2/2 037 UNCLASSIFIED PROCESSING DATE--27NOV70

CIRC ACCESSION NO--AT0129326

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE WIDE RANGE OF SPACE INVESTIGATION AS WELL AS HIGH COST AND LABOUR CONSUMING CHARACTERISTICS OF SPACE INFORMATION SYSTEMS MAKE IT NECESSARY TO TACKLE THE PROBLEM OF SELECTING THEIR OPTIMUM DESIGN. IN ORDER TO AVOID ERRORS AND UNNECESSARY EXPENDITURE THIS SELECTION HAS TO BE CARRIED OUT DURING THE FIRST STAGES OF THE WORK BY COMPARING THE DIFFERENT METHODS AVAILABLE FOR THEIR DESIGN USING A COMMON INTEGRAL CHARACTERISTIC CALLED THE GENERALIZED EFFICIENCY CRITERION. THIS CRITERION HAS TO BE HIGHLY INFORMATIVE, NUMERICAL AND USABLE IN ANY DEVELOPMENTS OF SPACE INFORMATION SYSTEMS ON THE ONE HAND AND MUST PERMIT THE USE OF VARIOUS FORMS IN ACCORDANCE WITH THE PECULIARITIES OF GIVEN SYSTEMS ON THE OTHER HAND. TO SOLVE THE PROBLEM OF EVOLVING A GENERALIZED EFFICIENCY CRITERION IT IS NECESSARY TO DEVELOP A GENREALIZED MODEL OF THE SPACE INFORMATION SYSTEM AND TO INVESTIGATE ITS STATISTICAL DYNAMICS AS WELL AS TO DEVELOP AN ALGORITHM DEFINING THE METHOD OF CHOOSING THE OPTIMUM DESIGN. THE ALGORITHM IS TO PROVIDE A SYSTEMATIZED METHOD OF DESIGN ACCORDING TO WHICH THE SPACE INFORMATION SYSTEM IS CONSIDERED TO BE A CERTAIN WHOLE, HAVING DEFINITE PROPERTIES COMMON TO ALL THE SYSTEMS OF THIS CLASS. IN THIS PAPER A GENERALIZED MODEL OF A SPACE INFORMATION SYSTEM IS SUGGESTED, ITS STATISTICAL DYNAMICS ARE INVESTIGATED, A GENERALIZED FORM OF THE EFFICIENCY CRITERION AND THE ALGORITHM OF THE OPTIMUM DESIGN OF SPACE INFORMATION SYSTEMS ARE GIVEN. THE PROCEDURE FOR OBTAINING THE CONCRETE FORMS OF THIS CRITERION IS DISCUSSED.

UNCLASSIFIED

1/2 031 UNCLASSIFIED PROCESSING DATE--27NOV70

TITLE--EFFECTIVENESS OF SPACE INFORMATION SYSTEMS EVALUATION PROBLEMS -U-

AUTHOR--MATVEYEVSKIY, S.F.

COUNTRY OF INFO--USSR, FRANCE

SOURCE--3RD IFAC SYMPOSIUM ON SPACE CONTROL, TOULOUSE, FRANCE, MARCH 1970

DATE PUBLISHED--------70

SUBJECT AREAS--BEHAVIORAL AND SOCIAL SCIENCES, ELECTRONICS AND ELECTRICAL ENGR., SPACE TECHNOLOGY

TOPIC TAGS--SCIENTIFIC INFORMATION, SPACECRAFT DATA GATHERING EQUIPMENT, SPACECRAFT DATA ANALYSIS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3008/1928 STEP NO--FR/0000/70/000/000/0000/0000

