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SOLUKhIN, R. I., YaKOBI, Yu. A., and KOMIN, A. V., Institute of Theoretical and Applied Mechanics, Siberian Branch of the Academy of Sciences of the USSR

"Discussion of Some Results of the Calculations"

Opticheskiye Kharakteristiki Vodorodnoy Plazmy, Novosibirsk, "Nauka" (Siberian Branch), 1973, pp 40 - 48

Abstract: The special characteristics obtained are based on modern theoretical concepts and do not require extensive commentary. A few interesting results may be noted. At a temperature of 0.6 electron volts the Doppler mechanism begins to predominate for the Lα and Lβ resonance lines at 1 atmosphere and for the Lα lines at 10 atmospheres because of the low electron density at this temperature and the deep locations of the levels corresponding to these lines. At 10 and 20 atmospheres, the lines are clearly visible against the background; at high temperatures they become narrower again because of the reduced electron density.

Although much energy is in the Lyman lines and continuum, self-absorption reduces radiation in these regions quite strongly, particularly at low temperatures.

The lines of the Balmer and Lyman series tend to fuse even at relatively low quantum numbers. There is some question about the boundary between discrete,

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continuous spectra and the relative displacement of this boundary due to Coulomb interactions and the smearing of lines as a result of transitions from high energy levels. The authors' calculations show that the spectral lines begin to fuse significantly earlier than the Coulomb "trimming" of the discrete spectrum.

In addition to the spectral curves, the authors calculated integral energy losses for hydrogen plasma over the range of parameters used. Special calculations were made to relate their work to that of D. B. Olfe, reported in J. Quant. Spec. Rad. Trans. 1,104, 1961, and satisfactory agreement was found.

The use of lasers to probe plasma requires quantitative information about the relationship between transparency and plasma temperature and density. These calculations were performed in two ways, assuming constant pressure and at a given initial particle density. The first procedure is necessary because the plasma has significant absorption only at relatively high pressures, yielding a condition without significant pressure gradients, but with high temperature and density gradients as the plasma is forced against the walls. Although there is an overall tendency toward absorption at longer wave lengths, there are anomalies due to the existence of strong absorption lines which are more or less active, depending on pressure and temperature. The second form of calculation

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is more appropriate when the laser beam is directed along the long axis of the plasma chamber, as well as in evaluating the transparency of a plasma under laser heating.

PHYSICS

Electricity & Magnetism

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KOMIN, A. V., LOBANOV, K. M., and USTYUZHANINOV, V. G.

"Effect of an Electric Field on Particle Movement in a Stellarator"

Leningrad, Zhurnal Tekhnicheskoy Fiziki, Vol 40, No 7, 1970, pp 1,346-1,350

Abstract: The equipotential surfaces of the electric field in question in this article coincide with the magnetic surfaces of the stellarator. The method followed by the authors in making their calculations is to solve, by the Runge-Kutta method, the system of differential equations describing the motion of charged particles in the electric and magnetic fields. These equations are given in vector form. Since the exact analytic expression for the magnetic surfaces is unknown, the averaged magnetic surfaces experimentally corrected in the separatrix region to reduce the divergence between the true and equi-potential magnetic surfaces are used. The results of the computations indicate that the electric field strongly affects the particle trajectories. The authors express their gratitude to R. Z. Sagdeyev and A. A. Galeyev for thier useful comments.

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"The Continuum"

Opticheskiye Kharakteristiki Vodorodnoy Plazmy, Novosibirsk, "Nauka" (Siberian Branch), 1973, pp 23 - 29

Abstract: Continuous spectra are generated by transitions to, from, or within the unbound ("free") state. At temperatures below 5000 degrees these represent free atoms (the total continuous radiation is small) while at higher temperatures free electrons are a primary radiation mechanism. At electron temperatures much less than 500 ev a semiclassical treatment is appropriate, yielding the so-called Kramer's formulas with the Gaunt factor as a quantum mechanical corrective. A formula for recombination radiation can be obtained by applying Kirchhoff's law for local thermal equilibrium to the formulas for photo-ionization absorption. This radiation is characterized by significant intensity close to the line series and an exponential decay in the direction of short waves. Bremsstrahlung extends indefinitely in the direction of long waves. The ratio of these two effects can be calculated for a given temperature and frequency. Another factor is so-called multi-quantum recombination occurring as a result of triple recombination. In a nonequilibrium plasma this can substantially influence the distribution of electrons in levels and the number of free electrons, but in an equilibrium plasma a

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Boltzmann distribution in the levels is established, uniquely determined by temperature equilibrium. At fairly high pressures and temperatures below 10,000°K a significant role is played by the formation of negative hydrogen ions, accompanied by radiation. At still lower temperatures continuous molecular spectra appear. There is also the so-called quasi-molecular continuum, which is due to the transition of a hydrogen molecule from an initial unstable state (occurring as the result of a collision between atoms with parallel spins) to a stable state.

In addition to the true continuum, there are quasi-continua, resulting from the overlapping of large numbers of broadened lines. These occur as various bands. At temperatures below 1000°K induced rotational transitions are significant; although the radiation of gases at low temperatures is very low, the coefficient of absorption is quite significant.

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"Spectral Lines"

Opticheskiye Kharakteristiki Vodorodnoy Plazmy, Novosibirsk, "Nauka" (Siberian Branch), 1973, pp 16 - 23

Abstract: Three factors determine the nature of spectral lines: population, transition probability, and form of the line. Although many processes contribute to population distribution, collision with electrons and spontaneous radiation are usually dominant. At low plasma densities secondary collisions can be ignored and radiative transitions are dominant, while in dense plasmas nonradiative de-excitation predominates. When the electron density becomes sufficiently high, radiation intensity becomes independent of it; the plasma becomes a Boltzmann radiator.

Spectral lines from a plasma are all broadened as a result of interaction with fluctuating internal microfields. The extension can be considered in terms of two components; one described as the result of a linear Stark effect due to the interaction of ions with other, relatively slow ions, and the other due to collision broadening (also with a Stark effect component) from interactions with faster-moving electrons. The electron effect is most significant at the center of the broadened line; the statistical effect at its edges. The center is also somewhat displaced

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from what would be obtained from an isolated atom. Although theoretical calculations for the edges of the broadened line show good agreement with experiments, computations for the central portion are considerably less satisfactory. In this area the authors base their work on a theory developed by Sobel'man, extended to cover also broadening due to collisions with other particles.

When the concentration of charged particles is low, Doppler broadening becomes significant. The integral expression for combined Doppler and dispersion broadening is not in finite form, so that calculation by approximation method is required.

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"Method of Performing the Calculations"

Opticheskiye Kharakteristiki Vodorodnoy Plazmy, Novosibirsk, "Nauka" (Siberian Branch), 1973, pp 33 - 39

Abstract: Five mechanisms were considered in the computer programs used: 1) bound-bound electron transitions (linear radiation from atoms); 2) free-free and free-bound electron transitions in the field of protons (the H continuum); 3) free-free and free-bound electron transitions in the field of atoms(H^- continuum); 4) free-free and free-bound proton transitions in the field of atoms (the H^+_2 continuum); 5) continuous radiation of quasi-molecular hydrogen (H^{quasi}_2 continuum). Previous studies have lumped line spectra in two or three groups. The present work considers all transitions between discrete levels in the hydrogen atom that realistically exist in the plasma. Within the limits of the parameters chosen, this number varies from less than 10 to several tens of levels; the number of spectral lines is proportional to the square of this number. Each line is considered in its broadened form. The results are presented on a wave scale. Variable step sizes are used to keep the calculation error approximately constant over the entire spectrum. Step sizes were based on relative values of the derivative

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of spectral intensity, except where the contribution of the maximum line was less than 1/10 the background radiation, where the step size was based on the continuum. In each step the calculation of step size was based on the line making the strongest contribution, rather than the line with the nearest center.

The program was written in ALPHA, a modification of ALGOL. Calculations were performed at the computer center of the Siberian Branch, Academy of Sciences of the USSR.

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SOLUKhIN, R. I., YaKOBI, Yu. A., and KOMIN, A. V., Institute of Theoretical and Applied Mechanics, Siberian Branch of the Academy of Sciences of the USSR

"Energy Structure of the Hydrogen Molecule"

Opticheskiye Kharakteristiki Vodorodnoy Plazmy, Novosibirsk, "Nauka" (Siberian Branch), 1973, pp 12 - 14

Abstract: Quantum mechanical analysis shows that the diatomic hydrogen molecule is not stable unless the ends of the two electrons are in an antiparallel orientation. Although the two electrons of the molecule can be in various energy states, they are within an axially symmetric field whose axis of symmetry is the line connecting the two nuclei. In this case what is significant is not the absolute value of the orbital moment but its projection on the axis $\lambda\hbar$, where $\hbar$ is Planck's constant and λ is a quantum number similar to the magnetic quantum number m in atoms.

In addition to the electron degrees of freedom, the molecule has oscillatory and rotational degrees of freedom. For each characteristic electron state, there is a set of discrete oscillatory states, which can be obtained as the solution of Schroedinger's equation for a harmonic oscillator. Consideration of non-harmonic oscillations leads to a more complex expression. Rotation is also

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characterized by a discrete selection of energy states, describable in terms of the rotational quantum number, the molecular constant, and a coefficient which characterizes the relationship of rotation to oscillation (nonrigidity of the rotator). Since the hydrogen molecule does not have a constant dipole moment, it cannot in isolation have oscillatory and rotational transitions, but in a real gas this prohibition is removed because of induced electric dipole moments occurring in collisions. Although any transition can occur, transitions of ± 1 are most common. For electron-oscillatory spectra, the relative probability of various transitions is determined by the Franck-Condon principle.

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"Total Radiation from Hydrogen at Temperatures Below 10,000 Degrees"

Opticheskiye Kharakteristiki Vodorodnoy Plazmy, Novosibirsk, "Nauka" (Siberian Branch), 1973, pp 29-33

Abstract: Calculating the radiational characteristics of gases at relatively low temperatures requires primarily consideration of molecular radiation. Detailed calculations for this were made by Olfe in 1961. For a thin layer of plasma in which self-absorption can be ignored, radiation from rotational transitions predominates up to 1000°; that from oscillation-rotational transitions between 1000 and 5000°. At higher temperatures negative hydrogen ions and positive molecular ions appear, the former more significant by an order of magnitude from 3000 to 10,000°K. At higher temperatures linear radiation becomes significant. When the plasma is of significant density and thickness, the results must be adjusted to account for the varying degrees of absorption at different frequencies and by different mechanisms.

