for the diffusion welding of parts made of similar and dissimilar metals and alloys (steel-steel, copper-copper, steel-copper, steel-aluminum, steel-iron, steel-titanium, etc.) as well as nonmetals (copper-ceramic, kovar-glass, steel-graphite, etc.). They make it possible to produce weld joints of 400 different compositions which are identical to their initial state for all the basic characteristics (strength, ductility, thermal stability and electrical conductivity). On these units it is possible to weld parts without restriction of thickness correspondence on plane, conical, cylindrical and relief surfaces.

These units make it possible to combine the process of joining parts and assemblies with their vacuum or hydrogen annealing, vacuation of electrovacuum instruments, sintering of powders, etc.

A distinguishing feature of unit A.306.20 is the possibility of switching it to a hydrogen system which expands the technological possibilities of the unit.

Unit UDS-2 (see Fig. 1) is easier to operate than the A.306.20. This was achieved by a more practical positioning of the control elements and panel. Productivity of the unit was increased by means of improving the system of shielding and cooling the bottom of the housing and welding chamber support.

The control apparatus and panel of the unit makes it

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possible to perform smooth adjustment and regulation (control) of welding temperature is automatic) of the welding mode para- meters which provides the capability of welding an assembly according to specified conditions.

Inquiries may be sent to the following address: Moscow, Zh-29, Problem Laboratory of Vacuum Diffusion Welding.
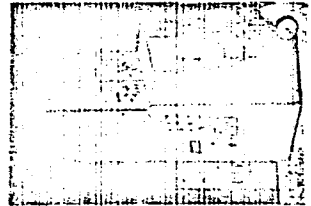

Fig. 1. Overall view of UDS-2.

Technical specifications for UDS-2 and A.305.20 Units.

	UDS-2	A.305.20
Maximum dimensions of welded parts, mm:		
height..................	180	150
diameter................	80	60
Dimensions of working vacuum chamber, mm:		
diameter................	250	490
height..................	450	450
Productivity, parts/hour.......	2-3	1-2
Type of heater............	Induction	Induction
Maximum heating temperature, °C...	1100	
Welding pressure, kgf........	50-1000	1000-10000
Chamber vacuum, mm Hg........	10-5	10-5
Type rough exhaust pump.......	VN-2MG	VN-1M1
Type high vacuum pump........	N5-S-M1	N-2T
Type high frequency generator...	10.60008.3	A.621.25
Operating frequency range, khz...	440-880	300-500
Maximum power, kw..........	25	60
Supply voltage (three-phase), 50 Hz), v.........	380/220	
Water consumption, l/min......	10	40

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USSR

KONYUSHKOV, G. V., YEREKIN, V. M., FEDOROV, M. I.

UDC 53.07/.08+53.001.5

"Effectiveness of Diffusion Joining of Metals in the Stemless Pumping of Electro-vacuum Devices"

Translation: To obtain a vacuum up to 10^{-9} mm Hg in the working space of domestic electrovacuum devices and to maintain this vacuum during use of the device, diffusion welding of the components of the device in stemless pumping after degassing is recommended instead of sealing the stem by soldering or cold welding. Comparative characteristics of the vacuum state in samples sealed by various methods over the course of a day, week, and month, and also metallographic studies of seams obtained by the diffusion method and by soldering are given. It was shown that the sealing of metalloceramic electrovacuum devices with a diffusion joint makes it possible to obtain a quality-reliable joint in these components. Yu. N. Kogan.

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USSR   UDC: 621.396.6.72:621.791

ZOTOV, B. M., KONYUSHKOV, G. V., KAZAKOV, N. F.

"Diffusion Welding of Metal-Ceramic Joints"

Elektron. tekhnika. Nauchno-tekhn. sb. Tekhnol. i organiz. proiz-va (Elec-
tronic Technology. Scientific and Technical Collection. Technology and Or-
ganization of Production), 1970, vyp. 5 (37), pp 9-14 (from RZh-Radiotekh-
nika, No 1, Jan 71, Abstract No 1V257)

Translation: The authors investigate the effect which parameters of the
diffusion welding process, phase composition and pretreatment of polished
high-clay M-7 ceramic have on the quality of welded joints with copper.
It is found that preliminary annealing of the ground ceramic improves the
quality of the welded joints. The optimum parameters of the diffusion
welding process are determined. Resumé.

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1/2   012   UNCLASSIFIED   PROCESSING DATE--23OCT70
TITLE--THE ROLE OF DIFFERENT REGIONS OF THE SMALL INTESTINE IN THE
   SECRETION OF CHOLESTEROL -U-
AUTHOR--KONYUSHKO, S.O.

COUNTRY OF INFO--USSR

SOURCE--BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY, 1970, VOL 69,
   NR 5, PP 32-33
DATE PUBLISHED-------70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--SMALL INTESTINE, CHOLESTEROL, EXCRETION

CONTROL MARKING--NO RESTRICTIONS'

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1998/0371   STEP NO--UR/0219/70/005/069/0032/0033

CIRC ACCESSION NO--AP0121059
                              UNCLASSIFIED

CIRC ACCESSION NO--AP0121059

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE EXCRETION OF CHOLESTEROL BY
THE INTESTINAL WALL IN HEALTH AND IN RESECTION OF 50PERCENT OF THE
PROXIMAL REGION WAS STUDIED IN DOGS WITH ISOLATED SECTIONS OF THE UPPER
AND LOWER REGION OF THE SMALL INTESTINE BY MEANS OF THIRY'S TECHNIQUE.
IT IS SHOWN THAT THE SMALL INTESTINE EXCRETES A SIGNIFICANT QUANTITY OF
CHOLESTEROL ALONG THE WHOLE LENGTH OF THE INTESTINE, AND THE DISTAL
REGION OF THE SMALL INTESTINE EXCRETES A SOMEWHAT GREATER AMOUNT OF
CHOLESTEROL THAN THE PROXIMAL REGION. AFTER RESECTION OF 50PERCENT OF
THE PROXIMAL INTESTINAL REGION IN THE MAJORITY OF DOGS THERE WAS NOTED
AN INCREASED EXCRETION OF CHOLESTEROL FROM THE SECTION OF THE UPPER
REGION OF THE INTESTINE. IN THE LOWER INTESTINAL SECTION THE
CHOLESTEROL EXCRETION AUGMENTED IN ONE OUT OF TWO DOGS.
FACILITY: INSTITUTE OF NORMAL AND PATHOLOGICAL PHYSIOLOGY OF THE
ACADEMY OF MEDICAL SCIENCES OF THE USSR, MOSCOW.

-USSR   UDC 616.273.2:612.288

AGADZHANYAN, N. A., BRESLAV, I. S., KONZA, E. A., USAKOVA, N. A., and
YELFIMOV, A. I., Institute of Physiology imeni I. P. Pavlov, Academy of
Sciences USSR, Leningrad

"The Role of Peripheral Chemoreceptors in Reactions of Rats Subjected to Short-
Term and Prolonged Hypoxia"

Abstract: The role of the deafferentated synocarotid and aortic reflectogenic
zones on respiratory, cardiovascular, and thermoregulatory activities of rats
subjected to hypoxia was studied. The ventilation in intact rats breathing
with the air containing 11% (PO_2 = 83.6 mm Hg), increased by 20.3% compared
with the normal air respiration. No noticeable changes were observed on rats
with deafferentated synocarotids on both sides and breathing with the same
hypoxia mixture. The same was true for rats with deafferentated aortic zone.
A rapid elevation (25 m/sec) of intact rats to 1000-7000 m produced a rapid
breathing. The same was observed in deafferentated rats but it occurred much
later and was 15-25% lower than in intact rats. The number of heart beats
in both groups of animals increased, without any significant difference between
them. The severe hypoxia at 7000 m inhibited sharply both the respiration and
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the cardiovascular activity. A decrease in the pO_2 in the thigh muscle of the deafferentated rats was more noticeable under severe hypoxia. When animals spent 30 min at 5000 m elevation (pO_2 = 85 mm Hg), the number of respirations increased during the first 10 min and was high during the entire exposition time, but was lower in deafferentated rats. There were no significant differences in the reactions of the cardiovascular and thermoregulatory systems at this elevation. A complete exclusion of the synocarotid chemoreceptors lowered in pO_2 pressure in the thigh muscles of the deafferentated rats at 5000 m elevation (barochamber) with low oxygen concentration. Intact and deafferentated rats died within 86 and 68 seconds, respectively at 12,280 m elevation. No significant changes in the ventilation system were observed among both groups of rats placed in chambers with 11% oxygen for 30 days. It is concluded that the peripheral chemoreceptors play a definite role in a total adaptation of the animal organism to oxygen deficiency. At the same time, the synocarotid chemoreceptors do not play any significant role in reactions of the cardiovascular and thermoregulatory systems in response to hypoxia. Since the synocarotid deafferentation did not produce significant changes in the adequate ventilation in response to hypoxia it can be assumed that other chemosensitive systems, yet unknown, take part in this process.

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Acc. Nr: AP0052793   _KONZA_   Ref. Code: UR0239

PRIMARY SOURCE: Fiziologicheskiy Zhurnal SSSR imeni
                 I. M. Sechenova, 1970, Vol 56, Nr 3 ,
                 pp 447-448

THE DEVICE FOR PRECISE RESPIRATION RECORDING IN RATS

E. A. Konza and _V. P. Frolova_

The construction and working principles of a device for measurement and recording of the lung ventilation in rats (the respiratory volume per minute, breathing rate, tidal air), was described.

The recording system of the device included an inductive transducer for transformation of the tension gradients into an amplitude-modulated signal.

Breathing curves for normal and hypoxic conditions were demonstrated.

REEL/FRAME
19821597

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UDC 669.71'721.048

LUKASHENKO, E. YE., KOPACH, I. I., and POGODAYEV, A. M.

"Two-layer Process for the Vacuum Distillation of Alloys of Light Metals"

V. sb. Vakuumn, protsessy v tsvetn. metallurgii (Vacuum Processes in Non-ferrous Metallurgy -- Collection of Works), Alma-Ata, "Nauka," 1971, 136-141 pp (from Referativnyy Zhurnal -- Metallurgiya, No 6, Jun 71, Abstract No 6G169)

TranslationOf Abstract: A new process was considered for the process of vacuum distillation of alloys of light metals by using a "hot" salt bath (two-layer process). As an example the purification of secondary metals and Al alloys are discussed for the characteristic two-layer process of vacuum distillation (14 bibliographic entries)

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USSR

UDC 669.71'721.018.9.4

LUKASHENKO, E. YE., POGODAYEV, A. M., KOPACH, I. I., KUZNETSOVA, V. P.