CIRC ACCESSION NO--AT0138791

UNCLASSIFIED

2/2 031 UNCLASSIFIED PROCESSING DATE--27NOV70

CIRC ACCESSION NO--AT0138791

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE MODERN COMPLEXES OF TECHNICAL MEANS SERVING THE MAIN PURPOSE OF CONQUERING SPACE ARE INTENDED FOR OBTAINING INFORMATION. AMONG THEIR GENERAL PROPERTIES THE FOLLOWING MAY BE MENTIONED: DEFINITE INTEGRITY -THE TENDENCY TO BEHAVE AS A WHOLE-, THE GREAT COMPLEXITY AND VARIETY OF STRUCTURES AND LINKES, VARIOUS INTERFERENCE EFFECTS WHICH MAY BE CONSIDERED AS COUNTERACTION AND MAY COUNT FOR STOCHASTIC GAME CHARACTER OF UTILIZATION, CONSIDERABLE TIME AND MATERIAL EXPENSES FOR DEVELOPEMNT AND OPERATION, DIFFICULTLY OF REPETITION AND THE GREAT IMPORTANCE OF THE RESULTS OF EVERY SPECIFIC EXPERIMENT. THE COMMONNESS OF MAIN PROPERTIES GIVES REASON FOR MARKING OUT THE ABOVE COMPLEXES INTO SEPARATE CLASS OF LARGE TECHNICAL SYSTEM E.G. INFORMATION SPACE SYSTEMS. -I.S. LARGE SCALE SPACE EXPLORATION AS WELL AS HIGH COST AND LABOUR CONSUMPTION OF I.S.S. PUT UP AS A PRIMARY PROBLEM THE CHOICE OF THEIR OPTIMAL INFRASTRUCTURE. TO AVOID MISTAKES AND NONPRODUCTIVE WASTES THIS CHOICE SHOULD BE MADE AT THE INITIAL DESIGN STAGE BY MEANS OF OBJECTIVE COMPARISON OF STRUCTURE ALTERNATIVES AVAILABLE WITH THE AID OF CERTAIN INTEGRAL INDEX WHICH MAY BE CALLED GENERALIZED EFFECTIVENESS CRITERION. THIS SHOULD BE THE MOST INFORMATIVE, NUMERICAL AND SUITABLE FOR USE IN ANY I.S.S. DEVELOPMENT.

UNCLASSIFIED

1/2 018 UNCLASSIFIED PROCESSING DATE--23OCT70

TITLE--CHRONIC TONSILLITIS AND HEART -U-

AUTHOR--MATVEYKOV, G.P.

COUNTRY OF INFO--USSR

SOURCE--ZDRAVOOKHRANENIYE BELORUSSII, 1970, NR 4, PP 44-48

DATE PUBLISHED--------70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--RESPIRATORY SYSTEM DISEASE, HEART DISEASE, ELECTROPHYSIOLOGY, DIAGNOSTIC MEDICINE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3001/0831 STEP NO--UR/0477/70/000/004/0044/0048

CIRC ACCESSION NO--AP0126508

UNCLASSIFIED

2/2 018 UNCLASSIFIED PROCESSING DATE--23OCT70

CIRC ACCESSION NO--AP0126508

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. FOR THE PURPOSE OF DETECTING THE CHRONIC TONSILLITIS INFLUENCE ON THE HEART FUNCTIONAL STATE 235 PATIENTS WITH CHRONIC TONSILLITIS HAVE BEEN INVESTIGATED. IN A MAJORITY OF THE PATIENTS CONSIDERABLE CHANGES HAVE BEEN DETECTED OF THE HEART ELECTROMECHANIC ACTIVITY; THE BASIS OF THEM IS DYSTROPHY OF THE MYOCARDIUM AND CONDUCTING SYSTEM, THE LATTER CARRIES A REVERSIBLE CHARACTER IN THE MAJORITY OF PATIENTS UNDER THE TREATMENT INFLUENCE. THE CONBINATION OF CLINICAL, LABORATORY AND ELECTROPHYSIOLOGIC FINDINGS IN 10.4PERCENT OF THE PATIENTS HAS ALLOWED US TO MAKE THE DIAGNOSIS AS TONSILLOGENOUS MYOCARDITIS. FACILITY: 2-YA KAFEDRA GOSPITAL'NOY TERAPII MINSK. MEDITSINSKOGO INSTITUTA.