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"Energy Structure of the Hydrogen Atom"

Opticheskiye Kharakteristiki Vodorodnoy Plazmy, Novosibirsk, "Nauka", (Siberian Branch), 1973, pp 9-12

Abstract: Schroedinger's equation yields solutions only for negative values of E for which

$$E_n = -\frac{2\pi^2 me^4}{h^2 n^2} = \frac{Rh}{n^2},$$

where n is a whole number and R is the Rydberg constant. m must be replaced by $\frac{mM}{m+M}$,

where m is the mass of the electron and M is the mass of the nucleus, to account for movement of the nuclear mass. Relativistic generalization of Schroedinger's equation requires that azimuthal quantum numbers be considered in addition to the primary number n. In the presence of an external field, the

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magnetic quantum number must also be considered (Zerman effect). However, not all transitions described by this scheme are found in spectroscopic observation. According to quantum mechanics, the following types of optical dipole transitions are possible: change in azimuthal quantum number = $\pm$ 1; change in magnetic quantum number = 0 $\pm$ 1; change in m = 0; change in internal quantum number ($\left|\right.$ azimuthal $\pm$ m_s $\left|\right.$) = 0 $\pm$ 1.

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"The Composition of Hydrogen Plasma"

Opticheskiye Kharakteristiki Vodorodnoy Plasmy, Novosibirsk, "Nauka" (Siberian Branch), 1973, pp 5-9

Abstract: A plasma of pure hydrogen can contain ten different kinds of particles -- H_2 and H_3 molecules, positive and negative ions of these molecules, atoms, positive and negative ions of the atoms, and free electrons. Diagrams are given to show the relative contribution of each of these particles as a function of temperature and pressure. The law of mass action gives the relative amounts of large particles and their breakdown products as functions of the degrees of freedom of each such component. There are four types of freedom: electron, oscillatory, rotational, and translational. The product of the first three is the statistical sum of internal degrees of freedom, called the statistical weight of the particle. There are formulas for finding each of these as the sum of a series in terms of energy of excitation, electron level, natural oscillation frequency, oscillatory quantum number, and other factors. Translational freedom can also be expressed in terms of mass and relative volume.

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Since dissociation and ionization ordinarily begin at temperatures significantly below the corresponding binding energy, because of the high statistical sum of the free state, in the majority of cases only the basic electron term need be considered and the unharmonic nature of hydrogen molecule oscillations can be ignored. Several studies have determined ionization energy in a plasma and its reduction due to the total electric field of charged particles around the atom, particularly Ecker and Kroell (1963). The thermodynamic calculations of plasmic composition made in the present work yielded results close to those obtained by Patch in 1969.

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"On the Thermodynamics of Radiation"

Opticheskiye Kharakteristiki Vodorodnoy Plazmy, Novosibirsk, "Nauka" (Siberian Branch), 1973, pp 14-16

Abstract: The primary obstacle to establishing equilibrium in a system including radiation is the loss of energy by radiation outside the system. An excited particle can lose energy either through a damping collision or by spontaneous radiation. If there is any significant ionization, the majority of collisions are with electrons. Thus, given the damping collision cross-section of the particle and its radiational lifetime (considering also stimulated emission), the relative probabilities of damping and radiation can be calculated. If damping is more probable, local thermodynamic equilibrium may be established. Overall equilibrium will depend on the volume absorption coefficient and the relative probability of damping. The calculations for absorption must consider re-radiation, so that "absorption" implies a sufficient number of collisions to make the probability of damping high. If this total path length is much greater than the dimensions of the volume, the result is 1/3

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volume radiation; if it is much less, surface radiation. Equilibrium radiation of a surface plasma radiator is equivalent to that of an absolute black body and is referred to as Planck radiation. Volume equilibrium in the sense of local thermodynamic equilibrium yields so-called Boltzmann radiation, since the nature of the radiation is determined by the Boltzmann distribution of electrons in levels. While a special form of Kirchhoff's law applies to the latter case and the black body radiation is determined from Planck's formula, nonequilibrium radiation can be analyzed only by solving an enormous system of kinetic equations, since nature depends on the probabilities of a large number of elementary processes.

In a moderately dense plasma local thermodynamic equilibrium is the most probable state; it is sufficient for the probability of collision processes to exceed the probability of radiation processes by an order of magnitude. In fact, the rigidity of this condition for a resonance transition with maximum probability of spontaneous radiation can be significantly reduced in the majority of real cases by the trapping of radiation in the optically dense plasma. Since most experimental installations produce a plasma for a short time, it is necessary to verify that the time to establish equilibrium is brief in comparison with the time to establish a quasi-stable state. This can be

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done by considering the slowest process, the relaxation of the resonance level. Under experimental conditions, radiation scattering (primarily Thomson scattering) is ignored, since the mean free path is very long; under actual physical conditions, this factor may be important.

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Opticheskiye Kharakteristiki Vodorodnoy Plazmy (Optical Characteristics of Hydrogen Plasma), Novosibirsk, "Nauka" (Siberian Branch), 1973, 82 pp

Abstract: Results are given from detailed calculations of the special characteristics of hydrogen plasma over a wide range of parameters, considering all significant radiation mechanisms. The material on the computation is preceded by a brief systematic summary of information about the hydrogen atom and molecule and the composition and thermodynamic and gas dynamic properties of the hydrogen plasma. Radiation processes are covered in detail, including radiation from nonisothermic plasma, which requires simultaneous consideration of radiation and thermal conduction. In this connection, the results of the calculations are discussed, recommendations for their practical use are made, and some questions of the diagnostics of hydrogen plasma are examined.

This material will be useful to a broad group of engineer-physicists and graduate students and students in senior courses specializing in spectroscopy, plasma physics, astrophysics, and physical gas dynamics.

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SOLUKhIN, R. I., YaKOBI, Yu. A., and KOMIN, A. V., Institute of Theoretical and Applied Mechanics, Siberian Branch of the Academy of Sciences of the USSR

"Optical Diagnostics of Plasma"

Opticheskiye Kharakteristiki Vodorodnoy Plazmy, Novosibirsk, "Nauka" (Siberian Branch), 1973, pp 48-55

Abstract: Plasma characteristics (primarily the concentration and temperature of various components) are determined from active and passive optical analysis. Passive methods, in which the plasma is illuminated by external sources, have the advantage of causing less perturbation to the plasma than other sampling techniques, although nonlinearities must be considered when such strong light sources as lasers are used.

The most developed methods are based on measurement of radiative and absorptive properties, although measurements of the index of refraction are also used. Due to the complexity of optical processes in a plasma, the most widely used method is to begin with rough measurements based on one of the basic radiation mechanisms and proceed to more detailed analysis. Although in some particularly clear situations this method is expedient, there are many cases in which the preliminary determination of the primary mechanism is quite

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difficult or even meaningless. In addition, the overwhelming majority of these methods assume an optically rare plasma; when self-absorption must be considered, this analytical approach leads to very complex expressions. A more general approach, ignoring only those components whose contribution is obviously unimportant, is clearly necessary. The use of computer calculations over a broad range of parameters provides this more general approach, serving as a "mathematical experiment" to relate the results of different studies and serve as a guide for future research.

The index of refraction is the foundation of another group of methods, primarily interferometry and Schlieren methods. These methods can determine the density and density gradient of a single type of particle when this type has primary influence on the effects of refraction. The relative sensitivity of these two methods depends on the effective radius of the plasma formation, the diameter of the focal point, the focal length of the lenses used in the Schlieren method, and the wave length of light employed.

Primary attention is currently on the use of infra-red and x-ray-probe wave lengths. Infra-red is particularly sensitive to the charged particle components, including the electron continuum. Passive x-ray diagnosis can be used in determining parameters of a high-temperature plasma along the discharge

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axis.

As a rule, the diagnostic methods produce information about the plasma in a given element of the volume at a specific moment in time. Local discrimination is achieved usually by using the Abel transform and assuming axial symmetry of the plasma formation. Time discrimination is achieved by using various types of time scanning. Optical analysis of hydrogen plasma is characterized by four specific factors: 1) absence of a constant dipole moment; 2) relatively high availability of electrons, so that the continuum in the initial stages of ionization is determined primarily by radiation related to negative ions; 3) the Stark effect as a primary determinant of the spectral line broadening; 4) complete ionization at high plasma temperatures.

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"The Role of Hydrogen Plasma Radiation in the Problem of Thermonuclear Fusion"

Opticheskiye Kharakteristiki Vodorodnoy Plazmy, Novosibirsk, "Nauka" (Siberian Branch), 1973, pp 73-76

Abstract: In the majority of thermonuclear installations radiation is the primary source of heat loss, since the times involved are too short for convection losses (particularly when viscosity is increased by a magnetic field), and conductive heat loss can be ignored when the plasma is separated or distant from the walls. For a deuterium-tritium plasma the necessary conditions can be achieved at temperatures over 5 kev, while for pure deuterium they cannot be achieved at all unless the magnetic field is used only for thermal insulation, not retention of the plasma, or measures are taken to reduce radiation loss (use of an optically thick plasma or radiation-reflecting walls).

Quantitative information about radiation capacity of the plasma makes it possible to determine the minimum power of a steady-state reactor and the minimum temperature of its center in the general case of combined heat transfer

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and radiation losses. Assuming the plasma is not separated from the wall and its lifetime is not limited by instabilities, the zone of maximum brightness will be a hollow cylinder at a temperature of several electron volts. Calculations indicate a minimal temperature of about 7 kev at the center of a reactor without magnetic field, using a 50% deuterium-tritium mixture. The dimensions of such a reactor must be on the order of several kilometers and the heat loads on its walls must greatly exceed the capacity of modern materials.

Calculations show that an equilibrium reactor with a magnetic field would not produce energy at the center sufficient to compensate losses at the exterior due to the poor heat transfer properties of the magnetized plasma and that reflecting shells would be difficult to obtain, since most of the radiation is in the form of x-rays.

Since continuous operation is apparently impossible, attention is currently focused on various short-term processes. One main line of research involves the use of relatively long laser pulses for supplementary heating of plasma in various magnetic containment devices, while a second line is directed toward the use of very short-powerful laser pulses to bring targets

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to the threshold of useful fusion without auxiliary containment. Unfortunately laser efficiencies at the wave length needed for this second process are very low. There is also work being done on combined fusion-fission mechanisms, using the fusion to produce additional neutrons for improved fission output.

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"Radiation of a Quasi-Equilibrium Hydrogen Plasma, Considering Conductive Thermal Conductivity"

Opticheskiye Kharakteristiki Vodorodnoy Plazmy, Novosibirsk, "Nauka" (Siberian Branch), 1973, pp 59-61

Abstract: Only conductive and radiant heat transfer are considered in this book, although convective transfer is important in a number of cases, because convective heat transfer has not been adequately studied, either theoretically or experimentally. There are, however, many cases in which convective transfer does not occur.