"Study of the Processes of Refining Aluminum and Magnesium Alloys by Vacuum Distillation"

Translation: The kinetics and mechanism of vacuum distillation of aluminum and magnesium alloys (synthetic and industrial) and electrolytic magnesium are studied. The effect of temperature, distillation time, composition, and height of the layer of distilled alloy, the residual pressure, the tap and vapor condensation conditions and kinetic factors on the mechanism, rate, and completeness of refining the alloys is investigated in a broad range of values. There are 4 illustrations, 4 tables, and a 20-entry bibliography.

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Extraction and Refining

USSR   UDC 669.716,721:621.745.55:66.067

LUKASHENKO, E. Ye., POGODAYEV, A. M., KOPACH, I. I., and KUZNETSOVA, V. P.

"Investigation of Refining Processes of Aluminum and Magnesium Alloys by Vacuum Distillation"

Metallovedeniye Splavov Legkikh Metallov-Sbornik, Moscow, "Nauka", 1970, pp 91-98, resume

Translation: The kinetics and mechanism of vacuum distillation of aluminum and magnesium alloys (synthetic and industrial) and electrolytic magnesium are investigated. Analyzed are, in a broad interval of values, the effects of temperature, duration of distillation, composition and layer depth of the distilled alloy, residual pressure, conditions of elimination and condensation of vapor, and kinetic factors on the mechanism and the rate and completeness of refining alloys. Four figures, four tables, twenty bibliographic references.

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Aluminum and Its Alloys

LUKASHENKO, E. Ye., and KOPACH, I. I., Krasnoyarsk Institute of Non Ferrous Metals, Department of Physical Chemistry and Theory of Metallurgical Processes

"Vacuum Deleading of Aluminum"

Abstract: The results of an investigation of the process of deleading aluminum by the method of vacuum distillation are presented. The AS1 (0.97 wt.% Pb), AS02 (0.19 wt. % Pb), and AS5 (5 wt. % PB) binary aluminum alloys and the AVS1 (1. wt % Pb) and AVS02 (0.18 wt. % Pb) secondary crude industrial aluminum alloys were investigated. Studies were made of the effect of temperature (973-1373°K), distillation time (30-180 min), initial lead content (0.2-5%), residual pressure (0.01-1.0 mm Hg), and height of alloy layer (10 and 100 mm), on the rate and degree of refining. All tests were conducted on a retort-type laboratory vacuum-distillation installation. A schematic diagram of the installation is presented and the experimental techniques are described. For the purpose of evaluating the process efficiency, the obtained experimental kinetic characteristics of distillation were compared with theoretical
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LUKASHENKO, E. Ye., and KOPACH, I. I., Izvestiya Vysshikh Uchebnykh Zavedeniy --
Tsvetnaya Metallurgiya, No 5, 1970, pp 45-50

calculations using the Langmuir equation for the distillation time. The results
show that the optimal parameters and conditions of vacuum distillation of binary
Al-Pb alloys and secondary aluminum alloys are: temperature $\geqslant$ 1273°K, residual
pressure $\leqslant$ 10^{-2}mm Hg, and an intensive bath mixing or film distillation. Under
these conditions the lead content may be reduced by one or two orders (from
0.2-1.0%) in 1-3 hours. It was established that lead diffusion in the liquid
phase appears as a limiting stage of the process. The lead concentration
gradient and the thickness of the diffusion layer in the distillation of
Al-Pl (1% Pb) alloy were evaluated.

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USSR   UDC   517.9:532

KOPACHEVSKIY, N. D., Khar'kov

"Hydrodynamics in Weak Gravitational Fields. Two-Dimensional Problems on Oscillations of an Ideal Fluid in a Vessel"

Moscow, Zhurnal Vychislitel'noy Matematiki i Matematicheskoy Fiziki, Vol 13, No 4, Jul/Aug 73, pp 952-970

Abstract: The author considers plane problems on determining the frequencies and forms of small natural oscillations of an ideal fluid in different vessels under the action of capillary and gravitational forces. It is assumed that acting parallel to the vertical axis is a weak homogeneous gravitational field. Four problems are considered: a) oscillations of the fluid in a sector-shaped channel; b) oscillations of a liquid drop located on a plane under conditions of weightlessness; c) oscillations of an air bubble adjacent to a flat solid wall in an infinite liquid; d) oscillations of a liquid in a circular channel. An investigation is made of the nature of asymptotic behavior of the frequencies of oscillations in the last problem with fill factors which are low and close to unity. It is shown that as $\kappa \to 0$, the eigenvalues of problem d) are expressed through

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KOPACHESKIY, N. D., Zhurnal Vychislitel'noy Matematiki i Matematicheskoy
Fiziki, Vol 13, No 4, Jul/Aug 73, pp 952-970

the eigenvalues of problem b); and as $\kappa \to 1$, the eigenvalues of problem d) are
expressed through the eigenvalues of problem c).

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UDC 517.9:532

KOPACHEVSKIY, N. D., Khar'kov

"Hydrodynamics in Weak Gravitational Fields. On Plane Oscillations of an Ideal Liquid in a Rectangular Channel"

Moscow, Mekhanika zhidkosti i gaza, No. 5, Sep/Oct 72, pp 3-13

Abstract: The plane problem of determining the frequencies and shapes of small natural oscillations of an ideal liquid in a rectangular channel under conditions close to weightlessness is considered. It is assumed that the weak gravitational field acts parallel to the vertical walls of the channel. As applied in this problem the term "weakness" of the gravitational field indicates that the dimensionless Bond number $b = \rho n g l^2 \sigma^{-1}$ is of the order of unity, where n is the overload coefficient, $g = 9.81$ m/sec^2 is the acceleration of gravity at the earth's surface, l is the half-width of the channel, and σ is the coefficient of surface tension at the liquid-gas interface, so that gravitational and surface forces are comparable. The Ritz method is applied to the variational problem equivalent to the problem of vibrations of the liquid under conditions of weightlessness. The cases of total weight-

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KOPACHEVSKIY, N. D., Mekhanika zhidkosti i gaza, No. 5, Sep/Oct 72, pp 3-13

lessness ($b = 0$) and oscillations in a weak gravitational field ($b \neq 0$) are discussed separately in detail. The formulas and the steps used to calculate the Ritz coefficients are given. The results of calculations of the frequencies and shapes of oscillations of the liquid on the M-20 computer are given. The following values of b were used in the computer calculations: -1.089, -0.557, 0, 0.857, 1.307, 2.206, 3.046, 4.528. It is noted that the technique described in the paper for calculating frequencies and shapes of oscillations of a liquid under total and partial weightlessness is suitable for the solution of the similar problem in an arbitrary axisymmetric vessel if the proper system of coordinate functions is selected.

2/2

USSR   UDC 532.593

MYSHKIS, A. D., KOPACHEVSKIY, N. D., TYUPTSOV, A. D.

"Oscillations of a Liquid Under Conditions of Total or Partial Weightlessness"

Tr. V Mezhdunar. konf. po nelineyn. kolebaniyam. T. 3 (Works of the V International Conference on Nonlinear Oscillations. Vol. 3), Kiev, Institute of Mathematics of the Academy of Sciences UkrSSR, 1970, pp 518-524 (from RZh-Mekhanika, No 12, Dec 71, Abstract No 12B732)

Translation: A survey of the results of mathematical studies of small motions of a liquid that were conducted at the Physicotechnical Institute of Low Temperatures of the Academy of Sciences UkrSSR is presented. This work was concerned with the study of the following problems in the dynamics of an incompressible liquid subjected to forces of surface tension: (1) investigation of the stability of the state of rest; (2) investigation of the reserve of stability; (3) the Cauchy problem and the spectral problem of oscillations of an ideal liquid; (4) the Cauchy problem and the spectral problem of oscillations of a viscous liquid; (5) the asymptotic behavior of the oscillation frequencies of an ideal liquid in an axisymmetric vessel; (6) approximate method for calculating free oscillations. N. N. Moiseyev.

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USSR   UDC 576.5

LAGIDZE, R. M., LAGIDZE, D. R., TSVENIASHVILI, V. Sh., and KOPALADZE, B. A.,
Institute of Experimental and Clinical Surgery, Ministry of Health GSSR

"Half-Wave Potentials (φ 1/2) and Biological Activity of Some Antitumor Compounds"

Translation: Compounds which differ considerably in their chemical structure fre-
quently exhibit similar physiological activity. This leads to the speculation that
it might be possible to find some similarities in their ultrafine structures by
means of modern physical methods. Wright and Sere have reported interesting facts
on this type of relationship for a specific group of redolent substances. In this
connection, we believe that various compounds with antitumor activity should also
exhibit some common physical properties. Application of the results of spectro-
scopic studies, polarography, and other physical research methods, for this purpose
may prove to be a promising lead in an approach to a more rational selection of
new antitumor agents from among the tremendous number of organic compounds and
natural products. However, it should be noted that, with the exception of systematic
studies investigating the relationship between the hydrolysis rate of certain groups
of alkylating compounds and their antitumor activity, no other physical

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methods have been used for such purposes to any extent. All this also pertains to some extent to the polarographic studies of antitumor compounds.

Z. V. Pushkareva and her coworkers determined the half-wave potentials of a large group of nitrogen mustards with aliphatic, aromatic, and heterocyclic carriers. Having investigated the nature of the reduction and hydrolysis processes of these compounds, they proposed reaction mechanisms for their conversions. It was shown that the $\varphi 1/2$ of these compounds is constant in a wide range (from -0.97 to -1.42 volts with a saturated calomel reference electrode). A polarographic technique was also successfully used in a quantitative determination of ethylene immonium ions of N,N-di-(2-chloroethyl)-amines with aliphatic and aromatic groups.

We believe that valuable results could be obtained in this area from systematic studies of individual series of specific organic compounds, leading to elucidation of a relationship between their antitumor activity and minute structural changes and physical properties. It was shown in earlier studies that compounds of the 3-arylbutyl-N,N-di-(2-chloroethyl)-amine type are well suited for such studies. As a result of biological studies of these compounds, it has been established that their antitumor activity depends substantially on the nature, number, and position of the substituents in the aromatic nucleus. In the present paper, we report the

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LAGIDZE, R. M., et al., Soobshcheniya Akademii Nauk Gruzinskoy SSR, Vol 58, No 1, Apr 70, pp 217-220

results of polarographic determinations of 3-arylbutyl-N,N-di-(2-chloroethyl)-amines and 3-arylbutyl-2-chloroethylsulfides obtained earlier by R. M. Lagidze and his coworkers.

All of these compounds exhibit proven antitumor activity. The polarograms were determined on the LP-60 polarograph. The potentials were measured with a saturated aqueous calomel reference electrode. The $\varphi_{1/2}$ values of these compounds are reported in a table. In contrast to the above compounds, 3-arylbutyl-2-chloroethyl sulfides are insoluble in water. Therefore their $\varphi_{1/2}$ were determined in dry dimethyl formamide against 0.1 M LiClO$_4$ and a 10^{-3} M concentration of the _____ depolarizer. For comparison, the $\varphi_{1/2}$ values of 3-arylbutyl-N,N-di-(2-chloroethyl)-amines obtained by us were also determined in dimethylformamide under identical conditions. It was shown that replacement of dimethylformamide with water had no effect on the $\varphi_{1/2}$ value in this case.