UNCLASSIFIED

USSR

UDC 621.791.042.048

MILICHENKO, S. L., and MATVEYSHIN, Ye. N., Zaporozhe Machine-Building Institute imeni V. Ya. Chubar'

"Welding Materials for Wear-Resistant Copper and Nickel Alloys"

Kiev, Avtomaticheskaya Svarka, No 12, Dec 70, pp 60-62

Abstract: The purpose of the work described in this article was to create materials for fusing the parts of machines for continuous brewing of cellulose, the details being subject to wear due to friction in a caustic medium in steam with stainless steel. An investigation of such materials as aluminum and silicon-manganese bronze, high-chromic cast iron, and "Ni-Resist" as well as several copper-nickel alloys was made. These investigations showed that the materials most resistant to wear were the copper-nickel alloys with a composition of 46-50% Ni and 4.0-6.0% Si. The introduction of silicon causes the separation of the hardened phase of Ni_3Si which forms a wear-resistant substance. The welding seam should contain a sufficient quantity of nitride-forming elements in welding nickel alloys, since investigations have shown that pores and cracks in the welds are caused by nitrogen and oxygen. Tests were also made to establish the optimal composition of plating on the electrodes for making the melts.

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1/2 009 UNCLASSIFIED PROCESSING DATE--20NOV70

TITLE--SPECTROPHOTOMETRIC STUDY OF PLATINUM COMPLEXES WITH STANNOUS CHLORIDE -U-

AUTHOR-(02)-MATVIYENKO, L.G., YELIZAROVA, G.L.

COUNTRY OF INFO--USSR

SOURCE--ZH. ANAL. KHIM. 1970, 25(2), 301-6

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--PLATINUM COMPOUND, COMPLEX COMPOUND, TIN CHLORIDE, SPECTROPHOTOMETRIC ANALYSIS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3001/0382 STEP NO--UR/0075/70/025/002/0301/0306

CIRC ACCESSION NO--AP0126137

UNCLASSIFIED

2/2 006 UNCLASSIFIED PROCESSING DATE--20NOV70

CIRC ACCESSION NO--AP0126137

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. PT FORMS 2 COMPLEXES WITH SNCLSUB2 AT A PT:SN RATIO OF 1:1 AND 1:2, RESP., IN SOLNS. OF 1-2M CHLORIDES AT A CONST. IONIC STRENGTH OF MU EQUALS 2. IN SOLNS. CONTG. 0.25-0.5M CHLORIDES AT THE SAME IONIC STRENGTH, A COMPLEX WITH A PT:SN RATIO OF 1:2 IS FORMED. THE AV. DIAADCN. CONST. IN THE 2M HCL MEDIUM EQUALS 1.1 TIMES 10 PRIME NEGATIVE6 AND IN 0.25M HCL 3.7 TIMES 10 PRIME NEGATIVE8. THE EXISTENCE OF CIS TRANS ISOMERIC FORMS OF THE PT COMPLEX WITH SNCL SUB2 IS SUGGESTED. THE COEFF. OF MOLAR ABSORPTIVITY AT 310 M MU IS 5 TIMES HIGHER THAN THAT AT 400 M MU, WHICH ENABLES INCREASING THE SENSITIVITY OF THE PHOTOMETRIC DETN. OF PT TO 0.0007 GAMMA-ML.

FACILITY: INST. CATAL., NOVOSIBIRSK, USSR.

UNCLASSIFIED

1/2 018 UNCLASSIFIED PROCESSING DATE--16OCT70

TITLE--DEPENDENCE OF THE TEMPERATURE QUENCHING OF THE LUMINESCENCE OF PHOTOEMULSION LAYERS ON EXCITATION DENSITY, AND ITS CONNECTION WITH THE

AUTHOR-(04)-BELOUS, V.M., KARTUZHANSKIY, A.L., MATVIENKO, V.I., SHUR, L.I.