The relative contributions of radiant and convective heat transfer for a plasma without interior directed velocities can be determined from the differential equation of radiation transport and the law of energy conservation. If the absorbed energy is much less than the radiated energy, the system of descriptive equations can be reduced to two equations; an expression for heat transfer which determines the state of matter throughout the entire volume, and an expression of radiation transfer which can be used to find the spectral density of radiation. This occurs in an optically thin system without external

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radiation flows. A similar separation can be obtained if the absorbed energy is greater than the radiated energy, but the total absorption of the radiation flow throughout the entire volume is less than the flow of energy related to heat transfer and is thus incapable of changing the temperature distribution. Truly radiative transfer states also exist, described by the so-called diffusion or radiant heat transfer approximations. Although the assumption that radiant heat transfer exceeds conductive transfer is correct in the overwhelming majority of cases, there is a region in which this is not true.

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"Radiation of a Nonisothermic Plasma. Transfer Coefficients"

Opticheskiye Kharakteristiki Vodorodnoy Plazmy, Novosibirsk, "Nauka", (Siberian Branch), 1973, pp 55-58

Abstract: In the presence of a substantially nonisothermic plasma, radiation transfer is described with the aid of special coefficients, calculated, in turn, from the spectral characteristics of isothermal plasmas. In an optically thin layer, the divergence of radiation flow can be described by using modified Planck coefficients, while an optically dense plasma is described by Rosseland's equation. In the general case of arbitrary optical density, the radiation transfer is computed by using the so-called modified emission capacity. Although the calculations are simpler for extremely thin plasmas in which lines predominate or extremely thick plasmas in which the continuum is dominant, real situations usually require dealing with the more complex calculations of intermediate cases.

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"Laser Heating of a Plasma"

Opticheskiye Kharakteristiki Vodorodnoy Plazmy, Novosibirsk, "Nauka" (Siberian Branch), 1973, pp 69 - 72

Abstract: Laser heating is one of the proposed methods of attaining a controlled thermonuclear reaction. The necessary conditions are the opposite of those necessary for optical analysis without perturbation. There are varying difficulties in this process. At low temperatures, there are many energy-absorbing transitions to be passed through, and radiation losses begin to be significant as the plasma is heated. At higher temperatures, effective heating is also reduced by the increase in transparency of the plasma. The heating must be rapid to prevent loss of heat to the walls and the development of instabilities. Use of a solid or liquid target, although it requires additional energy for melting and evaporation, makes attainment of the Lawson criterion easier because of the high initial plasma density; if evaporation takes place from all sides simultaneously, a significant compression factor can be added.

At thermonuclear temperatures, only inverse bremsstrahlung is effective for heating. For plasmas of moderate density (less than or equal to $10^{19}cm^{-3}$),

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infra-red lasers are significantly more effective, but short-wave lasers are most effective for heating solid targets. The decrease in the coefficient of absorption at very high temperatures may be compensated by the inverse cyclotron effect. Heat absorption may also be increased by several new types of non-linearities that have recently been reported.

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"Gas Dynamic Properties and Elements of Radiation Gas Dynamics"

Opticheskiye Kharakteristiki Vodorodnoy Plazmy, Novosibirsk, "Nauka" (Siberian Branch), 1973, pp 61-69

Abstract: In many cases, gas dynamic properties of plasmas must be considered along with radiative properties. The authors arbitrarily distinguish two thermodynamic regions: a) temperature less than 10 electron volts and pressure less than 1 atmosphere -- radiation is not blocked and the pressure of the photon gas may be ignored; b) a "black" plasma at high temperatures and densities -- radiation energy and pressure must be considered. There are also such cases as the propagation of shock waves with high radiation flow, in which it is necessary to consider changes in the thermodynamic properties of the gas ahead of the front due to absorption of the flow of advance radiation from the hot gas behind the front. Knowledge of some thermodynamic and gas dynamic properties of low-temperature hydrogen plasma is therefore also necessary.

Where there is overall flow of matter in an optically thin plasma, the usual hydrodynamic equations must be supplemented by a radiant energy factor which represents a volume energy source. For an optically thick body in which the radiant heat transfer approximation holds, the state of the matter is determined solely by its optical properties. In other cases, as in the problem

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SOLUKhIN, R. I., et al., Opticheskiye Kharakteristiki Vodorodnoy Plazmy, 1973, pp 61-69

without material flow, a complete system of equations must be solved.

The equilibrium concepts used by the authors are applicable to quasi-equilibrium processes, since the time to establish equilibrium between radiation and matter is of the same order as the lifetime of the photon, which is usually very much less than the characteristic times of hydrodynamics, which are equal to or less than the thermal velocities of the molecules. Of course, the usual conditions of quasi-equilibrium must be supplemented by a condition that the radiation absorbed by matter in the time interval of interest does not change the state of the matter.

USSR UDC: 681.332.65

ALEKSEYEVSKIY, M. A., GAL'PERIN, M. P., KOMINAROV, I. Z.

"A Device for Interrupting a Multicomputer System"

Moscow, Otkrytiya, izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, No 5, Feb 71, Author's Certificate No 293242, Division G, filed 3 Mar 69, published 15 Jan 71, p 164

Translation: This Author's Certificate introduces a device for interrupting a multicomputer system. The device contains logic circuits, comparison circuits, diodes, flip-flops, a search module for the "one" furthest to the left, a command number register, an interrupt register, priority registers, protection registers and a synchronization circuit. As a distinguishing feature of the patent, the functional possibilities of the device are extended by connecting as many priority registers as there are computers to the inputs of the comparison circuits, connecting the second inputs of the comparison circuits to the search unit for the "one" furthest to the left in the priority registers, and connecting the outputs of the inhibit-enable flip-flops to the third inputs of the comparison circuits. Some outputs of the comparison circuits are connected to diodes between the command counters and the command number register. The other outputs are connected through a logic circuit to the terminate flip-flop. The outputs of this flip-flop are connected

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USSR

ALEKSEYEVSKIY, M. A. et al., USSR Author's Certificate No 293242

to the search unit for the "one" furthest to the left in the priority registers, while the second input of the terminal flip-flop is connected through a logic circuit to the outputs of comparison circuits for protection codes. The inputs of these comparison circuits are connected to the decoder of the search unit for the "one" furthest to the left in the interrupt register, and to the outputs of the interrupt register, protection registers, and inhibit-enable flip-flops. The second outputs of these comparison circuits are connected through a logic circuit, the synchronization circuit and the initiate flip-flop to the search unit for the "one" furthest to the left in the interrupt register. The output of the interrupt register is connected to the input of the search unit for the "one" furthest to the left in the priority registers, and the other outputs are connected through diodes to the computer command counters. The synchronization circuit is connected to the inhibit-enable flip-flop for interruption of all computers.

2/2

1/2 029 UNCLASSIFIED PROCESSING DATE--30OCT70

TITLE--DETONATION FAILURES DURING BLASTING -U-

AUTHOR-(04)-DRUKOVANYY, M.F., KOMIR, V.M., LITVIN, L.N., OBEREMOK, O.N.

COUNTRY OF INFO--USSR

SOURCE--GORN. ZH. 1970, 145(2), 56-9

DATE PUBLISHED--------70

SUBJECT AREAS--ORDNANCE

TOPIC TAGS--EXPLOSIVE, DETONATION, TRINITROTOLUENE, WATER, HEXOGEN, SHOT BLASTING

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3003/0434 STEP NO--UR/0127/70/145/002/0056/0059

CIRC ACCESSION NO--AP0129659

UNCLASSIFIED

2/2 029 UNCLASSIFIED PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0129659

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. SYSTEMATIC EXPTL. STUDIES WERE DONE TO CLARIFY CAUSES OF DETONATION FAILURES DURING BLASTING. TNT AND GRANULIT AS WERE USED AS EXPLOSIVES. EXPLOSIVE CHARGES WERE PLACED IN GLASS TUBES 3.5-4 M LONG AND OF 100-140 MM IN DIAM. FACTORS CONSIDERED INCLUDED: STICKING OF THE CHARGE; FORMATION OF VOIDS; CONTAMINATION OF THE CHARGE WITH WATER, DUST, GRANULES, AND PIECES OF ORE; PRESENCE OF WATER IN THE BLASTING HOLE; ETC. DETONATION FAILURES ARE NOT LIKELY TO BE CAUSED BY VOIDS AND THE PRESENCE OF INERT CONTAMINANTS. THE PRESENCE OF H SUB2 O CAN CAUSE FAILURES IN THE CASE OF SOL. OR H SUB2 O REACTIVE EXPLOSIVES. UNSTABLE EXPLOSIVES CAN THEN FORM A KIND OF INERT BARRIER. TROTYL AND TROTYL HEXOGEN DETONATORS ARE EFFECTIVE AND RELIABLE EVEN IN LOW WTS. (13-200 G); THEY MUST BE USED IN SOMEWHAT LARGER AMTS. FOR INITIATION OF DETCNATION OF H SUB2 O CONTAMINATED EXPLOSIVES. THE MOST FREQUENT FAILURES ARE DUE TO QUENCHING OF BURNING OF THE DETONATION CORD, WHICH HAPPENS WHEN THE CORE OF THE CORD IS MOIST. IT IS RECOMMENDED THAT THE MOISTURE INSULATION OF DETONATION CARDS BE INCREASED BY APPLYING AN EXTRA BITUMINOUS LAYER. FACILITY: INST. GEOTEKH. MEKH., KIEV, USSR.

USSR

GOL'TSMAN, B. M. and KOMISSARCHIK, M. G., Physicotechnical Institute, Academy of Sciences, USSR, Leningrad

"Mechanical Stresses in Films of the Solid Solution $(BiSb)_2Te_3$"

Leningrad, Fizika Tverdogo Tela, Vol 15, No 1, Jan 73, pp 301-303

Abstract: An investigation is made of mechanical stresses in films of an extensively used thermoelectric material, the solid solution $(BiSb)_2Te_3$, and the influence of these stresses upon conductance and the thermo-emf coefficient is evaluated. The stresses acting in the films were evaluated on the basis of flexure of the backings. It was established that the films are in a stretched state, the radius of curvature R of the backing comprising 6-7 mm. Calculations conducted on the basis of a formula for determining the stresses in the film, show that considerable stresses are present in films with a surplus of tellurium and in films of stoichiometric composition; these stresses attain values of 25 kg/mm^2. Subsequent annealing of the films in an atmosphere of spectrally pure argon at a temperature of 380°C brings about a decrease in the radius of flexure, and consequently an increase of the stresses to 50-55 kg/mm^2.
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USSR

GOL'TSMAN, B. M., and KOMISSARCHIK, M. G., Fizika Tverdogo Tela, Vol 15, No 1, Jan 73, pp 301-303

Measurement of conductance and the thermo-emf coefficient in the films under various stress conditions indicates that the stresses acting in $(BiSb)_2Te_3$ films should essentially affect the electrical properties of the film. 1 figure, 7 references.