Literature values of the $\varphi_{1/2}$ for various antitumor agents are reported. The $\varphi_{1/2}$ of 37 compounds studied by Z. V. Pushkareva and her coworkers.are included. In spite of the small differences in the conditions under which the $\varphi_{1/2}$ values were determined by various investigators, including some variations in the pH of the media, the results are in agreement with each other and with data 3/4

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obtained by us.

It is noteworthy that the $\varphi_{1/2}$ interval for these various classes of anti-tumor agents is quite narrow, even though some of them are quite different from the standpoint of both their structural relationship and the polarography of their active groups. Obviously it should not be concluded from this fact that all compounds with the halfwave potentials, in the reported region will have antitumor activity. Furthermore, in many cases, for example with steroid hormones, the antitumor activity relates closely to the hormonal activity. Nevertheless, it may be hoped that accumulation of a large amount of this type of experimental data, coupled with a thorough analysis of the data in relation to other physical properties, may generate a new complex of criteria for rational selection of new, effective antitumor agents.

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KOPALEYSHVILI, V.P., POPOVIDI, R.S.

"Diffraction At Infinitely Long Bodies"

Abstract: The problem is considered of the diffraction of plane or cylindrical electromagnetic waves at a finite number of infinitely long bodies of arbitrary cross section and location, with the continuous surface replaced by conductors of small radius. A method is proposed by means of which the problem of the diffraction of plane electromagnetic waves at cylinders and strips is solved with the aid of an electronic computer. Currents induced at the surface, diagrams, and neighboring fields are calculated. Some of the results obtained are compared with the results of other authors. It is concluded that the proposed method of solution of the problem by replacement of the conducting surface of the bodies by conductors of small radius is most effective in the case of co-phased excitation by an incident wave of the particles of the body. In all remaining cases good results are obtained with a distance between the conductors of $\lambda/5$. In all cases the radius of the conductors was taken equal to 0.003λ because a further decrease did not change the response. 6 fig. 8 ref. Received by editors, 28 May 1971.
1/1

USSR   UDC 669.71:539.4

KOPAN', V. S., and LYSENKO, A. V., Kiev

"Some Physical and Mechanical Properties on Multilayer Al-Pb and Al-Graphite Composites"

Abstract: The production and study of aluminum-base multilayer composites is reported where Al-Pd and Al-C (graphite) composites were produced with the idea of having the second component not soluble in aluminum. Al-Pb samples were made with more than 12 layers which were annealed at 200°C for 2-3 minutes and rolled with 30-50% reduction. This process was repeated several times. The Al-C samples were made by using Al foil, sprayed with graphite, with the foil weighed before and after spraying. The overall packet had 100-200 sprayed foils and the packet was pressed under 100 kG/mm^2 pressure and annealed at 550°C for 3-5 minutes in an air-free atmosphere. It was found that, in the Al-Pb samples, tensile strength was independent of average layer thickness when thickness was greater than 200 A. The annealed samples had a tensile strength greater than the additive strengths of the two materials while the unannealed samples were less strong. Increased Pb

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USSR

KOPAN, V. S., and LYSENKO, A. V., Fizika i Khimiya ' Obrabotki Materialov, Vol 4, Jul- Aug 73, pp 104-109

content causes reduced strength of the Al-Pb composite while in the Al-C composites an increase in graphite content up to about 23 at .% C is accompanied with increased tensile strength after which strength drops rapidly. It was also noted that, up to certain level of second component contents, the Al-C strength is six times greater than the additive strength and Al-Pb strength is only 1.5 times greater. Four figures, one table, and fifteen bibliographic references.

2/2

KOPAN V.S.

Kopan', V. S., A. V. Lysenko, and V. D. Mikhailov.
Effect of surface reinforcement and the medium on
properties of aluminum and tin laminated materials.
F-KhMM, no. 6, 1971, 15-17.

115

The purpose of this article is to establish the dependence of microviscosity limits on the specific contribution of the inner surfaces in a multilayer Al-Sn composition (MLC) and to determine possible causes of observed phenomena. The authors establish that the tensile strength of MLC depends on the average thickness of a single layer (the critical thickness is 0.1 μm) and increases with increased inner surface area. The reinforcement is explained by changes in the dislocation structure on the metal interlayer surfaces. Earlier structural studies of the boundaries between the monocrystals of different elements established the existence of an incongruity dislocation lattice acting as an effective barrier for sliding dislocations. The effectiveness of this lattice possibly increases with the increased interlayer area and has a pronounced effect on the microviscosity limits. The existence of a single critical deformation amplitude indicates that the changes of the centers of the dislocation lattice on the interlayer boundary are probable causes of the collapse of the dislocation lattice in MLC layers. Tensile stress has a tendency to increase with a decrease of individual layer thickness. Experimental durability tests of Al-Sn MLC, as a function of time exposure to humidity, show a pronounced decrease of durability with increased exposure. The changes in density and mass of a test sample are explained by interlayer boundary corrosion. Soaking of the sample in distilled water resulted in its total dissolution within 24 hours, comprising non-metallic sediments. The solubility of the sample increased as its layer thickness decreased. The above phenomena are explained by the intensive corrosive processes which take place on the interlayer boundaries.

Mechanical Properties

USSR   UDC 539.4:539.216

KOPAN', Y. S., and LYSENKO, A. V., Kiev State University

"The Mechanical Properties and Electrical Resistance of Multilayer Composi-
tions Based on Aluminum and Cadmium"

Kiev, Metallofizika, No 31, 1970, pp 161-169

Translation: Materials representing packs from welded alternate layers of
aluminum and cadmium were studied. The thickness of the layer h ranged
from 1 to 0.02 microns. The total thickness of a pack was 12-13 microns.
It is shown that the breaking stress σ increases as h decreases and
reaches a maximum (27 kg/mm^2) with h = 200 Å. With a further reduction in h,
σ and the specific electrical resistance do not depend on h, which is due
to the appearance with $h \sim 200$ Å of a scaly structure of the multilayer
compositions and their transformation into a variety of powder material.
A breaking stress exceeding the maximum breaking stress of deformed initial
foils, of which the pack was made, was attained through the use of the idea
of lamination. Bibliography: 15 entries, 5 illustrations, 1 table.

1/1

USSR   UDC: 621.762.014

KOPAN', V. S., and LYSENKO, A. V., Kiev State University imeni T. G.
Shevchenko

"Application of the Effect of Dislocation Fixing of Solid Coatings for
Obtaining Multilayer Compositions on Aluminum and Tin Base"

Kiev, Poroshkovaya Metallurgiya, No. 9, Sep 70, pp 52-56

Abstract: Involved in this study are multilayer-composition packets 12 to
13 microns thick, consisting of 100-12000 very fine alternating tin and
aluminum foils, welded together by cold rolling. This pair of metals is
of interest since both feature rather low mutual solubility in the solid
state. Besides, these metals have different types of lattices
contributing to a highly homogeneous dislocation density in layers when
simultaneously deformed. A comparison is made between the properties of
multilayer compositions and those of individual foils of the same thickness

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KOPAN', V. S., and LYSENKO, A. V., Poroshkovaya Metallurgiya,
No 9, Sep 70, pp 52-56

and composition similar to those in multilayer-composition (MC) specimens.
It is shown that the tensile strength of MC markedly increases with an
increase in the mean thickness (h) to 200 Å; a further increase in the
thickness does not affect the tensile strength. Based on the disagreement
between the experimental values of resistivity of MC and the theoretical
data, the conclusion is made that at h<500 Å, MC becomes a modification
of a powder material and may be rolled without further thinning.

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TITLE--MECHANICAL PROPERTIES OF MULTILAYER COMPOSITIONS BASED ON ALUMINUM,
  COPPER, TIN, AND CADMIUM -U-

AUTHOR-(02)-KOPAN, V.S., LYSENKO, A.V.

CCUNTRY OF INFO--USSR

SOURCE--FIZ. METAL. METALLOVED. 1970, 29(3), 663-4

DATE PUBLISHED------70

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

TOPIC TAGS--MECHANICAL PROPERTY, ALUMINUM, COPPER ALLOY, TIN ALLOY,
  CADMIUM ALLOY, TENSILE STRENGTH, COLD ROLLING, BIMETAL, METAL FOIL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--3001/0339   STEP NO--UR/0126/70/029/003/0663/0664

CIRC ACCESSION NO--AP0126095
                         UNCLASSIFIED

CIRC ACCESSION NO--AP0126095
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE TITLE SPECIMENS WERE PRODUCED
 BY COLD ROLLING A STACK OF FOILS OF VARYING THICKNESSES (200 ANGSTROM TO
 4 MU). EACH SPECIMEN HAD THE SAME OVERALL THICKNESS, SOME WERE COMPOSED
 OF 12,000 LAYERS.   THE FOLLOWING THICKNESS RATIOS WERE USED CU-AL
 EQUALS 1.4, CD-AL EQUALS 0.3, AND SN-AL EQUALS 1.0. TENSILE STRENGTH
 INCREASED RAPIDLY WITH DECREASING LAYER THICKNESSES. AT 200 ANGSTROM IT
 WAS FOR AL,CU 90, FOR AL,CD 27, AND FOR AL,SN 23 KG-MM PRIME2, WHILE
 VALUES CALCD. ADDITIVELY WERE 26, 10, AND 7 KG-MM PRIME2 RESP. THE
 RAPID INCREASE IN THE STRENGTH OF MULTILAYERED SPECIMENS STARTED WHEN
 THICKNESSES OF FOILS WERE SMALLER THAN 1 MU. HOWEVER, AT THICKNESSES
 SMALLER THAN 500 ANGSTROM THE FOILS WERE TORN DURING COLD ROLLING SO
 THAT THE INCREASE IN STRENGTH FOR MULTILAYERED SPECIMENS FROM FOILS
 SMALLER THAN 500 ANGSTROM THICK WAS CONSIDERABLY LESS THAN FOR
 500-10,000 ANGSTROM THICKNESSES. THE MUTUAL SOLY. OF THE LAYERS DID NOT
 EXCEED 0.2 AT. PERCENT.   FACILITY: KIEV. GOSUNIV. IM.
 SHEVCHENKO, KIEV, USSR.

UNCLASSIFIED

USSR

UDC 669.2:541.18

LASKORIN, B. N., GOLDOBINA, V. A., and KOPANEV, A. M.