COUNTRY OF INFO--USSR

SOURCE--OPT. SPEKTROSK. 1970, 28(2), 311-16

DATE PUBLISHED--------70

SUBJECT AREAS--METHODS AND EQUIPMENT

TOPIC TAGS--LUMINESCENCE QUENCHING, SILVER COMPOUND, NUCLEAR EMULSION, ELECTRON CAPTURE, PHOTOSENSITIVITY, LOW TEMPERATURE EFFECT

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1996/1469 STEP NO--UR/0051/70/028/002/0311/0316

CIRC ACCESSION NO--AP0118458

UNCLASSIFIED

2/2 018 UNCLASSIFIED PROCESSING DATE--16OCT70

CIRC ACCESSION NO--AP0118458

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. TEMP. QUENCHING OF THE GREEN LUMINESCENCE OF A NO. OF NUCLEAR EMULSIONS WAS STUDIED. WITH DECREASING EXCITATION D., THE QUENCHING REGION IS SHIFTED TO LOWER TEMPS. AT A FIXED TEMP., AN INVERSE PROPORTIONALITY BETWEEN THE LUMINESCENCE INTENSITY AND IONIC COND. OF THE EMULSION MICROCRYSTALS EXISTS. THE ACTIVATION ENERGY FOR THE LUMINESCENCE QUENCHING IS 0.12 PLUS OR MINUS 0.02 EV. THE IONIC MECHANISM OF LUMINESCENCE QUENCHING OF THE AG(BR, I) PHOTOEMULSION MICROCRYSTALS WAS CONFIRMED. THE CAPTURE CENTERS FORMED IN THE PRESENCE OF L,PHENYL,5,MERCAPTOTETRAZOLE (I), ARE NOT VACANCIES; THEY ARE PROBABLY CONNECTED WITH A I-AG PRIME POSITIVE COMPLEX AND WORK AS ELECTRON TRAPS. TEMP. DEPENDENCE OF THE SENSITIVITY OF THE SAME PHOTOEMULSIONS TO THE ALPHA AND BETA PARTICLES WAS MEASURED. AT SMALLER THAN 77DEGREESK, A PECULAIR INVERSION TAKES PLACE; THE SENSITIVITY TO THE WEAKLY IONIZING PARTICLES IS GREATER THAN THE SENSITIVITY TO THE STRONGLY IONIZING PARTICLES WHILE AT NORMAL TEMPS. THIS RELATIONSHIP IS JUST THE OPPOSITE. IN THE PRESENCE OF I, ADDNL. SHALLOW LEVELS OF THE ELECTRON CAPTURE OCCUR. DURING A SUBSEQUENT HEATING OF THE EMULSION BEFORE DEVELOPING, ELECTRONS CAN FREE THEMSELVES THERMALLY FROM THESE LEVELS AND CAN PASS NOT ONLY TO THE RADIATION RECOMBINATION LEVELS BUT ALSO TO DEEPER LEVELS WHICH DET. THE PHOTOGRAPHIC SENSITIVITY.

UNCLASSIFIED

APPROVED FOR RELEASE: 09/01/2001 CIA-RDP86-00513R002202010008-6"

1/2 025 UNCLASSIFIED PROCESSING DATE--16OCT70

TITLE--THE SURGICAL TREATMENT OF REGIONAL METASTASES OF CANCER OF THE UPPER RESPIRATORY TRACT -U-

AUTHOR-(03)-PACHES, A.I., FALILEYEV, G.V., MATYAKIN, YE.G.

COUNTRY OF INFO--USSR

SOURCE--VESTNIK OTORINOLARINGOLOGII, 1970, NR 3, PP 72-76

DATE PUBLISHED--------70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--SURGERY, METASTASIS, CANCER, RESPIRATORY SYSTEM, LYMPHATIC SYSTEM, VEIN, NERVE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1989/1250 STEP NO--UR/0607/70/000/003/0072/0076