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USSR

UDC 656.25:621.3

GLASHCHENKOV, G. A., Senior Instructor of the Khar'kov Institute of Railroad Transportation Engineers, KOMISARCHUK, N. A., Laboratory Chief of the Kiev Branch of the Khar'kov Institute of Railroad Transportation Engineers

"Microelectronics in Railroad Automation and Remote Control Systems"

Moscow, Avtomatika, Telemekhanika i Svyaz', No 10, 1971, pp 7-10

Abstract: A study was made of the possibility of using modern microelectronics media in monitoring and control systems for railroad transportation, in particular, centralization of dispatch control, the automatic braking system and automatic control.

Arguments are presented for the reliability of integrated circuits, and English and American experience is cited. The characteristics and diagrams of microcircuitry are discussed, and it is concluded that the application of integrated circuits in railroad automation and remote control systems would lead to a decrease in the construction and installation operations, higher installation quality reliability, a decrease in intake, high fitness independently of the number of responses, a decrease in the load of the service personnel, a significant reduction in the size of the installations, exclusion of adjustment of

USSR

GLASHCHENKOV, G. A., et al., Avtomatika, Telemekhanika i Svyaz', No 10, 1971, pp 7-10

systems and selection of parts, insurance of vibration and impact resistance and resistance to corrosion, the creation of standard units providing for repairs at the module replacement level and economically expedient reliable duplication of the automatic devices.

2/2

1/2 018 UNCLASSIFIED PROCESSING DATE--13NOV70

TITLE--LOW DENSITY OIL WELL CEMENTS CONTAINING POWDERED COAL -U-

AUTHOR-(02)-BEREZHNOY, A.I., KOMISSARCHIK, S.S.

COUNTRY OF INFO--USSR

SOURCE--NEFT. GAZOV. PROM. 1970, (1), 24-5

DATE PUBLISHED--------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--CEMENT, COAL, CALCIUM CHLORIDE, CHEMICAL REACTION RATE, HARDNESS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3005/1969 STEP NO--UR/0513/70/000/001/0024/0025

CIRC ACCESSION NO--AP0133813

UNCLASSIFIED

2/2 018 UNCLASSIFIED PROCESSING DATE--13NOV70

CIRC ACCESSION NO--AP0133813

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. AN OIL WELL CEMENT WITH LOW D. (1.02-1.5) IS MADE BY INCORPORATING 33-66PERCENT POWD. COAL IN CEMENT CONTG. CACL SUB2 OR OTHER SALTS TO CONTROL THE SETTING TIME. UP TO 25PERCENT AIR IS ENTRAINED WHEN THE COMPONENTS ARE MIXED. WITH INCREASING COAL CONTENT, THE D. IS DECREASED AND THE SETTING TIME IS INCREASED.

UNCLASSIFIED

USSR UDC: 621.385

PIPKO, A. I., GAVRILOV, A. A., KOMISSARCHIK, V. M.

"An Installation for Vacuum Treatment of the Cathode Elements of Magnetrons"

Moscow, Otkrytiya, Izobreteniya, Promyshlennyye Obraztsy, Tovarnyye Znaki, No 24, 1970, Soviet Patent No 277119, Class 21, filed 27 Dec 67, p 63

Abstract: This Author's Certificate introduces a device for vacuum treating the cathode elements of magnetrons. The unit contains a working chamber, a prevacuum chamber, a loading box, and a table for holding parts with vacuum electrical leads which can be moved out of the loading chamber into the working chamber. As a distinguishing feature of the patent, provision is made for checking the thermionic and secondary emission properties of the cathode by equipping the installation with a measuring device mounted on the working table. This device is made in the form of a cylindrical anode with an annulus in the middle, and an annular tungsten cathode surrounding the anode at the level of the annulus. The anode and cathode are fastened to insulators, and the the inner surface of the anode acts as a collector of secondary and reflected electrons from the cathodes being inspected.

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USSR

KOMISSARCHIK, YA. YU., and KUZNETSOV, V. G.

"Electron Microscope Investigation of Nerve Cells and Their Changes in Hypotonic Solutions by the Sighting Method Used for the Study of Single Cells", pp 19-28, Sintez Belka i Rezistentnost', Kletok, (Protein Synthesis and Cell Resistance), Leningrad, "Nauka," 1971, 104 pp

Abstract: A study was made of the ultrastructure of parasympathetic nerve cells in a frog auricle preparation (Rana temporaria) and their reaction to damage by distilled water. The article gives a description of the procedure which makes a sighting study of individual cells possible under both electron and light microscopes.

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USSR UDC: 621.373.52:621.373.42

KOMISSARCHUK, A. A., ROZHANKOVSKIY, R. V.

"Investigation of a Sinusoidal Oscillator Based on a Circuit With Distributed RC Parameters"

Otbor i peredacha inform. Resp. mezhved. sb. (Selection and Transmission of Information. Republic Interdepartmental Collection), 1970, vyp. 25, pp 103-107 (from RZh-Radiotekhnika, No 1, Jan 71, Abstract No 1D330)

Translation: The authors study harmonic distortions of the signals from a generator consisting of an emitter follower and a distributed RC circuit as a feedback link. Distributed circuits are analyzed and a study is made of the effect of circuit parameters on the shape of the emitted oscillations. Bibliography of three titles. Resumé.

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1/2 017 UNCLASSIFIED PROCESSING DATE--13NOV70

TITLE--EFFECT OF CITRIC ACID ON THE RESYNTHESIS OF RABBIT MUSCLE ADENINE NUCLEOTIDES -U-

AUTHOR-(02)-KOMISSARENKO, S.V., PKHAKADZE, G.A.

COUNTRY OF INFO--USSR

SOURCE--DOPOV. AKAD. NAUK UDR. RSR, SER. B 1970, 32(2), 171-3

DATE PUBLISHED--------70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--RABBIT, MUSCLE PHYSIOLOGY, HEART MUSCLE, ADENOSINE TRIPHOSPHATE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3005/1665 STEP NO--UR/0442/70/032/002/0171/0173

CIRC ACCESSION NO--AT0133570

UNCLASSIFIED

2/2 017 UNCLASSIFIED PROCESSING DATE--13NOV70

CIRC ACCESSION NO--AT0133570

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. I.V. INJECTION OF CITRIC ACID (10 MU G-G) (I) DID NOT CHANGE ADENINE NUCLEOTIDES CONTENT IN RABBIT HEART AND SKELETAL MUSCLES BUT INCREASED INCORPORATION OF GLYCINE,1,C PRIME14 INTO ADP OF SKELETAL, AND ATP, ADP, AND AMP OF HEART MUSCLE. IN VITRO I (4 MU MOLES) INCREASED SP. RADIOACTIVITY OF ADENINE NUCLEOTIDES OF DIAPHRAGM MUSCLE. FACILITY: INST. BIOKHIM., KIEV, USSR.

UNCLASSIFIED

KOMISARENKO U.P.

Acc. Nr: AP0052336 Ref. Code: UR0238

PRIMARY SOURCE: Fiziologichniy Zhurnal, 1970, Vol 16, Nr 1, pp 10-13

EFFECT OF *o, p'*-DDD ON TRANSCORTIN-BINDING ABILITY IN DOGS

V. P. Komi sarenko, O. S. Mikosha, M. D. Tronko

Department of Patophysiology, Institute of Endocrinology and Metabolism, Kiev

Summary

Hydrocortisone content and the level of transcortin in plasma of dogs were determined before and after *o, p'*-DDD administration.

It is noted that due to *o, p'*-DDD administration a complete inhibition of 11-oxycorticosteroid synthesis takes place.

Injections of *o, p'*-DDD raised the transcortin level. The application of the inhibitor did not change the protein concentration in plasma.

UNCLASSIFIED

TITLE--STATE AND PROSPECTS IN THE DEVELOPMENT OF BASIC PROBLEMS OF ENDOCRINOLOGY IN THE UKRAINE -U-

AUTHOR--KONISARENKO, V.P.

COUNTRY OF INFO--USSR

SOURCE--FIZIOLOGICHNIY ZHURNAL, 1970, VOL 16, NR 2, PP 197-204

DATE PUBLISHED--------70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--ENDOCRINOLOGY, SECRETION, CENTRAL NERVOUS SYSTEM, HORMONE, HYPOTHALAMUS, BRAIN

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1982/0918 STEP NO--UR/0238/70/016/002/0197/0204

CIRC ACCESSION NO--AP0052332

UNCLASSIFIED

Acc. Nr: AP0052332 Ref. Code: UR0403

PRIMARY SOURCE: Fiziologichniy Zhurnal, 1970, Vol 16, Nr 2, pp 197-204

STATE AND PROSPECTS IN THE DEVELOPMENT OF BASIC PROBLEMS OF ENDOCRINOLOGY IN THE UKRAINE

V. P. Komisarenko

Institute of Endocrinology and Metabolism, Kiev

Summary

The article deals with some basic achievements in the investigation of internal secretion glands and the main trends in the studying such problems of endocrinology as: 1) interconnection of the central nervous system and hypothalamus in the regulation of endocrinous functions; 2) interrelation between the internal secretion glands; 3) mechanism of hormone effect. Great attention in the article is paid to the role of inhibitors of the function of endocrinous glands and their importance for clinical and experimental endocrinology.

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1/2 020 UNCLASSIFIED PROCESSING DATE--30OCT70

TITLE--EMPLOYMENT OF INHIBITORS FOR REGULATION OF ENDOCRINE FUNCTIONS AND TREATMENT OF HORMONE DEPENDING TUMOURS -U-

AUTHOR--KOMISSARENKO, V.P.

COUNTRY OF INFO--USSR

SOURCE--VRACHEBNOYE DELO, 1970, NR 4, PP 13-18

DATE PUBLISHED--------70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--ADRENAL CORTEX, BENZENE DERIVATIVE, CHLORINATED ORGANIC COMPOUND, TUMOR, INHIBITION, CHEMOTHERAPY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3001/1867 STEP NO--UR/0475/70/000/004/0013/0018

CIRC ACCESSION NO--AP0127277

UNCLASSIFIED

2/2 020 UNCLASSIFIED PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0127277

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE AUTHOR PRESENTS LITERARY DATA ON ENDOCRINE FUNCTION INHIBITORS AND RESULTS OF STUDIED CARRIED OUT IN THE KIEV SCIENTIFIC RESEARCH INSTITUTE OF ENDOCRINOLOGY AND METABOLISM AND THE EFFECT OF DICHLORDIPHENYLDICHLORETHANE ON THE ADRENAL CORTEX IN EXPERIMENTAL AND CLINICAL CONDTIONS. RESULTS SUGGEST THAT DICHLORDIPHENYLDICHLORETHANE EXERTS AN EFFICIENT ACTION ON THE STRUCTURE AND FUNCTION OF THE ADRENAL CORTEX WHICH OPENS PROSPECTS OF NEW APPRAOCHES TO CHEMOTHERAPY OF HORMONE DEPENDENT TUMORS AND TREATMENT OF ITSENKO CUSHING'S DISEASE. FACILITY: AN UKR. SSR.