"Sorption of Nonferrous Metal and Iron Ions by Inorganic Titanium-Base Ion-Exchange Resins"

Moscow, Tsvetnyye Metally, No 1, Jan 73, pp 22-24

Abstract: Results are reported on studies of the sorption of several non-ferrous metal and iron ions by titanium phosphate Ti-P and a hydrated titanium dioxide Ti-OH. Tests were conducted under static conditions at $20 \pm 2°C$, and the ratio of ion-exchange resin (g) to solution (ml) was 1:500. Contact time (24 hours) was adequate for establishing equilibrium. Sorption of all the investigated metals on the sorbents Ti-P and Ti-OH from sulfate solutions at low pH values, with the exception of trivalent iron cations, were insignificant, but sorption grew with increased solution pH and was especially sharp for Cu^{2+} and Zn^{2+}. The maximum capacity for cations Fe^{3+}, Cu^{2+}, Zn^{2+}, Co^{2+}, and Ni^{2+} during sorption from sulfate solutions was achieved at pH values of the solutions close to the pH at the start of precipitation of the corresponding hydroxides. It was found that the sorptability series of elements in sulfate solutions was the same as for Ti-P and Ti-OH and almost coincident with the solubility series of the hydrates of these same elements (in the order of increasing solubility). 3 figures.
1/1

these signals are applied to the base-emitter of
transistor 7 which thus opening, during switching,
prevents passage of false signals.
30.6.67 as 1170961/24-7, A.S. KOPANEV et alia.
USSR (24.10.68) Bul 23/22.7.68. Class: 21c.
Int.Cl. H 02h.

AA9028587

USSR

VODOP'YANOV, L. K., KOPANEV, V. D., and VINOGRADOV, Ye. A.

"Automation of Optical Measurements from Points in the Far Infrared Region"

Abstract: Although the method of optical measurements in the far infrared region involving point-by-point spectrum recording is the most accurate, it is also the most tedious. The authors of this paper therefore present a system for making such measurements automatically. As the simplified drawing shows, the equipment consists of a diffraction grating that is turned precisely to a given angle, a cryostat that periodically enters the light beam for a time and carries the specimen, and a slide which interrupts the beam for zero signal measurements. A detailed explanation of the equipment's operation is given. It used periods of 1.2, 3.5, 7.0, and 14.0 min for performing its recording cycles. Two factors were considered in setting these periods: the measurement accuracy, which improves with increasing spectral recording time in each phase, and the total time for recording the whole spectrum.
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USSR

KOPANEV, V. I.

"Motion Sickness and How to Prevent It"

Moscow, Zdorov'ye, No 8, Aug 70, pp 10-11

Abstract: Motion sickness affects people traveling on moving vehicles including
ships, aircraft, and space vehicles. While 40-90% of persons traveling by sea
was affected, only 3-13% suffer from motion sickness on aircraft. The symptoms
vary from person to person. Digestion is often disturbed, and pathological symp-
toms develop in the central nervous system. Blood analyses indicate that metab-
olism is disrupted after prolonged periods of motion sickness. In persons with
a weak vestibular apparatus, the symptoms of motion sickness may not be pro-
nounced and the slight discomfort associated with the sickness often passes
unnoticed. However, it is very dangerous for such persons to drive an automo-
bile, particularly in heavy city traffic. Besides the nerve endings of the
vestibular apparatus in the inner ear, those of the skin, muscles, and internal
organs, as well as the sensory cells of the retina, are irritated by repeated
accelerations. The vestibular apparatus can be trained and the sensitivity of
a person to the effects of motion reduced. Training consists of regular turning

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KOPANEV, V. I., Zdorov'ye, No 8, Aug 70, pp 10-11

of the head to the right and then to the left, followed by inclining the head
forwards and then backwards and rotation to the right and then to the left.
The sequence of movements is initially repeated 6-8 times while sitting on a
chair. It is carried out at the rate of 30-60 movements per minute during
the first month, whereupon healthy persons may increase the rate to 120 move-
ments per minute and carry out the movements standing up. The exercise should
not be conducted for longer than 8-10 min. It is best to combine it with the
morning setting-up exercises. Among drugs that alleviate motion sickness,
aeron was particularly effective when taken as a prophylactic 1/2 to 1 hr
before exposure to motion. However, because of the individual characteristics
of the nervous system, there is no universal drug for preventing motion
sickness.

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Measuring, Testing, Calibrating

USSR   UDC 620.179.16

GITIS, M. B., DOBROMYSLOV, V. M., KOPANSKIY, A. G., and SAZHIN, V. V., All-
Union Scientific Research Institute for the Development of Nondestructive
Materials Quality Control Methods and Facilities

"Separate-Combined Finder for Ultrasonic Flaw Detector"

USSR Authors' Certificate No 363031, Cl. G 01n 29/04, filed 10 Mar 70, pub-
lished 20 Dec 72 (from Otkrytiya, Izobreteniya, Promyshlennyye Obraztsy,
Tovarnyye Znaki, No 3, 1973, p 87)

Abstract: The device contains an emitting and a receiving transducer mounted
on acoustic lines separated by an acoustic screen. The unique feature is
that, to increase measurement accuracy, one of the transducers takes the
form of a capacitor consisting of two metal plates separated by a dielectric
layer and connected to the polarizing voltage. An illustration is given.

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USSR

GITIS, M. B., KOPANSKIY, A. G., All-Union Scientific Research Institute on
Development of Nondestructive Methods and Facilities for Quality Control
of Materials, Kishinev

"Measuring the Coefficient of Absorption of Ultrasound in Solids at High
Temperatures"

Abstract: The paper describes an installation and method for measuring
the coefficient of absorption of ultrasound in small solid specimens at
frequencies of 5-100 MHz in the temperature range of 20-2000°C. The mea-
surement installation was made up of two acoustic lines fastened coaxially
on a coordinate device. One line is stationary during measurement, and
can be adjusted with respect to angle. The other acoustic line acts as
a clamp for the specimen. The acoustic lines are made of fused quartz.
The design and operation of the measurement apparatus is described in
some detail. Measurements of ultrasonic absorption on fused quartz,
nickel and silicon showed that the proposed method gives an error of only
0.2-0.3 dB/cm. The authors thank V. G. Mikhaylov for helpful comments
and discussion of the results.

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                                    UNCLASSIFIED   PROCESSING DATE--20NOV7C
TITLE--SEPARATE COMBINED HEAD FOR ULTRASONIC DEFECTOSCOPES -U-

AUTHOR-(03)-BUDENKOV, B.A., KOPANSKIY, A.G., SAZHIN, V.V.

CCUNTRY OF INFO--USSR

SOURCE--U.S.S.R. 245425
REFERENCE--CTKRYTIYA, IZOBRET., PROM. OBRAZTSY, TOVARNYE ZNAKI NR 19
DATE PUBLISHED--23OCT70

SUBJECT AREAS--METHODS AND EQUIPMENT

TOPIC TAGS--DEFECTOSCOPE, ULTRASONIC EMITTER, SIGNAL INTERFERENCE, ERROR
    MINIMIZATICN, PATENT

CCNTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1994/0734   STEP NO--UR/0482/6U/000/000/0000/0000

CIRC ACCESSICN NO--AA0114886
                            UNCLASSIFIED

CIRC ACCESSION NO—AA0114886
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. SEPARATE COMBINED HEAD FOR
  ULTRASONIC DEFECTOSCOPES OVERCOMES THE DISADVANTAGE OF CONVENTIONAL
  HEADS, WHICH HAVE A DEAD ZONE NEAR THE INSPECTED SURFACE CAUSED BY
  ECHOES DUE TO IMPERFECTIONS OF THE SCREENING BETWEEN HEADS AND ECHOES IN
  NEARBY DEFECTS IN A ZONE OF LOW SENSITIVITY. IN THE PROPOSAL, ONE PRISM
  IS MADE SHORTER THAN THE OTHER BY A LENGTH EQUAL TO THE PRODUCT OF THE
  PICK UP PULSE AND THE VELOCITY OF PROPAGATION OF THE WAVE IN THE PRISM
  MATERIAL. THIS CUTS DOWN THE DEAD ZONE, SINCE THE ECHO SIGNAL OF THE
  SHORTER PRISM IS CLEAR OF THE INSPECTED ZONE, AND THAT FROM THE LONGER
  ONE IS DISPLACED INTO A ZONE OF HIGH SENSITIVITY, THUS AVOIDING
  HINDERING THE RECEPTION OF THE DEFECT SIGNAL.   FACILITY:
  VSESOYUZNYY NAUCHNO-ISSLEDOVATEL'SKIY INSTITUT PO RAZRABOTKE
  NERAZRUSHAYUSHCHIKH METODOV I SREDSTV KONTROLYA KACHESTVA MATERIALOV.

UNCLASSIFIED

USSR

UDC 53.07/.08+53.001.89

KOPAS', N. F., GALUSHKA, A. P., KONOZENKO, I. D.

"Radiation Resistant Gamma Dosimeters based on CdS Single Crystals with Compensated Admixtures"

Moscow, Pribory i Tekhnika Eksperimenta, No 5, 1972, pp 59-60

Abstract: Gamma-dosimeters based on single CdS crystals with compensated admixtures are described which permit measurement of the γ-radiation intensity of ^{60}Co from 0.1 to several thousands r/sec with an error not exceeding $\pm 5\%$ to an integral dose of 10^8 r. The increase in radiation stability of the γ-sensitivity of the CdS single crystals is achieved by alloying them during the growth process with admixtures: 0.05% Ag and 0.1% Ga (by weight). The admixtures are added to the initial CdS powder. The structural design and the basic characteristics of the γ-dosimeters are presented.

The sensitivity of the γ-dosimeters as a function of temperature is plotted for three different intensities of the γ-radiation (70, 420 and 1,600 r/sec) with a crystal voltage of 0.1 volts. By comparison with the CdS crystals without admixtures these single crystals have several times less dependence on temperature.

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USSR

YELESIN, V. F. and KOPAYEV, YU. V., Physics Institute imeni P.N. Lebedev of the
USSR Academy of Sciences

UDC:

"The Effect of a Strong Magnetic Field on the Superconducting Properties of Semi-
conductors"

Abstract: The authors study the effect of the intermingling of the valence and
conductivity band states under the effect of an electromagnetic wave field on the
conductivity of nonequilibrium electrons and holes in the case of a semiconductor
model whose extrema of the valence and conductivity bands are at $p = 0$. This ef-
fect amounts to the existence of a dielectric gap which is proportional to the
amplitude of the field and the matrix element of interband transition. The
superconductivity state in this case is possible only if the magnitude of this
gap is less than the value of the superconducting gap which was obtained without
considering ingermingling. This is analogous to the existence of the exciton
insulator phase in a semiconductor when the magnitude of the forbidden band of
the latter is less than the binding energy of the exciton. Because of the simul-
taneous presence of electrons and holes of both dielectric and superconductivity
gaps at Fermi quasilevels, the relationship between the temperature of supercon-
ducting transition and the magnitude of the superconducting gap at $T = 0$ is
1/2

USSR

different from that for the Bardeen-Cooper-Schrieffer model. From a study of the Meissner effect of such a system, it follows that even at T=0 only a part of the electrons and holes participates in superconductivity. The participating part is proportional to the ratio of the superconducting gap to the full one. In addition, the authors study the effect of a field on the spin structure of electon-hole pairs, while taking into consideration Coulomb's interaction. It is shown that the basic state of these pairs is of the triplet type, while the electron-hole pairing without the field is indifferent with respect to their spin structure. Original article: 35 formulas and eight bibliographic entries.