CIRC ACCESSION NO--AP0107726

UNCLASSIFIED

2/2 025 UNCLASSIFIED PROCESSING DATE--16OCT70

CIRC ACCESSION NO--AP0107726

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE PAPER PRESENTS A DESCRIPTION OF THE OPERATION OF FACIAL SHEATH REMOVAL OF THE CELLULAR TISSUE OF THE NECK IN METASTASES OF MALIGNANT TUMORS OF THE UPPER RESPIRATORY TRACT. ITS ADVANTAGE OVER CRILE'S OPERATION CONSISTS IN THAT IT PRESERVES THE INTERNAL JUNGULAR VEIN, THE STERNOCLEIDOMASTOID MUSCLE AND ACCESSORY NERVE. THIS PRODUCES BETTER FUNCTIONAL AND COSMETIC RESULTS. THIS TYPE OF OPERATION MAY BE PERFORMED IN CLINICALLY OBSCURE METASTASES OR MOBILE LYMPH NODES NONADHERED TO THE MUSCLE AND VEIN. THE OPERATION MAY BE EFFECTED SIMULTANEOUSLY FROM BOTH SIDES. THIS TYPE OF OPERATION BY ITS RADICAL CHARACTER IS NOT INFERIOR TO CLILE'S OPERATION. FROM 1965 THE AUTHORS PERFORMED 117 SUCH OPERATIONS IN 104 PATIENTS WERE FOLLOWED UP (28 OF THEM OVER THREE YEARS)-RELAPSES OF REGIONAL METASTASES WERE NOTED IN 7.4 PER CENT OF CASES. FACILITY: OTO. OPUKHOLEY GOLOVY I SHEI INSTITUTA EKSPERIMENTAL'NOY I KLINICHESKUY ONKOLOGII AMN SSSR AND KAFEDRY ONKOLOGII TSENTRAL. INST. USOVERSHENSTVOVANIYA VRACHEY.

UNCLASSIFIED

MATYASH, A.A.

JPRS 57008

6-72

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VII-5 EFFECT OF SOME GAS DYNAMIC FACTORS IN THE SOURCE ZONE ON THE GROWTH PROCESSES OF EPITAXIAL LAYERS OF GALLIUM ARSENIDE IN THE CHLORIDE SYSTEM

[Article by A. A. Matyash, G. B. Lun'kina, S. S. Strel'chenko, V. V. Lebedev, Kaluga; Novosibirsk, III Simpozium po Protsessam Rosta i Sinteza Poluprovodnikovykh Kristallov i Plenok, Russian, 12-17 June, 1972, p 92]

The growth of epitaxial layers of gallium arsenide in a chloride flow system [Ga + $AsCl_3$ + H_2] is determined to a significant degree by the processes taking place in the source zone.

Under the assumption that the mass delivery of the components of the vapor-gas mixture to the surface of the source takes place as a result of molecular diffusion, a quantitative calculation was made of the degree of completeness of the interaction of the vapor-gas flow in a broad range of variation of its linear velocities. The experimental results obtained satisfactorily coincided with the calculated results.

The equations of thermodynamic equilibrium in the source zone were compiled and calculated on a computer taking into account the degree of completeness of the interaction (β). The partial pressures of the components of the vapor-gas mixture were calculated in a broad temperature range for β = 0.1, 0.2, 0.3, ... 0.9, 1.

A study was made of the effect of the degree of completeness of the interaction on the composition of the gas phase in the crystallization zone and the growth rate of the epitaxial layers.

APPROVED FOR RELEASE: 09/01/2001 CIA-RDP86-00513R002202010008-6"

MATYASH, A.A.

JPRS 57208
6-73

XIV-15. STRESSES AND STRUCTURAL DEFECTS IN EPITAXIAL SOLID SOLUTIONS OF GaAs

[Article by V. N. [illegible], [illegible] Zakharov, G. V. Bol'shakova, A. A. Matyash, Kaluga, Novosibirsk, III Simpozium po Protsessam Rosta i Sinteza Poluprovodnikovykh Kristallov i Plenok, Russian, 12-17 June 1972, p 201]

A study was made of the causes of the occurrence of stresses and structural defects in epitaxial layers of solid solutions of GaAs.