UNCLASSIFIED

1/2 017 UNCLASSIFIED PROCESSING DATE--13NOV70

TITLE--THE IMPORTANCE OF DYSFUNCTION OF THE ADRENALS IN THE PATHOGENESIS OF DIABETES MELLITUS AND DIABETIC ANGIOPATHIAS -U-

AUTHOR-(05)-KOMISSARENKO, V.P., YEFIMOV, A.S., POVOLOTSKAYA, G.M., LIMANSKAYA, G.F., BEZVERKHAYA, T.P.

COUNTRY OF INFO--USSR

SOURCE--KLINICHESKAYA MEDITSINA, 1970, VOL 48, NR 5, PP 118-123

DATE PUBLISHED--------70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--DIABETES MELLITUS, ADRENAL GLAND, HORMONE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3002/1772 STEP NO--UR/0497/70/048/005/0118/0123

CIRC ACCESSION NO--AP0129140

UNCLASSIFIED

2/2 017 UNCLASSIFIED PROCESSING DATE--13NOV70

CIRC ACCESSION NO--AP0129140

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE COMPLEX EXAMINATION OF 154 PATIENTS SUFFERING FROM DIABETES MELLITUS REVEALED DYSFUNCTION OF THE ADRENALS MANIFESTED BY AN INCREASE OF THE GLUCOCORTICOID, ANDROGENIC AND ADRENAL FUNCTION IN A SIMULTANEOUS REDUCTION OF THE MINERALOCORTICOID ACTIVITY. THE NOTED DISTURBANCE WAS CHARACTERITIC FOR PATIENTS DURING DECOMPENSATION OF THE DISEASE. WITH THE CONCOMITANCE OF VASCULAR COMPLICATIONS THERE WAS SEEN A MORE MARKED RISE OF THE CATECHOLAMINE AND ADRDGENIC ACTIVITY. GLUCOCORTICOID HYPERFUNCTION OF THE ADRENALS WAS MORE PECULIAR TO PATIENTS WITH INITIAL FUNCTIONAL LESIONS OF THE VESSELS. A SUPPOSITION IS MADE ON THE POSSIBLE PATHOGENETIC ROLE OF HYPERPRODUCTION OF CONTRINSULAR ADRENAL HORMONES IN THE DEVELOPMENT OF DIABETIC ANGIOPATHIAS. FACILITY: KIEV. N-I INSTITUT ENDOKRINOLOGII I OBMENA VESCHESTV.

UNCLASSIFIED

KOMLOSHAROV, G.

Public health/cybernetics

30 Oct 70 32 FPD:CYBERNETICS

USSR

CSSR, A., Vecherniaya Moskva, 15 Jun 70, p 2

Laboratory work and examinations from students. The examiner machines save time that is necessary for practical work. Besides this, television cameras and microphones have been installed in the lecture halls and now all may watch how the lecture is going.

2/2 SO: FOREIGN PRESS DIGEST 30 Oct 70

22. USSR 33.29

KOMAROV, A., Director of the Mathematical Economics Laboratory of the Medical Institute, KAZHDAYEV, I., Chief Physician of City Clinical Hospital No 1, and [redacted], Deputy Chief Physician for Medical Section, Novosibirsk

"The Computer in the Hospital"

Moscow, Meditsinskaya Gazeta, 26 May 70, p 2

Abstract: This 1400-bed, multiple service hospital is using a Minsk-22 computer for information processing. Several different kinds of data are handled by the computer.

The primary analysis is of patient records, which are begun as part of the admission process, continued by medical entries during the hospital stay, and completed at discharge time. Considerable effort has been expended to mesh the forms and procedures as brief and simple as possible, while still collecting the necessary information. Patient records are analyzed by a variety of programs, particularly for difficulties or errors in diagnosis. The analysis of 22,000 such records has enabled the hospital to pinpoint types of pathology which lead to difficulties in diagnosis

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1/2 039 UNCLASSIFIED PROCESSING DATE--13NOV70

TITLE--CURRENT OSCILLATIONS IN BETA CAROTENE FILMS -U-

AUTHOR-(03)-SHUMOV, YU.S., MIKHEYEVA, G.P., KOMISSAROV, G.G.

COUNTRY OF INFO--USSR

SOURCE--DOKL. AKAD. NAUK SSSR 1970, 191(1), 70-2

DATE PUBLISHED--------70

SUBJECT AREAS--PHYSICS, MATERIALS

TOPIC TAGS--SURFACE FILM, CURRENT DENSITY, VOLT AMPERE CHARACTERISTIC, DIRECT CURRENT, LIGHT PULSE, IMPURITY LEVEL, OSCILLATION, PIGMENT, BIOCHEMISTRY, HYDROCARBON

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--3003/1483 STEP NO--UR/0020/70/191/001/0070/0072

CIRC ACCESSION NO--AT0130412

UNCLASSIFIED

2/2 039 UNCLASSIFIED PROCESSING DATE--13NOV70

CIRC ACCESSION NO--AT0130412

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. SURFACE TYPE CELLS WERE USED TO FOLLOW CURRENT VARIATIONS IN AMORPHOUS FILMS OF CAROTENE AND ITS MIXTS. WITH PROTOPORPHYRIN (I), USING A TYPICAL D. C. SOURCE WITH INTERMITTENT EXPOSURE TO LIGHT. THE RESULTING CURRENT VOLTAGE (I-V) CURVES ARE SHOWN. CURRENT OSCILLATIONS WERE OBSD. ONLY IN THE FILMS THAT HAD BEEN FORMED BY FLOWING AND NOT IN THE FILMS FORMED BY EVAPN. CONDENSATION. THE I-V CHARACTERISTICS OF THE FILMS SO PREPD. FROM THE MIXED PIGMENT HAD OHMIC BEHAVIOR AT LOW FIELDS; AS THE FIELD WAS RAISED TO SATN. UNDER BOTH DARK AND LIGHT CONDITIONS, THE CURRENT OSCILLATIONS BEGAN, AND THE VALUE OF THRESHOLD P. D. IN LIGHT NECESSARY FOR SUCH OSCILLATIONS WAS SMALLER THAN THAT IN THE DARK. AS THE CONCN. OF I INCREASED, THIS THRESHOLD P. D. DECLINED. THUS, THE IMPURITY INCREASED THE POPULATION OF MICROHETEROGENITIES IN THE VOL. OF THE PIGMENT AS WELL AS IN THE ZONE OF CONTACT WITH THE ELECTRODES. FACILITY: INST. KHIM. FIZ., MOSCOW, USSR.

UNCLASSIFIED

USSR

UDC 615.31:547.718.1].012.1

KOCHERGIN, P. M., KOMISSAROV, I. V., TKACHENKO, A. A., and VLASOV, V. V., All Union Scientific Chemical-Pharmaceutical Research Institute imeni S. Ordzhonikidze, Moscow, Zaporozhe Medical Institute, Donets Medical Institute

"Studies in the Imidazole Series. LII. Synthesis and Pharmacological Properties of the Derivatives of Imidazolino(1,2-f)xanthene"

Moscow, Khimiko-Farmatsevticheskiy Zhurnal, Vol 4, No 12, Dec 70, pp 14-18

Abstract: Starting from 8-bromo-, 8-amino-, and 8-methylmercaptotheophyllines a series of imidozolino(1,2-f)xanthene derivatives was synthesized. Tneir pharmacological action was investigated. The products exhibited a positive inotropic action on frog's heart, comparable to that of theophylline; they lowered the blood pressure and affected directly smooth vascular muscles. They shortened the latent period of conditional reflexes slowing down their extinction; they increased the 'spontaneous' motor activity, but counteracted the stimulating effect of theophylline on the motor activity of animals. The compounds showed no effect on the convulsive activity of corasol, hexenal, or chloral hydrate. Several among them stimulated breathing, but were not capable of counteracting the breathing inhibitory action of morphine or hexenal.

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USSR UDC 632.954

YATSENKO, V. G., KOMISSAROV, L. M., All-Union Scientific Research Institute of Sugar Beets

"Infiltration and Inactivation in the Soil of Herbicides Applied by the Strip Method"

Moscow, Khimiya v Sel'skom Khozyaystve, Vol 8, No 9 (83), Sep 70, pp 48-49

Abstract: Infiltration and inactivation of eptam, sodium trichloroacetate and dichloralurea were studied after application of the herbicides in strips 18-20 cm wide. Continuous application was also used for comparison. It was found that eptam is absorbed by the soil and therefore migrates only slightly with respect to the soil profile. Sodium trichloroacetate is washed out of the upper layers of the soil into the lower layers, which explains its weak effect on weeds in years with heavy rainfall. Dichloralurea does not migrate through the soil to any great extent and is retained chiefly in the upper layer.

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USSR

Adsorption

UDC 546.633:543.544.6

SHATSKIY, V. M., KRIVENKO, S. V., KOMISSAROVA, L. N., BEBIKH, G. F., PRUTKOVA, N. M., KESLER, YA. A., and TVOROGOV, V. A., Chain of Inorganic Chemistry

"Synthesis of Novel Phosphorus Containing Sorbents and the Study of the Sorption of Scandium on Them"

Moscow, Vestnik Moskovskogo Universiteta, Vol 13, No 6, Nov-Dec 72, pp 653-658

Abstract: Optimal conditions for scandium sorption and separation from iron have been determined on a pilot-plant scale. A specific sorbent was used in the process. It was the product of the copolymerization of styrene with divinylbenzene phosphorylated with $PNCl_2$ and subsequently hydrolyzed with alcoholic potassium hydroxide solution. The optimal conditions for the separation process on this sorbent are as follows: the sorption is carried out from a 0.1 N H_2SO_4 solution; a 7% ammonium fluoride solution is used for the desorption; under these conditions in one "sorption-desorption" cycle the iron is isolated practically completely. Repetition of the desorption process with a fresh portion of the desorbent removed 92% of scandium. This sorbent may be used for the concentration of scandium out of the solutions with high iron content. In addition to iron this method also separates all mono- and divalent elements, rare earth elements and other impurities from scandium.

1/1

1/2 010 UNCLASSIFIED PROCESSING DATE--13NOV70

TITLE--DETERMINATION OF GAS MOISTURE -U-

AUTHOR-(05)-DEMYANOV, YU.A., KOMISSAROV, N.M., BAKULIN, A.I., OXHIGIN, V.S., KUZAVIN, YE.I.

COUNTRY OF INFO--USSR

SOURCE--U.S.S.R. 261,740

REFERENCE--OTKRYTIYA, IZOBRET., PROM. OBRAZTSY, TOVARNYE ZNAKI 1970, 74(5)

DATE PUBLISHED--13JAN70

SUBJECT AREAS--METHODS AND EQUIPMENT, MATERIALS

TOPIC TAGS--SPECTROSCOPIC ANALYSIS, MOISTURE MEASUREMENT, CHEMICAL PATENT, GAS ANALYSIS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3005/0878 STEP NO--UR/0482/70/000/000/0000/0000

CIRC ACCESSION NO--AA0132968

UNCLASSIFIED

UNCLASSIFIED PROCESSING DATE--13NOV70

2/2 010

CIRC ACCESSION NO--AA0132968

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. GAS MOISTURE IS DETD. IN A WIDE PRESSURE RANGE BY 1ST HEATING THE GAS IN A HERMETIC CELL BY USING SHOCK WAVES AND THEN DETG. THE AMT. OF OH PRIME NEGATIVE, FORMED FROM DISSOCN. OF H SUB2 O VAPOR, BY ABSORPTION SPECTROSCOPY.