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USSR

KOPAYEV, YU. V., and TIMEROV, R. KH.

"Effect of Impurity States on Semiconductor-Semimetal Phase Transition"

Abstract: The article considers an isotropic model of a semi-metal with Coulomb interaction between electrons and holes, with the concentrations of these being the same. The dependence of phase transition on impurity concentration is studied, with allowance for the existence of local impurity states in such systems. It is shown that at low impurity concentrations the disappearance of the impurity states takes place by a second-order phase transition at the temperature T_0, but the system above or below T_0 remains in the semiconductor state. At high impurity concentrations, when impurity states disappear at the semiconduc-

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KOPAYEV, YU. V., and TIMEROV, R. KH., Fizika Tverdogo Tela, Vol 13, No 1, Jan 71, pp 122-124

tor-semimetal phase transition point, it is possible for a sequence of semiconductor-semimetal-semiconductor-semimetal phase transitions to occur.

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Acc. Nr: AP0043603   Ref. Code: UR 0056

PRIMARY SOURCE: Zhurnal Eksperimental'noy i Teoreticheskoy
                   Fiziki, 1970, Vol 58, Nr 3, pp 1012-1019

ON THE SUPERCONDUCTIVITY OF ALLOYED SEMIMETALS

Yu. V. Kopayev

Electron-electron and electron-hole pairing are taken into account simultaneously in the model of an impurity semimetal with an isotropic electron spectrum in which electron scattering by the impurity is neglected. The restriction on the relation between the intraband and interband interactions which makes such pairing possible is derived for the case when the dielectric gap due to electron-hole pairing is much greater than the superconducting gap. In the expression for the superconducting gap a large factor for the effective coupling constant is obtained due to increase of the state density at the boundary of the allowed band in the exciton insulator model. In the limit of weak alloying, when the degeneracy energy of «excess» electrons is less than the superconducting gap, the latter can be expressed in terms of an effective coupling constant by means of a power function instead of an exponential function. Thus with respect to electron — electron pairing such a system behaves as a one dimensional system.

REEL/FRAME
19770003

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KOPAYEV, Yu. V.

"Possibility of the Existence of Two Critical Temperatures during the Metal-Semiconductor Phase Transition"

Leningrad, Solid State Physics; January, 1970; pp 3-8

Δ Δ Δ

ABSTRACT: The effect of the difference in the concentration of electrons and holes in semimetals on the nature of electron-hole pairing is studied.

It is shown that with temperatures much less than the difference in energies of Fermi electrons and holes the gap Δ increases with an increase in temperature. In a certain interval of differences in concentration two critical temperatures T_{cL} and T_{cU} exist.

For $T_{cL} < T < T_{cU}$ the system is semiconducting, while for $T_{cL} > T > T_{cU}$ it is semimetallic.

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KOPAYEV, Yu. V., Solid State Physics; January, 1970; pp 3-4

    The existence of a lower critical temperature is connected with the break-
down of the Fermi distribution, contributing to the electron-hole pairing for
different concentrations.

    The author expresses his appreciation to L. V. Keldysh for his discussion
of the work.

    The article includes 26 equations. There are 8 references.

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KOPAYEV, Yu. V.

JPRS 57651

30 November 1972

ABSTRACTS OF REPORTS PRESENTED AT THE FIRST ALL-UNION CONFERENCE ON METAL-DIELECTRIC PHASE TRANSITIONS

CONTENTS

- a -

[I - USSR - I]

KOPAYEV, Yu.V.

JPRS 57631
30 Nov. 1972

METAL-DIELECTRIC PHASE TRANSITIONS OF BISMUTH ALLOYS IN STRONG MAGNETIC FIELDS

[Article by N. B. Brandt; Ye. A. Svistova, Moscow State University, Physics
Department, pp 8-10]

Presented in this paper are the results of a study of the magnetic
resistance of specimens with small controlled overlapping of zones and
controlled energy slit, i.e., of metallic and semiconductor alloys of
bismuth and antimony in which the antimony concentrations vary up to 40%,
in pulsed magnetic fields up to 700 ke in the 2-77°K temperature range.
The purpose of which was to discover effects related to qualitative changes
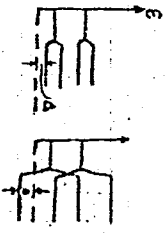in the energy spectrum of the specimens in the ultraquantum region of
magnetic fields.

Quantization of carrier energy
and the spin distribution of the
energy levels in the magnetic field
lead to displacement of the boundaries
of the energy zones (Figure 1).

In the ultraquantum region
the displacement of zone boundaries
(4) reaches a magnitude comparable
to or greater than the Fermi energy
in the zones of the metals or the
energy slit in semiconductors. Here

Figure 1.

electron transitions may occur, depending on the ratio of the spin and
orbital masses of the carriers.

5. Transition to the slitless state (S.S.) as a result of zone inversion at L under the influence of pressure was discovered in semi-conducting $Bi_{1-x}Sb_x$ alloys with x > 0.07. The S.S. transition is accompanied by a sudden drop in effective carrier masses and increase of mobilities at T = 4.2°K. In alloys with an ionized impurity concentration $n_i < 10^{15}$ cm^{-3} carrier mobility in S.S. at helium temperatures approaches ~10^8 cm^2/V·sec.

ON INSTABILITY OF TWO-ZONE MODEL OF METAL RELATIVE TO ANNIHILATION SCATTERING

[Article by Do chan Kat, Yu. V. Kopayev, pp 15-17]

In examination of the behavior of a system of conductivity electrons in a two-zone model of metal, as is known, summation of the loop diagrams in the vertex function corresponding to annihilation of a hole particle in each individual zone leads to a real pole corresponding to plasmons in it.

Also taken into account in the given work are loop diagrams corresponding to hole particle annihilation from one zone to the next, i.e., diagrams produced by terms of interaction corresponding to the conversion of the electron of one zone to the electron of the other, for example

$$\sum_{\vec{r},\vec{r}',\vec{q}} V(q)\, a^+_{1,\vec{r}+\vec{q},\sigma}\, a^+_{2,\vec{r}'-\vec{q},\sigma'}\, a_{2,\vec{r}',\sigma'}\, a_{1,\vec{r},\sigma} + \text{resistance} \qquad (1)$$

a^+, a and a are the operators of electron annihilation and generation in the i-th zone).

Consideration of such diagrams for a model of an isotropic semimetal and transition metal with identical concentrations of S and a-electrons leads to a vertex function with a purely imaginary and useless pole if V(q) < 0, which signifies instability of the basic state relative to the formation of plasmons.

Such instability often occurs for a semimetal in the presence of any weak repelling interaction between an electron and hole from various zones and leads to their pairing.

Restructuring of the system is dielectric (plasma insulator) with the slit

$$\Delta = (1+\alpha)\, v_1\, p_0\, \exp\left[-\frac{\pi^2(1+\alpha)}{4\, V(0)\, m_1 p_0}\right] \qquad (2)$$

($\alpha = m_1/m_2 < 1$ is the ratio of effective electron masses in the two zones; $p_1 = p_2 = p_0$ is the Fermi pulse, $v_1 = p_0/m_1$).

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Organometallic Compounds

USSR

UDC 542.91:547.1'119:547.412.732

KOPAYEVICH, Yu. L., VELEN'KIY, G. G., MYSOV, Ye. I., GERMAN, L. S., and KNUNYANTS, I. L., Institute of Element-Organic Compounds, Academy of Sciences USSR

"Derivatives of Bis(pentafluoroethyl)arsenous Acid"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, 1, Jan 73, pp 121-122

Abstract: The reaction of ethanol with $(C_2F_5)AsF$ (I) results in the formation of small amounts of the corresponding ester. In the presence of SiO_2, however, the yield of $(C_2F_5)_2AsOC_2H_5$ is significantly increased. The hydrolysis of I leads to the formation of $(C_2F_5)AsOAs(C_2H_5)_2$; and the subsequent reaction with diethylamine to $(C_2F_5)_2AsN(C_2H_5)_2$. Reaction of (I) with phenylmagnesium bromide leads to the formation of $(C_2H_5)_2AsC_6H_5$. Syntheses, elemental composition, and mass spectrometric and NMR data are given for the compounds generated.

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USSR

UDC 539.193:547.242

KOPAYEVICH, YU. L., STUMBREVICHUTE, Z. A., FEDOROV, L. A., and GERMAN, L. S.

"NMR Spectra and Structure of Polyfluoroalkylarsines"

Leningrad, Zhurnal Obshchey Khimii, Vol 43 (105), No 5, May 73, pp 1140-1147

Abstract: Derivatives of bis(pentafluoroethyl)arsinous acid, of mixed tertiary arsines, derivatives of bis(α-chlorotetrafluoroethyl)arsinous acid, and tertiary arsines were studied by NMR ^{19}F spectroscopy. Spectral characteristics originating from the presence of chiral and prochiral centers in the compounds studied have been observed and discussed. The As-Hg bonds were shown to be very labile. Inversion of the arsenic atom was shown to be slow (in the NMR time scale).

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Organometallic Compounds

USSR

UDC 542.91:547.242+546.16

KOPAYEVICH, YU. L., BELEN'KIY, G. G., GERMAN, L. S., and KNUNYANTS, I. L.,
Institute of Organoelemental Compounds, Academy of Sciences USSR

"Fluoroalkylarsenic Derivatives"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 5, 1971,
pp 1124-1125

Abstract: Tertiary polyfluoroalkylarsines were synthesized by addition of AsF_3
(I) to certain fluoro-derivatives of ethylene in the presence of SbF_5 (II).
Thus, the reaction of (I) with $CH_4=CF_2$ at 100-120° under pressure for 6 hours,
in the presence of traces of (II) yielded the following: $(CH_3CH_2)_3As$, 42% yield,
b.p. 146-147°. The reaction of (I) with $CF_2=CFH$ requires 0.3 moles of (II) and
is easily executed under pressure at 20°. This produced $(CF_3CFH)_3As$ in 74%
yield and b.p. 114-115°. By the reaction of (I) with $CF_2=CF_2$ in the presence
of 0.3 moles (II) under pressure at 20°, the following products were obtained:
1) $(C_2F_5)_3As$, b.p. 87-89°, yield 39%; 2) $(CF_3CF_2)_2AsF$, yield 30%, b.p. 67-68°.
The structure of these compounds were confirmed by nuclear magnetic resonance
and mass-spectroscopic data.