Measurements were made of the bending of the structures at different temperatures, and the difference of the coefficients of thermal expansion of the substrate and the films with different composition of the solid solutions was determined. The dislocation structure of the solid solutions was investigated.

It was demonstrated that the stresses causing bending of the structures were caused both by the difference of coefficients of thermal expansion of the film and the substrate and inhomogeneity of the distribution of the composition of solid solutions with respect to depth of the epitaxial layer. The dislocation structure of the epitaxial solid solutions was basically caused by local inhomogeneities of the composition and also the stresses as a result of the difference in the coefficient of thermal expansion of the film and the substrate.

1/2 011 UNCLASSIFIED PROCESSING DATE--20NOV70

TITLE--ESR OF ENERGETICALLY NONEQUIVALENT TETRAGONAL CU PRIME2POSITIVE IONS IN HYDRATED CUNAA ZEOLITE -U-

AUTHOR-(04)-SILCHENKO, V.A., PAFOMOV, N.N., MATYASH, I.V., PIONTKOVSKAYA, N.A.

COUNTRY OF INFO--USSR

SOURCE--DOPOV. AKAD. NAUK UKR. RSR, SER. A 1970, 32(3), 235-7

DATE PUBLISHED--------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--ELECTRON SPIN RESONANCE, COPPER, ION, ZEOLITE, EPR SPECTRUM

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3002/1298 STEP NO--UR/0441/70/032/003/0235/0237

CIRC ACCESSION NO--AT0128712

UNCLASSIFIED

2/2 011 UNCLASSIFIED PROCESSING DATE--20NOV70

CIRC ACCESSION NO--AT0128712

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. ANAL. OF THE MEASURED EPR SPECTRA OF CU PRIME2POSITIVE IONS IN A HYDRATED A TYPE ZEOLITE IN WHICH SIMILAR TO 20PERCENT OF NA PRIME POSITIVE IONS WAS REPLACED (BY USUAL ION EXCHANGE PROCEDURE) REVEALED THAT THE CU PRIME2POSITIVE IONS IN THE ZEOLITE ARE IN 2 ENERGETICALLY NONEQUIV. STATES MAGNITUDE OF X PRIME2-Y PRIME2 GREATER THAN AND MAGNITUDE OF 3Z PRIME2-R PRIME2 GREATER THAN. THE SPECTRUM OF THE HYDRATED ZEOLITE CONTG. SIMILAR TO 20PERCENT CU PRIME2POSITIVE IONS IS CONSIDERED AS A SUPERPOSITION OF 2 COMPONENTS: THAT OF LOW CU CONTENT ZEOLITE (UP TO SIMILAR TO 8PERCENT) AND OF A DEHYDRATE (AT 500DEGREES AND 10 PRIME NEGATIVE6 MM HG) ZEOLITE. THE EXPTL. EPR SPECTRUM SPECTRUM OF CU PRIME2POSITIVE IONS IN THE GROUND STATE MAGNITUDE OF 3Z PRIME2-R PRIME2 GREATER THAN IS DESCRIBED FOR THE 1ST TIME. FACILITY: DONETS. FIZ.-TEKH. INST., DONETSK, USSR.

UNCLASSIFIED

USSR

UDC: 669.71.053.21

LEONT'YEV, L. I., MATYASH, V. G., DAVYDOV, A. D., KASHIN, V. V., UTKOV, V. A., IVANOVA, S. V.

"Reducibility of Highly Basic Bauxite Sinters"

Vosstanovimost' Vysokoosnovnykh Boksitovykh Aglomeratov [English version above], Sverdlovsk, 1973, 9 pp (Translated from Referativnyy Zhurnal Metallurgiya, No 8, 1973, Abstract No 8G155DEP, by the authors).