UNCLASSIFIED

USSR

UDC: 62-525:621.375

BOCHNEV, Yu. A., KOMISSAROV, O. A.

"A Pressure Amplifier"

USSR Author's Certificate No 254208, filed 29 Jun 68, published 4 Mar 70 (from RZh-Avtomatika, Telemekhanika, i Vychislitel'naya Tekhnika, No 11, Nov 70, Abstract No 11A102 P)

Translation: This Author's Certificate introduces a pneumatic pressure amplifier with high precision. The amplifier contains a conical damper suspended between high-pressure and low-pressure flows. The conical shape of the damper allows its position to be centered in the flow, and the vortex flow which develops at a certain value of the controlling pressure causes the damper to rotate, thus stabilizing its position. One illustration.
T. R.

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1/2 034 UNCLASSIFIED PROCESSING DATE--23OCT70

TITLE--REACTION OF BUTADIENE NITRILE RUBBERS WITH PHENOLFORMALDEHYDE RESINS IN THE PRESENCE OF HEXAMETHYLENETETRAMINE -U-

AUTHOR-(04)-DINZBURG, B.N., CHECHIK, L.E., KOMISSAROV, S.A., BARAMBOYM, N.K.

COUNTRY OF INFO--USSR

SOURCE--KAUCH. REZINA 1970, 29(2), 10-12

DATE PUBLISHED--------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--BUTADIENE, NITRILE RUBBER, PHENOL FORMALDEHYDE RESIN, HEXAMETHYLENETETRAMINE, IR SPECTRUM, COPOLYMER, VULCANIZATE, PLASTIC FABRICATION, MOLECULAR STRUCTURE, SPECTROMETER/(U)SKN40 NITRILE RUBBER, (U)NOVOLAK PHENOLIC RESIN, (U)UR10 SPECTROMOTER, (U)UKC14 SPECTROMETER

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1997/0461 STEP NO--UR/0138/70/029/002/0010/0012

CIRC ACCESSION NO--AP0119397

UNCLASSIFIED

2/2 034 UNCLASSIFIED PROCESSING DATE--23OCT70

CIRC ACCESSION NO--AP0119397

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE REACTION OF SKN-40 RUBBER (I) WITH A PHENOL CH SUB2 O NOVOLAK RESIN 18 (II), HEXAMETHYLENETETRAMINE (III), AND S WAS STUDIED BY IR SPECTROSCOPY. MODEL I-II-III MIXTS. WERE MILLED AT 30-40DEGREES AND MOLDED AT 155DEGREES FOR 20 HR, AND THE PRODUCTS WERE EXAMD. IN UR-10 AND UKC-14 SPECTROMETERS OVER A WIDE RANGE OF FREQUENCIES. I AND II REACTED DURING MILLING TO GIVE B-II COPOLYMERS (THE AMT. OF COPOLYMERS FORMED DEPENDS ON THE I-II RATIO AND PROCESSING CONDITIONS). MOLDING AND HEAT TREATMENT OF I COMPNS. WAS ACCOMPANIED BY HARDENING OF II WITH III, A REACTION BETWEEN I, II, AND III, AS WELL AS A REACTION BETWEEN S, I, AND II. THE REACTION LED TO THE FORMATION OF SUPRAMOL. STRUCTURES WHICH IMPROVED THE PHYSICOMECH. PROPERTIES OF THE VULCANIZATES. FACILITY: VSES. NAUCH.-ISSLED. INST. PLENOCHNYKH MATER. ISKUSSTV. KOZHI, MOSCOW, USSR.

UNCLASSIFIED

Acc. Nr: AP0052438 Abstracting Service: CHEMICAL ABST. 5-70 Ref. Code: 41'0460

101706b **Effect of the extent of orientation on the kinetics of the mechanical degradation of polymers.** Komissarov, Sh A.; Aleksandrov, V. L.; Baramboim, N. K. (Vses. Zaoch. Inst. Tekst. Legk. Prom., Moscow, USSR). *Vysokomol. Soedin., Ser. B* 1970, 12(2), 112-14 (Russ.). The method of least squares was used to derive an equation describing the mech. degradation of Kapron, Lavsan, and Nitron fibers taking into account the structural ordering coeffs. An equation relating the elongation multiplicity factor, the mol. wt., and the dispersion time for highly oriented systems was also derived. The equation $M_\tau = (M_0 - M_\infty)e^{-1.852 \cdot 0.084\tau} - 182\delta + 6750$, where M_τ = mol. wt. at any time τ, M_0 = initial mol. wt., M_∞ = limiting mol. wt., and τ = the elongation multiplicity factor, satisfactorily described the mech. degradation of Nitron fibers. DBJR

REEL/FRAME 19821072

1/2 016 UNCLASSIFIED PROCESSING DATE--30OCT70

TITLE--KINETICS AND MECHANISM OF METHYL ETHYL KETONE OXIDATION IN THE PRESENCE OF COMPLEXES OF IRON,III, AND 9,PHENANTHROLINE -U-

AUTHOR-(02)-KOMISSAROV, V.D., DENISOV, YE.T.

COUNTRY OF INFO--USSR

SOURCE--ZH. FIZ. KHIM. 1970, 44 (2), 390-5

DATE PUBLISHED--------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--CHEMICAL KINETICS, METHYL ETHYL KETONE, CATALYTIC OXIDATION, CHEMICAL REACTION MECHANISM, IRON COMPOUND, COMPLEX COMPOUND, CATALYST REGENERATION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--2000/0891 STEP NO--UR/0076/70/044/002/0390/0395

CIRC ACCESSION NO--AP0124554

UNCLASSIFIED

2/2 016 UNCLASSIFIED PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0124554

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. KINETIC DATA ON THE OXIDN. OF ACET IN AQ. SOLN. BY MOL. O CATALYZED BY FE(III),O,PHENANTHROLINE COMPLEXES (I) INDICATE THAT THE MECHANISM INVOLVES OXIDN. OF MECH:C(OH)ME BY I TO MEC:C(OTIMES)ME, WHICH DECOMP. TO MECH TIMES AC, WHICH REACTS WITH O TO FORM MECH(OOH)AC, WHICH DECOMP. BOTH TO FREE RADICALS THAT ACCELERATE THE OXIDN. NAD TO THE OXIDN. PRODUCTS ACH AND ACOH. THE OVERALL RATE DEPENDS ON PH AND O PRESSURE. THE AMT. OF FE(III) THAT IS REDUCED LEVELS OFF AT 60PERCENT DURING THE OXIDN., INDICATING REGENREATION.

FACILITY: FILIAL INST. KHIM. FIZ., CHERNOGOLOVKA, USSR.

UNCLASSIFIED

USSR

UDC 621.791.856.3:620.193.41

YURCHENKO, YU. F., SOTNICHENKO, A. L., AZAPOV, G. I., KOMISSAROV, V. G., and SHURAKOV, S. A.

"Effect of Heat Treatment on the Structure and Corrosion Resistance of the Metal In the Heat-Affected Zone of Joints of Kh18N10T Steel"

Kiev, Avtomaticheskaya Svarka, No 6, Jun 71, pp 8-11

Abstract: Studies were made on joints of 1Kh18N10T pipe 57 mm in diameter with a wall thickness of 3 mm produced by argon-arc welding. After welding, a portion of the joints were tempered at 700°C for 2,10, 100, and 1000 hours: the other portion was quenched in water after heating for different times at 1000-1250°C. Heat treatment of 1Kh18N10T weld joints increases the rate of knife corrosion and expands the front of its development. This was caused by precipitation, at this temperature, of chromium carbides of the type $Me_{23}C_6$ along the grain boundaries of the heat-affected zone. Holding at 700°C for 10-100 hours leads to coalescence and dissolution of these carbides and to the appearance of the sigma-phase at the grain boundaries. In this case the carbon, being freed in the dissolution of metastable chromium carbides, is bonded in carbides of titanium which are basically distributed in the body of austenite grains. However this process dimenishes the rate of knife corrosion. Quenching joints from 1000-1150°C lowers (by 1.5-5 times) the rate of knife

USSR

YURCHENKO, YU. F., etal, Kiev, Avtomaticheskaya Svarka, No 6, Jun 71, pp 8-11

corrosion. This has been associated with a change in the type of carbides of titanium in the heat-affected zone, by redistribution and removal of internal stresses, as well as with the elimination of concentration heterogeneity of austenite in grain bodies and in their boundaries. Increasing quenching temperature (1150-1250°C) leads to homogenization of all zones of the weld joint and prevents knife corrosion; Reheating joints for quenching above 1250°C increases the rate of knife corrosion. 7 figures, 2 bibliographical references.

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UDC 621.372.833

USSR

KLIGER, G.A., KOMISSAROV, V.I., KUZNETSOV, V.D.

"Wide-Band Balancing Transformer (Short Report)"

Elektrosvyaz', No 9, Sept 1972, pp 17-19

Abstract: Previous works with V.D. Kuznetsov as a coauthor described a number of schemes for wide-band balancing adapters with transformation, which are used for accordant connections of symmetrical and nonsymmetrical lines with various wave impedances. Because it is difficult to make a symmetrical line with the low wave impedance required, particularly in the short wave range, the present paper presents a method for simplifying the design of such a balancing adapter and decreasing its length by half. The method is based on a scheme previously proposed by the authors (Author's Certificate No 345327, "Byulleten' izobreteniy," No 20, 1972). An analysis is made of the adapter in order to determine the optimum magnitudes of the wave impedances W_T and W_S. 7 fig. 4 ref. Received by editors, 6 Sept 1971.

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USSR

UDC 621.396.679:621.372.3

KUZNETSOV, V.D., KOMISSAROV, V.I.

"Noncontact Tuning Of Traveling-Wave Feeder"

Elektrosvyaz', No 4, Apr 1972, pp 68-71

Abstract: A noncontact tuning system is described which permits smooth fine tuning of a traveling-wave feeder line for matching, without disconnecting the transmitter and to eliminate in practice the possibility of an incorrect abrupt mismatch of the line. Formulas and curves are presented which make it possible to produce a design of the device, and possible constructive schemes of the arrangement for a two-conductor symmetrical feeder are discussed. The electrical stability of the device is evaluated. 9 fig. Received by editors, 24 June 1971.