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UDC 621.398.93

USSR

SHCHERBAN', A. N., FURMAN, N. I., PRIMAK, A. V., KOPEIKIN, V. I., POKARZHEVSKIY, A. S., MARUSOV, A. G., DASHEVSKIY, L. N., and KHOMYAKOV, A. T., Institute of Technical Heat Physics, Acad. Sc. Ukr SSR, Gas Institute, Acad. Sc. UkrSSR

"Telemetric System for Sanitation-Chemical Control of Air Pollution"

Abstract: A complex system is discussed designed to fulfill the following functions: organization of the input operations of the informations from control-determination points (CDP) into the computer memory with wide range of possible changes in the frequency and order of query to CDP; determination of the measurement points with higher pollution and increased frequency of queering the respective recorder; statistical treatment of the information, tabulation or graphing of the results; and analysis of the effectiveness of the utilization of purifying equipment by the change in air pollution in a controlled region.

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USSR   UDC 616.988.75-085.339:576.858.75.095.383:616.988.75-035.2]-036.1

GAYLONSKAYA, I. N., KOPELEV, M. F., BUSUYEK, G. P., KUZNETSOV, V. P., and
LOZINSKAYA, T. M., Institute of Epidemiology and Microbiology imeni
N. F. Gamaleya, Academy of Medical Sciences USSR, Moscow

"Clinical Course of Influenza Treated With Interferon and Symptomatic Agents"

Abstract: The clinical course of influenza was much milder in patients treated
solely with concentrated leukocytic interferon than in a matched group treated
with conventional symptomatic drugs. Interferon treatment was administered 4
days: 2 drops (= 200 units) instilled in each nostril the first and second days
of the disease every other hour and the same amount on the third and fourth days
5 to 6 times a day. Total interferon used was 4 to 6 ml. In these patients,
the symptoms of intoxication were less pronounced than in controls and they
lasted 2.4 days compared to 3.8 days while chills persisted 1.8 and 2.6 days,
respectively. Body temperature returned to normal on day 2 or 3 of the disease
compared to day 4 or 5 in those treated with symptomatic drugs. The EKG changes
too were less pronounced in the patients given interferon. Interferon did not
produce side effects or complications nor did it prevent the formation of type-
specific antibodies.
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- 85 -

UDC 533.697

USSR

KOPELEV, S. Z., LIKHERZAK, YE. YE. and IEV, S. G.

"On the Computation of Parameters for a Lattice with Air Cooling"

Moscow, Gazoturbin. i kombinir. ustanovki (Gas-Turbine and Combined Installations, Collection of Works), 1971 (1972) pp 118-125, (from Referativnyy Zhurnal -- Mekhanika, No 4, 1973, Abstract No 4B368 by A. G. Plotkina)

Translation: In place of the ordinarily used estimate the flow irregularity with the value of the amplitude of the parameter variation, it is proposed to use the coefficient of irregularity, determined independently from two different conservation equations. Thus, for example, the average velocity could be determined from the equation of the content of motion $\bar{c}=I/G$, where $I = \int c\,dG$ and from the equation of kinetic energy flow $\tilde{c} = \left| \sqrt{2E/G} \right|$, where $E = \int c_z\,dG$.

Analogous expressions may be obtained for temperature and density from the state and flow-rate equations. On the basis of the work of Krokko (in the collection Osnovy gazovoy dinamiki [Fundamentals of Gas Dynamics], Moscow, Published by the Institute of Literature, 1963) two coefficients

$\alpha = \tilde{T}/\bar{T}$ and $\beta = (\tilde{c}/\bar{c})^2$ are used for evaluation of flow irregularity. Using these coefficients (neglecting the loss of quantities of motion, moments and

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USSR
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KOPELEV, S. Z., et al., Gazoturbin. i kombinir. ustanovki, 1971(1972) pp 118-125

mechanical energy at the outer limits) the authors obtained a full system of conservation equations. The values of coefficients alpha and beta are obtained for a flat nozzle lattice with distances from the output edge z greater than or equal to 4 mm from the processing of experimental data produced with this equation. The greatest deviation from unity of the values of these coefficients (occurring in uniform flow) are observed near the root of the blade with alpha equal to 0.89 and beta to 1.12. At the mean diameter, alpha equals 0.985 and beta 1.06. Nonuniformity of flow was also investigated beyond the flat lattice with an edge blown through the output edge of different quantities of coolant up to 5% of the basic flow. It was shown that up to a value of the cooling flow approximately equaling 2% a loss of ram pressure occurs; at large values, ram pressure increases as a result of the introduction of additional mass and energy.

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USSR   UDC 621.428.001.5

KOPELEV, S. Z., Engineer, GUROV, S. V., Engineer, and
AVILOVA-SHUL'GINA, M. V., Engineer

"Increasing the Cooling Effectiveness of the Inlet Edge of
Turbine Blades"

Abstract : The cooling effectiveness of turbine blades with air
passages in the inlet edge was experimentally investigated on
blades of two types: thin-walled blades with inserted deflector
and transversely arranged cooling air passages and blades with
a cast loop-like deflector in the hollow. The investigation re-
sults are discussed by reference to diagrams showing the input
-output characteristics and the cooling intensities of the in-
let edge and of all blade parts (inlet-, outlet-, and back ed-
ges) of both blade types. Possibilities to increase the cooling
intensity of the inlet edge of blades by air by-pass from the
edge inner hollow into the flow part of the turbine are analy-
zed. It is demonstrated that in cases where the available pres-

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USSR

KOPELEV, S. Z., et al, Teploenergetika, No 12, 1971, pp 38-41

sure differential in the cooling system permits a reliable air flow from the
inlet edge hollow into the flow part of the turbine, the by-pass of air rep-
resents an effective means of increasing the cooling intensity. Four illustr.,
three biblio. refs.

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Abstract: The heat exchange at the outer and inner surfaces of
the vanes of a turbine takes place in a field of centrifugal
forces. The purpose of this article is to settle the question
of the competence of extending the data acquired under static
conditions to the conditions of vane operation in turbines, as
well as the question of the criteria characterizing the effect
of the field of centrifugal forces on the heat exchange. Results
of theoretical and experimental work relating to these questions
are given in this article. The theoretical part of the work be-
gins with the equation of motion, taken from the system of equa-
tions describing the heat exchange process in a continuous, non-

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USSR

KOPELEV, S. Z., et al., Izvestiya Akademii Nauk SSSR - Energetika i Transport
No 4, 1971, pp 105-111

isothermic flow of an incompressible gas around the vane profile,
in terms of the centrifugal forces. The assumption is made that
the radial cooling channel in the vane is a tube of constant cross
section. The experimental work involved research into vanes with
transverse cooling channels; a table of the basic geometrical
characteristics for the vane lattice is given.

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KOPELEV, S. Z., GUROV, S. V., AVILOVA-ZHUL'GINA, M. V.

"Investigation of Heat-Exchange Processes in Cooled Gas Turbine Blades"

Translation: Data are given from an investigation of processes of heat exchange at the output edges of air-cooled gas turbine blades over a broad range of variations in Reynolds numbers on the air and gas side, and also in the temperatures of gas, air and turbine walls. It is shown that with a reduction in the Reynolds number calculated from the parameters of the gas in a narrow cross section of interblade channels (taking the chord of the blade as the characteristic linear dimension) of less than $0.5 \cdot 10^6$, the extent of the region of the laminar boundary layer on the profile of the cooled blade increases appreciably both on the convex and concave sides, and in the case of nondetached flow may extend right up to the outlet edge. Dimensionless heat-exchange relationships are given for the air and gas which can be used to determine the temperature of the outlet edge with precision satisfactory for practical purposes. Bibliography of nine titles.

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UNCLASSIFIED   PROCESSING DATE--09OCT70

1/3   015
TITLE--LIGHT SCATTERING INDICATRICES FOR SEA WATER, (INDICATRIX OF
SCATTERING FOR LIGHT IN SEA WATER) -U-
AUTHOR-(02)-VOYTOV, V.I., KOPELEVICH, O.V.

COUNTRY OF INFO--USSR

SOURCE--MOSCOW, DOKLADY AKADEMII NAUK SSSR, VOL 190, NO 4, 1970, PP
827-830
DATE PUBLISHED--------70

SUBJECT AREAS--EARTH SCIENCES AND OCEANOGRAPHY

TOPIC TAGS--SEA WATER, LIGHT SCATTERING, INDEX, INDICATRIX, MAP

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1993/1878   STEP NO--UR/0020/70/190/004/0827/0830

CIRC ACCESSION NO--AT0114326
UNCLASSIFIED

CIRC ACCESSION NO--AT0114326
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. IT IS STATED BY A. MOREL (ANN.
GEOPHYS., 21 (2), 1965) THAT IN TRANSPARENT WATERS THE ELONGATION OF THE
SCATTERING INDICATRIX BETA (GAMMA)-BETA (90) INCREASES WITH AN INCREASE
IN THE SCATTERING INDEX AT AN ANGLE 90DEGREES-(BETA(90)). IT HAS
POSTULATED THAT THE SCATTERING INDICATRIX FOR PARTICLES OF MARINE
SUSPENSIONS IS CONSTANT FOR ALL WATERS AND THAT THE OBSERVED DIFFERENCES
BETWEEN THE SCATTERING INDICATRICES FOR SEA WATER CAN BE ATTRIBUTED TO
CHANGES IN THE RELATIONSHIP BETWEEN MOLECULAR SCATTERING AND SCATTERING
BY SUSPENDED PARTICLES. A STUDY WAS UNDERTAKEN TO CHECK THIS HYPOTHESIS
BY ANALYZING THE SCATTERING INDICATRICES MEASURED IN THE NORTHERN PART
OF THE INDIAN OCEAN. THE 163 INDICATRICES WERE FOR TRANSPARENT WATER
(TRANSPARENCY 78 PERCENT). THEY ARE REPRESENTED BY SMOOTH CURVES
WITHOUT ANY LOCAL MAXIMA OR MINIMA SUCH AS ARE CHARACTERISTIC OF
SCATTERING INDICATRICES FOR MONODISPERSE SUSPENSIONS. THE CURVES
EXHIBIT APPRECIABLE DIFFERENCES, SIGNIFICANT IN THE REGION OF ANGLES
LESS THAN 70DEGREES AND COMMENSURABLE WITH THE EXPERIMENTAL ERRORS WHEN
GREATER THAN 70DEGREES. THERE WAS A SIGNIFICANT CORRELATION BETWEEN THE
CHANGES OF LOG BETA (GAMMA)-BETA (90) FOR ANY FIXED SCATTERING ANGLE FOR
THE REGION OF ANGLES 4-70DEGREES AND THE CHANGE IN THIS VALUE FOR AN
ANGLE OF 15DEGREES, SELECTED AS A REFERENCE LEVEL, AND THEREFORE LOG
BETA (GAMMA)-BETA (90) FOR AN ANGLE OF 15DEGREES CAN BE USED AS A
PARAMETER CHARACTERIZING THE FORM OF THE INDICATRIX. ALL CURVES WERE
DIVIDED INTO FOUR TYPES CORRESPONDING TO FOUR RANGES OF THE LOG BETA
(15)-BETA (90) VALUE.