Translation: The extraction of moist limestone from blast furnace charges significantly improves the technical and economic indicators of the blast furnace process. The possibility is demonstrated of producing a bauxite sinter with basicity 6.0, allowing complete elimination of limestone in the process of blast furnace melting of bauxites, in order to produce a slag which can be used for the production of Al_2O_3. The peculiarities of the reduction of the sinter of various compositions under equilibrium and kinetic conditions are studied. Reduction of bauxite sinter with basicity 1.3-6.0 under kinetic and equilibrium conditions has shown that as the basicity increases, reducibility improves. This agrees with the nature of the change of phase composition of sinters: as basicity increases, the content of difficultly reducible

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USSR

Leont'yev, L. I., Matyash, V. G., Davydov, A. D., Kashin, V. V. Utkov, V. A., Ivanova, S. V., Vosstanovimost' Vysokoosnovnykh Boksitovykh Aglomeratov, Sverdlovsk, 1973, 9 pp.

hercynite decreases, while the share of more easily reducible ferrites and aluminoferrites of Ca increases.

2/2

MATYASHCHUK, I. V.

JPRS 55882

4 May 1972

UDC 621.039.554:621.311.25:621.039

STUDY OF THE BUILDUP OF PLUTONIUM ISOTOPES IN THE FUEL OF THE VVER-1 REACTOR OF THE NOVO-VORONEZHSKIY ATOMIC POWER STATION

[Article by V. Ya. Gabeskiriya, V. S. Belokopytov, O. A. Miller, G. A. Simakin, L. I. Burnyakov, Z. I. Pakhomov, M. A. Vladimirova and I. V. Matyashchuk, Scientific Research Institute of Atomic Reactors; Issledovaniye nakopleniya izotopov plutoniya v toplive Reaktora VVER-1 Novo-Voronezhskoy AES, Russian, NIIAR P-66, 1970, printing 200 copies, signed to press January 1970, 16 pp]

Introduction

The isotopic composition of irradiated fuel in samples cut from fuel elements of the VVER-1 reactor of the Novo-Voronezhskiy Atomic Power Station was investigated in order to determine experimentally the isotopic composition of irradiated fuel in a reactor of the VVER type within the framework of contract no. 577/RB with the International Atomic Energy Agency. The tasks of this study were:

(a) determining the uranium and plutonium isotopic composition after irradiation of the fuel;

(b) determining the number of plutonium isotopes formed as a result of irradiation;

(c) determining the isotopic composition of the fuel as a function of the degree of burn-up.

1. Preparation of Samples

The assembly from which the fuel element was taken was irradiated for 2.75 years and held for 1.5 years before the investigation.

[I - USSR - X]

1/2 027 UNCLASSIFIED PROCESSING DATE--20NOV70

TITLE--SOME INDICATORS OF THE VITAMIN B SUBL, METABOLISM IN NONSPECIFIC ULCEROUS COLITIS -U-

AUTHOR--MATYASHINA, V.M.

COUNTRY OF INFO--USSR

SOURCE--SOV MED 33(1); 148-149. 1970

DATE PUBLISHED-------70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--VITAMIN B COMPLEX, VITAMIN METABOLISM, COLON, DIGESTIVE SYSTEM DISEASE, THIAMINE, ENZYME, URINE, BLOOD CHEMISTRY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3007/0518 STEP NO--UR/0399/70/033/001/0148/0149

CIRC ACCESSION NO--AP0136813

UNCLASSIFIED

2/2 027 UNCLASSIFIED PROCESSING DATE--30NOV70

CIRC ACCESSION NO--AP0135813

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE STUDY WAS CARRIED OUT ON 110 PATIENTS IN VARIOUS PERIODS OF THE DISEASE. THE LEVEL OF FREE THIAMINE WAS FOUND TO BE EXCEEDING THE NORM IN BLOOD (1.3 MU G PERCENT IN COMPARISON TO 0.49 MU G PERCENT OF THE NORM) AND IN URINE. THE CARBOXYLASE ACTIVITY IN BLOOD WAS SIGNIFICANTLY LOWER (1.8 MU G PERCENT AGAINST 3.8 MU G PERCENT OF THE NORM). THE DISTURBANCES IN THIAMINE METABOLISM WERE MORE DEEPLY EXPRESSED IN MEDIUM AND HEAVY COURSES OF THE ULCEROUS COLITIS. THE ACCUMULATION OF THIAMINE IN BLOOD AND URINE WITH SIMULTANEOUS LOW CONCENTRATION OF COCARBOXYLASE INDICATED THE DISTURBANCE IN VITAMIN B SUBI ASSORPTION. AN EXCESS IN PYRUVIC ACID LEVEL IN BLOOD AND URINE WAS OBSERVED DURING THE INTENSIFICATION OF NONSPECIFIC ULCEROUS COLITIS (3.0 MG PERCENT AND 40 MG IN 24 HR URINE).