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USSR

UDC 547.565.2

PAUSHKIN, YA. M., LUNIN, A. F., and KOMISSAROV, V. I., Moscow Institute of Petrochemical and Gas Industry Imeni I. M. Gubkin

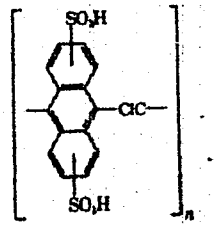
"Synthesis of Thermally Stable Oxidation-Reduction Polymers"

Moscow, Doklady Akademii Nauk SSSR, Vol 195, No 5, Dec 70, pp 1125-1127

Abstract: In light of the increasing interest in redox polymers, a synthetic route was developed based on heterocondensation of disodium acetylenide (DNaAc) with 2,5-dibromoquinone (DBQ) and 1,4-dimethoxy-2,5-dibromobenzene followed by demethoxylation with HI. It was determined that the redox capacity of the polymer drops with increased reaction temperature, which may be due to partial crosslinking and dehydration. The polymer obtained maintained its redox capacity for 10 hrs even when heated in air to 300°C. This polymer shows semiconductive properties. The synthesis took place in two stages: first stage was carried out in a flask in hexadecane medium, with reaction temperature of 250°. The process lasted 10 hrs in argon atmosphere. The ratio of DNaAc to DBQ was 2:1. Second stage was carried out in solid phase in temperature range 300-450° yielding the polymer, a black powder insoluble in water or organic solvents.

Acc. Nr: AP0052503 Abstracting Service: CHEMICAL ABST. 5-70 Ref. Code: 4R0460

101323z **Synthesis and properties of new aromatic polymers.** Paushkin, Ya. M.; Komissarov, V. I.; Lunin, A. F.; Aleksandrova, V. A.; Oganesov, S. S.; Meshcheryakov, S. V.; Shumov, V. N. (Inst. Neftekhim. Gazov. Prom. im. Gubkina, Moscow, USSR). *Vysokomol. Soedin., Ser. B* 1970, 12(1), 53-6 (Russ). The heteropolycondensation of Na_2C_2 with *o*-, *m*-, and *p*-$C_6H_4Cl_2$ and $C_6H_4Br_2$, 1,4-$C_{10}H_6Br_2$ and 1,5-$C_{10}H_6Br_2$, and 9,10-dibromoanthracene in $C_{16}H_{34}$ was studied under Ar at 200–87°. The most reactive monomers were the *o*-dibromo derivs. The polymers were brown to black powders stable at up to 300–400°, having an elec. cond. in the range of 10^{-7}–10^{-12} (ohm cm)$^{-1}$. The polymers were readily nitrated, sulfonated, and aminated; e.g.,



(I)

sulfonation with fuming H_2SO_4 gave heat resistant (to 300°) cation exchange resins I of high exchange capacity. CKJR

REEL/FRAME

19821144

USSR UDC: 621.315.592

VOROB'YEV, L. Ye., KOMISSAROV, V. S., and STAFEYEV, V. I., Leningrad Polytechnical Institute imeni M. I. Kalinin

"Double Beam Refraction With Hot Electrons in the Infrared Region in Degenerate InAs"

Leningrad, Fizika i tekhnika poluprovodnikov, vol 6, No 6, 1972, pp 1153-1155

Abstract: This brief communication is based on an earlier paper by the three authors named above (Phys. St. Sol., 50, 1972) in which it was shown that the dielectric permeability becomes an anisotropic quantity in strong electric fields as the result of the anisotropy of the distribution function of hot current carriers, and of the nonparabolicity of the conductive zone. The anisotropy of the index of refraction leads to a shift in phase for light polarized parallel and perpendicular to the strong field. In the present paper, double refraction is investigated in n-type InAs at a temperature of 80° K. The carrier concentration in the InAs is $1.5 \cdot 10^{16}$ per cc, and the electronic gas is weakly degenerate. The experimental method is fully described in another earlier paper by these same authors (Letters, ZhETF, 12, 1971, p 140). Curves are plotted for the anisotropy of the index of refraction and for the electron temperature as functions of the electric field intensity; good agreement between the measured and computed values is shown.

1/1

USSR

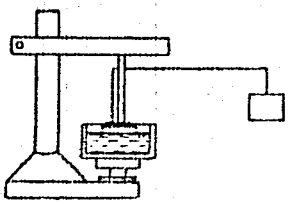
UDC: 531.715.2 531.717.53

SHATALOV, V. F., KOPYTIN, A. M., PONARIN, N. S., KOMISSAROV, V. T.

"A Method of Determining the Extent of a Destroyed Layer in Semiconductor Plates"

Moscow, Otkrytiya, Izobreteniya, Promyshlennyye Obraztsy, Tovarnyye Znaki, No 7, Mar 72, Author's Certificate No 329374, Division G, filed 7 Apr 70, published 9 Feb 72, p 151

Translation: This Author's Certificate introduces a method of determining the extent of a destroyed layer in semiconductor plates. The procedure consists in etching the surface of the plate in an electrolyte and measuring the parameters of plates. As a distinguishing feature of the patent, the method is designed for increased inspection productivity. A strain gauge is used for determining the greatest deformation of the plate during the etching process.



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USSR

UDC 621.396.677

KOMISSAROV, YA. S., PAVLYUK, V. A., KRIVOSHEYEV, YE. F., OSTROVSKAYA, L. S.

"Experimental Study of a Diffraction Problem"

Radiotekhnika. Resp. mezhved. nauchno-tekhn. sb. (Radio Engineering. Republic Interdepartmental Scientific and Technical Collection), 1970, vyp. 14, pp 106-109 (from RZh-Radiotekhnika, No 4, Apr 71, Abstract No 4B31)

Translation: The diffraction properties of periodic antenna arrays are investigated. There are 3 illustrations and a 3-entry bibliography.

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1/2 036 UNCLASSIFIED PROCESSING DATE--30OCT70

TITLE--STABILITY OF THE STEADY COMBUSTION REGIME OF A SOLID FUEL -U-

AUTHOR-(02)-KOMISSAROVA, G.I., SULIMA, I.M.

COUNTRY OF INFO--USSR

SOURCE--PMTF ZHURNAL PRIKLADNOI MEKHANIKI I TEKHNICHESKOI FIZIKI, JAN.-FEB. 1970, P. 163-167

DATE PUBLISHED-------70

SUBJECT AREAS--PROPULSION AND FUELS

TOPIC TAGS--SOLID PROPELLANT COMBUSTION, COMBUSTION STABILITY, COMBUSTION ANALYSIS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1996/1542 STEP NO--UR/0207/70/000/000/0163/0167

CIRC ACCESSION NO--AP0118525

UNCLASSIFIED

2/2 036 UNCLASSIFIED PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0118525

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. STUDY OF THE EFFECT OF HEAT GENERATION IN THE REACTION ZONES AND OF AN INHOMOGENEITY IN THE TEMPERATURE AND VELOCITY FIELDS ON THE STABILITY OF THE STEADY COMBUSTION REGIME OF A SOLID FUEL. USING THE METHOD OF SMALL PERTURBATIONS, A NEW CRITERION OF STABILITY OF THE STEADY COMBUSTION REGIME OF A SOLID FUEL IS OBTAINED, AND THE PARAMETERS ESSENTIALLY AFFECTING THE STABILITY ARE DETERMINED. THE PROBLEM IS SOLVED IN A ONE DIMENSIONAL FORMULATION, ASSUMING THAT THE COORDINATE SYSTEM IS INVARIABLY CONNECTED TO THE BOUNDARY SEPARATING THE DOLID FUEL FROM ITS DECOMPOSITION PRODUCTS.

UNCLASSIFIED

USSR

UDC: 533.9.082.5

IGNATOV, A. B., KOMISSAROVA, I. I., OSTROVSKAYA, G. V., and SHAPIRO, L. L.

"Double-Wavelength, Single-Exposure Holographic Plasma Interferometry"

Leningrad, Zhurnal Tekhnicheskoy Fiziki, vol. 41, No. 2, 1971, pp 417-423

Abstract: This paper is connected with an article written by the third-named of the authors above and published in the same journal (vol. 40, No. 11, 1970). In this earlier article the author proposed a method of double-wavelength, single-exposure holographic interferometry in which the form and position of the interference bands are determined only by the dispersion characteristics of the investigated object. Essentially, this method involves two wavelengths, one of which is half the other, radiated by a hologram of a phased object on photomaterial with a light transmissivity which is a nonlinear function of the illumination on it. In the present paper,

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USSR

IGNATOV, A. B., et al, Zhurnal Tekhnicheskoy Fiziki, Vol. 41, No. 2, 1971, pp 417-423

a closer and more detailed look is taken at this method, and a description is given of the first attempt to use it for interferometric investigation of a plasma. The authors found that dispersion interferometry gives results which are inferior to those of their method. They are with the A. F. Ioffe Physico-Technical Institute of Leningrad.

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USSR

UDC 620.193.5

NIKITIN, V. I., KOMISSAROVA, I. P., and PANKRAT'YEVA, N. V., Academy of Civil Aviation; Central Scientific Research, Planning and Design Institute imeni I. I. Polzunov, Leningrad

"Experimental Verification of the Parametric Method of Calculating the Heat Resistance of Metals at Varying Temperature"

Kiev, Fiziko-Khimicheskaya Mekhanika Materialov, Vol 9, No 5, 1973, pp 71-75

Abstract: Steel brands 20, Kh18N10T, and Kh25T were subjected to heat resistance tests in air under steplike changing temperature conditions, the interval of the latter being up to 150°. A graphic variant of the parametric method based on the use of an equivalent time nomogram and the parametric heat resistance diagram were used for the calculation of the characteristic of heat resistance, the mass loss of the metal. Tabulated experimental data of the mass loss of the first two steel brands at two-

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USSR

NIKITIN, V. I., et al., Fiziko-Khimicheskaya Mekhanika Materialov, Vol 9, No 5, 1973, pp 71-75

-step and multistep temperature change are in good agreement with calculated data (maximum difference 22% and 24%, respectively). The correlation of calculated and experimental data for Kh25T steel shows a maximum difference of 15% at relatively complex multistep temperature change conditions. The investigations indicate the possibility of calculating with sufficient accuracy the heat resistance of metals at changing temperature by the parametric method. Three figures, three tables, three bibliographic references.

2/2

USSR

UDC: 536.5:621.383

Anufriev, A. A., Komissarova, L. M., Sakharov, V. P.

"Photoelectric Sensor for Recording of Low-power Infrared Radiation"

Moscow, Pribory i Sistemy Upravleniya, No 5, 1972, pp 48-49.

Abstract: The sensor described in this article was designed for recording weak light signals radiated by heated substances in an adiabatic compression chamber. The sensor consists of an optical aperture, light guide, interference light filter, modulator disc, photoresistor and standard signal source. The device can record signals taken from the photoresistor in the range of 2-20 μv with a time constant of about 10^{-3} sec, with linear accelerations up to 150 g and vibrations at 100-2000 Hz, and therefore can be used for a number of problems where the properties of a gas and control of a process in the gas involve the radiaiton of light energy.