CIRC ACCESSION NO--AT0114326
ABSTRACT/EXTRACT--TRANSITION FROM TYPE I TO TYPE IV IS ACCOMPANIED BY AN
INCREASE IN ELONGATION OF THE INDICATRIX AND A SIMULTANEOUS DECREASE IN
THE ABSOLUTE VALUE OF THE SCATTERING INDICATRIX AT 90DEGREES. THUS, THE
HYPOTHESIS OF A CONSTANCY OF THE SCATTERING INDICATRIX FOR SEA WATER
PARTICLES IS INCORRECT FOR THIS REGION. A MAP WAS CONSTRUCTED SHOWING
THE DISTRIBUTION OF TYPES OF SCATTERING INDICATRICES FOR THE NORTHERN
PART OF THE INDIAN OCEAN.   FACILITY: INSTITUTE OF OCEANOLOGY.

UNCLASSIFIED

UNCLASSIFIED   PROCESSING DATE--04DEC70
1/2   010
TITLE--T,ODD CORRELATION IN SIGMA PRIME0 YIELDS AE PRIME POSITIVE E PRIME
   NEGATIVE DECAY DUE TO FINAL STATE INTERACTION -U-
AUTHOR-(02)-KONDRATYUK, L.A., KOPELIOVICH, V.B.

COUNTRY OF INFO--USSR

SOURCE--YADERN. FIZ.: 11: 1080-6, MAY 1970

DATE PUBLISHED----MAY70

SUBJECT AREAS--PHYSICS

TOPIC TAGS--RADIOACTIVE DECAY, HYPERON, PARTICLE INTERACTION, NUCLEAR
   MAGNETIC MOMENT

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY FICHE NO----FD70/605020/010 STEP NO--UR/0367/70/011/000/1080/1086

CIRC ACCESSION NO--AP0141024
                        UNCLASSIFIED

CIRC ACCESSION NO--AP0141024

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE T ODD CORRELATION IS
CALCULATED IN SIGMA PRIMED YIELDS AE PRIME POSITIVE E PRIME NEGATIVE
DECAY BETWEEN THE POLARIZATION VECTOR OF LAMBDA (SIGMA) HYPERON AND THE
NORMAL TO THE DECAY PLANE, WHICH IS DUE TO THE FINAL STATE INTERACTION.
THE HYPERON POLARIZATION DUE TO THIS CORRELATION IS SIMILAR TO 10
NEGATIVE PRIME4 WHILE THE EXPERIMENTAL LIMIT FOR IT IS SIMILAR TO 10
NEGATIVE PRIME2. MEASUREMENT OF THE CORRELATION IN VIEW MAY BE IN
PRINCIPLE USED FOR A DETERMINATION OF THE MAGNETIC MOMENT OF THE SIGMA
PRIMED HYPERON.   FACILITY: INST. OF THEORETICAL AND EXPERIMENTAL
PHYSICS, MOSCOW.

UNCLASSIFIED

TITLE--BIOSYNTHESIS OF COENZYME A FROM PANTOTHENATE DERVIATIVES IN RATS
-U-
AUTHOR-(04)-ROZANOV, A.YA., SAVLUCHINSKAYA, L.G., ZHDANOVICH, YE.S.,
KOPELEVICH, V.M.

COUNTRY OF INFO--USSR

SOURCE--BIOKHIMIYA 1970, 35(1), 58-63

DATE PUBLISHED--------70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--ENZYME, BIOSYNTHESIS, CELL PHYSIOLOGY, MITOCHONDRION, VITAMIN
B COMPLEX, ADENOSINE TRIPHOSPHATE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1984/0839   STEP NO--UR/0218/70/035/001/0058/0063

CIRC ACCESSION NO--AP0055541
                    UNCLASSIFIED

CIRC ACCESSION NO--AP0055541

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. PANTOTHENATE ADMINISTERED
PARENTERALLY TO RATS INCREASED THE CONTENT OF COA IN ORGANS ONLY WHEN
ATP, CYSTEINE, THIAMINE, AND NICOTINATE WERE ADMINISTERED
SIMULTANEOUSLY. THE DEGREE OF COA BIOSYNTHESIS CORRELATED WITH
INCREASING DOSES OF ITS PRECURSORS AND OF THE VITAMINS AND WAS INCREASED
BY HYDROCORTISONE.   4-PHOSPHO-D-PANTOTHENATE AND ESP.
S-BENZOYL-D-PANTETHEINE AND 4-PHOSPHO-S-BENZOYL-D-PANTETHEINE WERE MORE
EFFECTIVE THAN PANTOTHENATE IN INDUCING COA SYNTHESIS, POSSIBLY DUE TO
THEIR CLOSER STRUCTURAL SIMILARITY TO THE COENZYME AND THEIR MORE RAPID
PERMEABILITY THROUGH THE BLOOD TISSUE BARRIERS AND THE CELLULAR AND
MITOCHONDRIAL MEMBRANES.

USSR   UDC: 669.017:539.42

IVANOVA, V. S., KUDRYASHOV, V. G., SHTOVBA, Yu. K. KOPELIOVICH, B. A., Moscow

"Fractographic Study of the Rupture Toughness of Aluminum and Titanium Alloys"

Kiev, Problemy Prochnosti, No 11, Nov 72, pp 25-30.

Abstract: An electron microscope study of the surface of a crack is performed
after cyclical deformations of various Al alloys and Ti alloys under pure
bending with constant and gradually increasing stress, pure circular bending,
repeated extension and cantilever circular bending. It is shown that the
dimensions of the pits on the crack surface near hard second-phase particles
correlate with the value of H_{T_s} (change in heat content of base of alloy with
changing temperature from room temperature to the melting point). It is also
established that the rupture toughness determined by the method of Ivanova and
Kudryashov, under conditions of cyclical loading at the critical fatigue stress,
is near the rupture toughness produced by the method of Irwin.

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KOPELYOVICH AI

Acc. Nr: *AP0043581*   Ref. Code: UR 0056

EFFECT OF ELECTRON COLLISIONS ON INTERBAND TRANSITIONS IN METALS

A. I. Kopeliovich

A kinetic equation for electrons in metals is derived which takes into account interband electron transitions, their mutual collisions and collisions with phonons. An expression for the high frequency electric conductivity tensor is obtained. Its analysis leads to the following results which are valid for arbitrary electron and phonon dispersion laws. 1) For light frequencies which are smaller than the photoconductive effect threshold interband transitions appreciably affect the electric conductivity. In particular an additional contribution to electron-phonon collisions appears which, in the far infrared region, is identical with the intraband interelectron collision contribution with respect to frequency dependence as well as order of magnitude. However, the temperature dependence is different. 2) In the vicinity of the photoconductive effect threshold collisions modify the frequency dependence of interband electric conductivity.

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A concrete calculation of interband electric conductivity is performed for metals described by the weak pseudopotential model. For polyvalent nontransition metals «interband» effective collision frequencies are calculated and expressions are obtained which define the shape and height of the photoconductive effect peaks. The results are compared with available experimental data. Possible causes of discrepancy between the experimental values of the photoconductive effect peak widths and those calculated here are discussed. For alkali metals it is shown that the «extra» absorption bands observed experimentally may be ascribed to indirect interband and to intraband electron transitions to regions in p space which are close to the Bragg planes. The shape of the «extra» band and the value of its long wave threshold are in good agreement with the experiments.

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USSR   UDC 669.715'884:539.4

KOPELIOVICH, B. A., LASHKOV, N. I., and OVECHKIN, B. I.

"Study of the Effect of Lithium on the State of Grain Boundaries and the
Character of Failure in Aluminum-Base Alloys"

Translation of Abstract: In Al-Li alloys at 100-500° Li enriches grain
boundaries. At 100° in Al-55% Li alloy the excess Li content along the
boundaries is 0.36%, at 400° 0.16%. With a rise in temperature from 100
to 550° and with Li content of the alloy remaining constant, the Li excess
along the grain boundaries declines and segregation thereof does not result
in intercrystalline embrittlement. The failure mechanism of Al-4% Cu-1%
Li and VAD 23 alloys has the character of transcrystalline shear. Failure
arises on particles of the intermetallides lined up inside grains, with the
formation of X-shaped cracks in the matrix. The fusion of these cracks
causes transcrystalline failure.
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KOPELIOVICH, E.S.

SESSION VII

VII-1a. APPLICATION OF THE METHOD OF CONTINUOUS WEIGHING FOR STUDYING THE ETCHING AND GROWTH PROCESSES IN THE Ga-AsCl$_3$-H$_2$ SYSTEM

A simple method of continuous weighing has been developed to investigate the etching rates of gallium and the growth of the epitaxial layer of GaAs. On completion of the period of saturation of the gallium with arsenic, the composition of the gas phase is changed sharply, and the gallium content in the gas flow under stationary conditions corresponds to the equilibrium above the solid gallium arsenide, and the arsenic content is determined by the amount of AsCl$_3$ introduced into the reactor. In contrast to the available published data it has been found that the growth rate of the GaAs layer is established in practice immediately with respect to completion of the saturation period. The nature of the experimental dependencies of the growth rate on the process parameters indicates that the growth of GaAs takes place in the diffusion-kinetic region. The temperature profile in the reactor was determined for which the radial gradients are diminished which cause uncontrolled nucleation of the GaAs on the reactor walls in the substrate zone. A study was made of the effect of the conditions of the growth process on the structure and the electrical properties of the unalloyed epitaxial layers of GaAs. The dislocation density in the layers grown under optimal conditions reached 8250 cm^{-2} at 300°K and 63,000 cm^2/v-sec at 77°K with a concentration of them of 3·10^{14} cm^{-3}.

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KOPELIOVICH, ES

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Layers of gallium arsenide grown in the Ga-AsCl$_3$-H$_2$ system were alloyed either by thermal evaporation of the impurity (Te, Zn) or by introduction of it in the form of a gaseous compound (H$_2$Se, (C$_2$H$_5$)$_2$Zn). The dependence of the carrier concentration in the layers on the admixture concentration in the gas phase was found. With an increase in the tellurium content, the growth rate of the layer drops almost to zero whereas the zinc practically has no effect on the growth rate. The use of diethyl zinc does not lead to worsening of the electrophysical parameters of the layers by comparison with the alloying by the method of thermal evaporation of zinc. The concentration of the carriers in the layers alloyed with tellurium and selenium is reduced in the direction of the gas flow whereas in the layers alloyed with zinc, the concentration of the carriers increases a little. This difference is connected with the difference in the coefficients of the vapor-crystal junction. According to the data of electrophysical studies, the degree of compensation of the donors in the layers alloyed with selenium is constant and close to 0.5. An increase in the tellurium concentration in the layer leads to an increase in the dislocation density and the number of growth pyramids. In the epitaxial layers alloyed with selenium with a carrier concentration of the type of 5·10^{18} cm^{-3}, either an increase in the dislocation density to 1·10^6 cm^{-2} or the appearance of specific microdefects was observed. At low alloying levels with selenium (< 5·10^{16}cm^{-3}) and in the entire range of alloying with zinc using diethyl zinc, the dislocation density in the layer is close to the dislocation density in the substrate; the morphology of the layers does not change.