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USSR

UDC 546.682.3+546.824-31

ROZDIN, I. A., SPIRIDONOV, F. M., KOMISSAROVA, L. N. and PLYUSHCHEV, V. YE.,
Moscow Institute of Fine Chemical Technology imeni M. V. Lomonosov

"Interaction of Titanium Dioxide With Indium Oxide"

Moscow, Izvestiya Akademii nauk SSSR, Neorganicheskiye materialy, Vol 7, No 10, Oct 71, pp 1798-1800

Abstract: Described here are refined conditions for the synthesis of indium titanate as well as the nature of the interaction of In_2O_3 with TiO_2. The interaction was studied on specimens prepared by the simultaneous precipitation of hydroxides from chloride and nitrate solutions of In and Ti salts using ammonia. The x-ray diffraction study indicates that the reaction product -- indium titanate -- exists in the narrow region near the 50% mol. wt. TiO_2 and is of the formula In_2TiO_5; it is classed with the rhombic system with parameters a_0=10.47; b_0=9.895; c_0=14.51Å. In_2TiO_5 is a white substance; it melts at 1750°C. Relative to crystal optics, In_2TiO_5 is

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USSR

ROZDIN, I. A., et al, Izvestiya Akademii nauk SSSR, Neorganicheskiye materialy, Vol 7, No 10, Oct 71, pp 1798-1800

anisotropic with an index of refraction >1.76. After having been fired for 3 hrs, In_2TiO_5 will not dissolve in 25% HNO_3 but almost totally decomposes in HCl (1:1) with In going into the solution and Ti remaining in the precipitate. There are no analogs for the In_2O_3-TiO_2 system in reference literature. (3 illustrations, 3 bibliographic references).

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USSR

UDC 546.681.3'824:542.915

SPIRIDONOV, F. M., ROZDIN, I. A., SOTNIKOVA, M. N., KONISSAROVA, L. N., and PLYUSHCHEV, V. Ye., Moscow State University imeni M. V. Lomonosov, Moscow Institute of Fine Chemical Technology imeni M. V. Lomonosov

"Gallium Titanates"

Moscow, Izvestiya Akademii Nauk SSSR, Neorganicheskiye Materialy, Vol 7, No 5, May 71, pp 817-824

Abstract: A detailed study of gallium titanates by the method of roentgenographic analysis is presented. The experimental technique is briefly described. Gallium metatitanates, dititanates, and titanates were considered, and experimental data presented in tabular form show that the first two are formed at 1400°C and the latter at 950°C. The gallium metatitanate is stable at more than 1100°C, and in a metastable state it undergoes a polymorphic transformation at 960°. The dititanate is an unstable compound having a series of polymorphic transformations. The δ-phase (having a deformed rutile lattice) is the most stable gallium titanate. Melting points of gallium titanates are 1590 ± 20°C for $Ga_2O_3 \cdot Ti\ O_3$; 1680 ± 50°C for $Ga_2O_3 \cdot 2\ Ti\ O_2$; and 1860 ± 50°C for the δ-phase.

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AP9053075

UR 0289

PRIMARY SOURCE: Izvestiya Sibirskogo Otdeleniya, AN SSSR, Seriya Khimicheskikh Nauk, Nr 12(162), Nr 5, pp 58-62

N. P. Anoshina,
V. M. Schatzky, L. N. Komissarova

ON THE SOLUBILITY SCANDIUM CHROMATES TYPE $MSc(CrO_4)_2$ IN THE WATER SOLUTIONS M_2CrO_4 AND $M_2Cr_2O_7$

The solubility $MSc(CrO_4)_2 \cdot 2H_2O$ (M=NH_4, Na, K) is studied in the solutions of chromate and dichromate of alkaly metals and ammonium, corresponding to them.

1949 1831

1/2 012 UNCLASSIFIED PROCESSING DATE--13SEP70

TITLE--THERMAL STABILITY OF SCANDIUM HYDROXIDE THIOCYANATE -U-

AUTHOR-(04)-GULIA, V.G., KOMISSAROVA, L.N., KRASNOVARSKAYA, A.A., SAS, T.M.

COUNTRY OF INFO--USSR

SOURCE--VESTN. MOSK. UNIV., KHIM. 1970, 11(1), 38-41

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--THERMAL STABILITY, SCANDIUM COMPOUND, HYDROXIDE, THIOCYANATE, HYDROLYSIS, CHEMICAL DECOMPOSITION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1987/1098 STEP NO--UR/0189/70/011/001/0038/0041

CIRC ACCESSION NO--AP0104496

UNCLASSIFIED

2/2 012 UNCLASSIFIED PROCESSING DATE--18SEP70

CIRC ACCESSION NO--AP0104496

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE THERMAL STABILITY OF SC HYDROXIDE THIOCYANATE SC SUB4 (OH)SUB2(NCS)SUB10.11H SUB2 O IS STUDIED. THE COMPD. IS COMPLETELY UNSTABLE IN AIR EVEN AT ROOM TEMP. IT IS HYDROSCOPIC, ABSORBS MOISTURE INCREASING ITS WT. BY 24.71PERCENT, AND THEN SLOWLY DECOMPS. BY HYDROLYSIS.

UNCLASSIFIED

Acc. Nr. AP0055937 Abstracting Service: CHEMICAL ABST. 6/70 Ref. Code 4R0078

117254p Properties of zirconium and hafnium oxypropionates. Prozorovskaya, Z. N.; Komissarova, L. N.; Shestakova, T. V. (USSR). *Zh. Neorg. Khim.* 1970, 15(2), 435–40 (Russ). Products of thermal decompn. of $MO(EtCO_2)_2.H_2O$ (M = Zr or Hf) were, at 50–130°, $MO(EtCO_2)_2.0.5H_2O$; at 150–250°, $M_2O_3(Et_2CO_2)_2$; and, at 400–500°, MO_2; analyses are given. Intermediate products of the decompn. did not contain the M:O group (ir spectra). Diagrams of isothermal soly. of $MO(EtCO_2)_2.H_2O$ in $EtCO_2H$ were constructed and the compns. of liq. and solid phases are tabulated. The compn. of the solid phase ($MO(EtCO_2)_2.H_2O$) in the 10–100 wt. % propionic acid range remained unchanged. HMJR

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REEL/FRAME
19841266

Acc. Nr: AP0055938 Abstracting Service: CHEMICAL ABST. 6-70 Ref. Code: 4R0038

117288c Zirconium and hafnium nitrobenzoates. Smirnov, V. A.; Prozorovskaya, Z. N.; Kommissarova, L. N. (Mosk. Gos. Univ., Moscow, USSR). *Zh. Neorg. Khim.* 1970, 15(2), 341-6 (Russ). Acetylacetonato complexes of Zr or Hf react with *p*- or *o*-nitrobenzoic acid to give $M(p\text{-}C_7H_4O_4N)_4$ (I) (M = Zr or Hf) or $Zr_4O(o\text{-}C_7H_4O_4N)_{14}$ and $Hf(o\text{-}C_7H_4O_4N)_4$, resp. The compds. were studied by DTA and thermogravimetry. Zr-(p-$C_7H_4O_4N)_4$ and $Zr_4O(o\text{-}C_7H_4O_4N)_{14}$ decomp. thermally to $Zr_2O(C_7H_4O_4N)_6$, $Zr_4O_5(C_7H_4O_4N)_4$, and ZrO_2, and Zr(p-$C_7H_4O_4N)_4$ forms $ZrO(C_7H_4O_4N)_2$ in addn. to the mentioned compds. Analogously Hf(p-$C_7H_4O_4N)_4$ and $Hf(o\text{-}C_7H_4O_4N)_4$ decomp. to $Hf_4O(C_7H_4O_4N)_{14}$, $Hf_4O_5(C_7H_4O_4N)_4$, and HfO_2 and Hf(p-$C_7H_4O_4N)_4$ forms $Hf_2O(C_7H_4O_4N)_6$ in addn. to the mentioned compds. Activation energies of thermal decomposn. of I were ~20-1 kcal/mole and of $M_4O(o\text{-}C_7H_4O_4N)_{14}$ were 41 and 46 kcal/mole for M = Zr and Hf, resp. HMJR

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1/2 009 UNCLASSIFIED PROCESSING DATE--20NOV70
TITLE--COMPOSITION AND SOME PROPERTIES OF COMPLEX SCANDIUM SULFATES -U-

AUTHOR-(03)-SHATSKIY, V.M., KOMISSAROVA, L.N., BASHKOV, B.I.

COUNTRY OF INFO--USSR

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TOPIC TAGS--COMPLEX COMPOUND, SCANDIUM COMPLEX, SULFATE, THERMAL DECOMPOSITION

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ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. SOLY. DIAGRAM OF (NH SUB4) SUB2 SO SUB4 NEGATIVE SC SUB2 (SO SUB4) SUB3 NEGATIVE H SUB2 O SYSTEM AT 25DEGREES IS PRESENTED. THE SYSTEM FORMS NH SUB4 SC(SO SUB4) SUB2 (I) AND (NH SUB4) SUB3 SC(SO SUB4) SUB3 (II). I, HAVING NS ALPHA 1.560 PLUS OR MINUS 0.003 AND GAMMA 1.565 PLUS OR MINUS 0.003 IS THERMALLY STABLE SMALLER THAN OR EQUAL TO 390DEGREES, DECOMPN. AT LARGER THAN390DEGREES TO SC SUB2(SO SUB4) SUB3 AND AT LARGER THAN 850DEGREES, TO SC SUB2 O SUB3. THERMALLY LESS STABLE II DECOMP. AT 330-405DEGREES TO I AND THEN TO SC SUB2(SO SUB4) SUB3 AND FINALLY TO SC SUB2 O SUB3.

FACILITY: MOSK. GOS. UNIV. IM. LOMONOSOVA, MOSCOW, USSR.

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TITLE--THIOCYANATOSCANDATES OF SOME QUATERNARY AMMONIUM BASES -U-

AUTHOR-(03)-YEREMIN, YU.G., KATOCHKINA, V.S., KOMISSAROVA, L.N.

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CIRC ACCESSION NO--AP0136179
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. SOLY. OF (R SUB4 N) SUB3 (SC(NCS) SUB6) (I) (R EQUALS ME, ET, OR BU) IN H SUB2 O, MECOET, ACETOPHENONE, ETOH, AMYL ALC., ACOET, AND ACOBU IS GIVEN. ELEC. COND. OF I IN MEOH OR CONCD. AQ. SOLNS. SHOWS THAT THESE SALTS ARE 3:1 ELECTROLYTES AND THEY DECOMP. ON DILN. THE ANION HAS NCS COORDINATED VIA N (DELTA(NCS) EQUALS 490, NU(CS) 825, AND NU(CN) 2050-100 CM PRIME NEGATIVE1). I DECOMP. GREATER THAN 180DEGREES.

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