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USSR   UDC: 620.179.15

YAKOBSON, A. M., LEONOV, B. I., KANTER, B. M., and KOPELIOVICH,
M. Kh.

"Comparative Experimental Estimate of Various Visual X-Ray Intro-
scopic Systems Using Electronic Devices"

Sverdlovsk, Defektoskopiya, No. 4, 1970, pp 137-139

Abstract: The authors of this brief communication, members of the
Scientific Research Institute of Introscopy, discuss the labora-
tory model of the RIUS UM-92 Introscope, and offer indices by
which this instrument can be compared with the RTI, an x-ray
television introscope with a monocrystalline screen, described in
an earlier article by the first-named author in collaboration with
K. M. Dzhgalyan (Zavodskaya laboratoriya, 1962, No. 5). The RIUS
UM-92 described in the present article is also an x-ray introscope
with a monocrystalline screen, and uses an electron-optical light
amplifier of the UM-92 type. A simple diagram of the instrument
given in this article shows that the radiation from an x-ray source
is projected through the specimen under examination onto the mono-
crystalline screen, the x-rayed image being converted to a light
image by the screen and then put through the light amplifier and
a telescope to the observer's eye. A third instrument containing
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Instrumentation and Equipment

USSR

UDC: 621.791.052:620.178.7.05

KOPEL'MAN, L. A., SAIDOV, G. I.

"Installation for Determination of Mechanical Properties of Metal in Various Zones of a Welded Seam During Rapid Deformation over a Broad Range of Low Temperatures"

Moscow, Zavodskaya Laboratoriya, No 11, 1972, pp 1389-1393.

Abstract: The authors have developed a test installation consisting of a vertical frame with a dropping weight of 30 kg. The dropping height is up to 2000 mm, providing for application of tensile stresses at up to 6 m/sec. Particular attention was given to the production of a high-quality recording of the loading curve and to achievement of even distribution of temperature over the specimen. The dynamometer is in the upper clamp of the specimen holder, since the specimens used are too small (9 mm long, 1.2 mm diameter) for direct application of strain guages. The errors of the device are estimated and a diagram is presented of the system used to cool the specimens.

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USSR   UDC 620.172.251.12

DEYCH, A. SH., KOPEL'MAN, L. A., KOROTKIN, V. V., Leningrad Polytechnical
Institute imeni Kalinin

"Determining the Parameters of the True Stress-Strain Diagram in the Tempera-
ture Range From +25 to -196°C"

Abstract: The parameters of the true hardening curve in the temperature range
from +25 to -196°C were determined for VMSt. 3sp steel with a grain size of
5.5. The chemical composition of the steels is 0.17% C, 0.46% Mn, 0.15% Si,
0.05% Cr, 0.09% Ni, 0.17% Cu, 0.029% S and 0.017% P. The calculated values of
the true stresses and deformations for all samples tested are graphed. It is
shown that over the entire temperature range studied the power relationship
for the strengthening law is maintained and the parameters of the true stress-
strain diagram can be determined by the method used. The effect of scale
appears only in the deformation strengthening index, where in testing samples
of diameter 1.2 and 5 mm, there appeared some increase in the deformation
strengthening index for samples of the larger diameter.

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USSR

UDC 616.988.25-092.4-085.373.3

AZADOVA, N. B., ZHDANOV, V. M., KOPEL'MAN, R. N., and GAVRILOV, V. I., Institute of Virology imeni D. I. Ivanovskiy, Academy of Medical Sciences USSR, Moscow

"Virological Characteristics of Infection in the L Cell-Sindbis Virus System in the Presence of Antiviral Serum"

Abstract: Persistent infection in the L-SV system (multiplicity of infection 0.01 PFU/cell) in the presence of 0.5% of specific antivirus serum was characterized by alternating phases of degeneration and proliferation during the first three passages, with virus and hemagglutinin present in the culture medium. During the remainder of the 90-day long period of observation, proliferation predominated, the hemagglutinin titer fell to a low level, and the virus was frequently absent. This suggested marked inhibition of virus synthesis. However, immunomorphological investigations revealed active synthesis of two structural proteins of Sindbis virus -- ribonucleoprotein and lipoprotein membrane antigen -- in 70% of the cells. It is concluded that a persistent infection which causes cellular exhaustion does not arrest synthesis of virus proteins but only prevents the viruses from aggregating and leaving the cells. The infection is transmitted from one passage to another by daughter cells

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AZADOVA, N. B., et al., Voprosy Virusologii, No 5, Sep/Oct 72, pp 520-523

which acquire the virus during cell division. It is possible that defective viruses develop during the process, which are able to survive in the cells but unable to leave them.

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1/2   017   UNCLASSIFIED   PROCESSING DATE--02OCT70
TITLE--A STUDY OF THE ACTIVITY OF ANTILYMPHOID SERA IN THE CULTURE OF
LYMPHOCYTES IN THE PERIPHERAL BLOOD OF MAN -U-
AUTHOR-(04)-GOVALLO, V.I., GRIGORYEVA, M.P., KOPELYAN, I.I., KOSMIADI,
G.A.
COUNTRY OF INFO--USSR

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CIRC ACCESSION NO--AP0106325
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE ACTIVITY OF DIFFERENT
HETEROLOGOUS ANTILYMPHOID SERA WAS STUDIED IN THE CULTURE OF HUMAN
LYMPHOCYTES IN VITRO. IT IS SHOWN THAT DIFFERENT IMMUNE ANTISERA HAVE
THEIR CHARACTERISTIC SPECTRUM OF ACTION IN THE MONOCULTURE OF
LYMPHOCYTES, MANIFESTING IN A VARYING DEGREE THE LEUKOAGGLUTINATING,
CYTOTOXIC AND BLAST TRANSFORMING EFFECT. IN A MIXED CULTURE OF
LYMPHOCYTES ANTILYMPHOID SERA CAUSED BOTH STIMULATION AND INHIBITION OF
THE REACTION OF BLAST TRANSFORMATION IN COMPARISON WITH THE REACTION OF
NATIVE LYMPHOCYTES.

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Acc. Nr.:   AP0031628   Ref. Code: UR 0219

PRIMARY SOURCE: Byulleten' Eksperimental'noy Biologii i
                  Meditsiny, 1970, Vol 69, Nr 1, pp 80-83

A STUDY INTO REACTIVITY OF LYMPHOID CELLS CULTURE OF THE HUMAN FETUS IN VITRO

Govallo, V.I.; Grigor'yeva, M.P.; Kopelyan, I.I.

Central Scientific-Research Institute of Traumatology and Orthopedics

The ability of the thymic and splenic cells of 16—28 week old human fetuses to undergo morphological transformation in a mixed culture and under the effect of non-specific stimulators of blastogenesis was studied. As evidenced, the intensity of the blast-transformation reaction in a mixed lymphocyte culture of adults was directly related to the degree of antigenic distinctions of the cells cultivated. In a mixed culture and in the presence of stimulators the embryonal splenic cells underwent differentiation identical to that in lymphoid cells (lymphocytes, thymocytes) of adults. Thymic cells in fetuses of the same age were unable to undergo morphological transformation in similar experimental conditions.

REEL/FRAME

19691755

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TURYANITSA, I. D., KOPERLES, B. M., SLIVKA, V. YU., and CHEPUR, D. V.

"Synthesis and Certain Electrophysical Properties of Indium Chalcoiodides"

Translation: The compounds InSI, InSeI, and InTeI were synthesized by direct interaction of the initial components according to the scheme: $2A^{III} + 2B^{VI} + C_2^{VII} \rightleftarrows 2A^{III}B^{VI}C^{VII}$. The method of producing crystals is described and the parameters of their lattices are presented. The optical transmission and photoconductivity spectra of the crystals obtained were investigated. All compounds have an energy gap of more than 2 ev and possess photosensitivity in the region of the long-wave fundamental absorption edge. At 20° C the specific electrical conductivity of the crystals is $10^{10} \div 10^{11}$ ohm·cm. The temperature dependence of electrical conductivity, permittivity, and energy gap reveal no anomalies in the temperature range from -150 to $+50^\circ$C, which obviously indicates that there are no phase transitions in the given temperature region in the compounds obtained.

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USSR   UDC 539.3

KOPERNIK, G. R. , PETROV, V. V.

"On One Method for Solving Problems in the Theory of Flexible Hollow Shells"

V sb. Raschet. prostranstv. sistem stroit. mekh. (Calculation of Three-
Dimensional Systems in Structural Mechanics -- Collection of Works), Saratov,
Saratov University, 1972, pp 12-17 (from RZh-Mekhanika, No 3, Mar 73, Abstract
No 3V144)

Translation: A method is given for calculating flexible hollow shells that
is based on the simultaneous application of the Bubnov-Vlasov and Bubnov
methods.   The Bubnov-Vlasov method is applied to find the force function and
the Bubnov method is used to find the displacement function. The initial
system of partial differential equations, as a result of applying the proposed
technique, reduces to a system of ordinary differential equations and to a
system of nonlinear algebraic equations for which methods of the solution are
sufficiently well developed. A shell that is square in plan and loaded uni-
formly by a distributed pressure is used as an example. From an analysis of
the solutions and a comparison of the results with the data of other authors,
it was possible to conclude that a computational accuracy applicable for
quantitative evaluations is achieved under a single-term approximation of the
displacement function. 5 ref. V. B. Silkin.

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USSR   UDC 539.3

KOPERNIK, G. R., ZOLOTNITSKIY, Yu. S.

"Certain Problems in the Application of the Modified Vlasov-Kantorovich
Method to a Study of Hollow Panels"

V sb. Raschet prostranstv. sistem v stroit. mekh. (Calculation of Three-
Dimensional Systems in Structural Mechanics -- Collection of Works), Sara-
tov, Saratov University, 1972, pp 32-37 (from RZh-Mekhanika, No 3, Mar 73,
Abstract No 3V150)

Translation: The application of the Bubnov-Vlasov variational method for
studying deformations and forces in hollow shells under the action of static
loads is discussed. If the approximating functions by means of which the
solutions sought is represented do not satisfy the static boundary condi-
tions, it is proposed that the appropriate boundary conditions be satisfied
not integrally at the boundaries to the panel but in individual points of
the contour. It is shown that one can obtain a more exact solution of the
problem in this case if the points of collocation on the contour are selected
correctly. In selecting the appropriate points of collocation, it is proposed

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