FACILITY: CLIN. INFEC. DIS., DONETSK MED. INST., DONETSK, USSR.

UNCLASSIFIED

USSR

UDC 621.73.043.014.5-185.4

MAT'YAZH, V. A.

"Determination of the Velocity-Deformation Resistance Relationship of Titanium Alloys"

Moscow, Kuznechno-Shtampovochnoye Proizvodstvo, No 10, Oct 73, pp 10-12

Abstract: Results are presented from studies carried out at the Experimental Scientific Research Institute of Forging Machinery for determining the velocity relationship of titanium alloy deformation resistance during stamping on high-speed dies. Using results of other works for titanium alloys VT8 and OT4 and results from this work for VT3-1, values for the velocity factor n_{σ_S} were computed for the alloys and the velocity factors versus homological temperature were plotted to illustrate the relationship of velocity factor to homological temperature, thus revealing the velocity-deformation resistance relationship of these alloys. Comparing the values of n_{σ_S} for pure titanium and its alloys showed that in the region of homological temperatures T_N = 0.3-0.6 the values of n_{σ_S} for pure titanium and alloys VT8 and OT4 do not coincide and the velocity-

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USSR

MAT'YAZH, V. A., Kuznechno-Shtampovochnoye Proizvodstvo, No 10, Oct 73, pp 10-12

-deformation resistance relationship is better expressed by the alloys for a rise in temperature at slow rates of deformation. Comparison of the values of n_{σ_s} for the titanium alloys at fast deformation rates with the values at slow deformation rates showed that they also do not coincide and the temperature relationship of the velocity factor is reflected better at the faster rates of deformation. Three figures, seven bibliographic references.

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1/2 028 UNCLASSIFIED PROCESSING DATE--04DEC70

TITLE--USE OF THE DEVICE FERMENT 1 FOR IDENTIFYING MICROORGANISMS ACCORDING TO THEIR PROTEOLYTIC ACTIVITY -U-

AUTHOR-(04)-ANDREYEV, V.S., MATYKO, N.A., BASHTANOV, A.V., MARCHENKO, L.A.

COUNTRY OF INFO--USSR

SOURCE--MED. TEKH. 1970, 4(1), 16-17

DATE PUBLISHED--------70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--MICROORGANISM, AMMONIA, BIOSYNTHESIS, BACTERIOLOGIC LABORATORY INSTRUMENT, ELECTRIC CONDUCTIVITY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3005/0460 STEP NO--UR/0451/70/004/001/0016/0017

CIRC ACCESSION NO--AP0132675

UNCLASSIFIED

2/2 028 UNCLASSIFIED

CIRC ACCESSION NO--AP0132675 PROCESSING DATE--04DEC70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. A DEVICE IS DESCRIBED FOR THE IDENTIFICATION OF THE ACTIVITY OF NH SUB3 PRODUCING MICROORGANISMS. IT IS BASED ON THE CONTINUOUS REGISTRATION OF THE INCREASE OF ELEC. COND. (V. S. ANDREEV, V. I. ROSENGART, AND V. A. TORUBAROV, 1965) IN AN ELEMENT CONTG. THE BUFFERED GROWTH MEDIUM (PEPTONE). THE RESULTS ARE CHECKED BY A PARALLEL EXPT. CARRIED OUT IN THE PRESENCE OF A SPECIFIC NH SUB3 TRAPPING REAGENT (KI, NA SUB2 HPO SUB4, OR NAH SUB2 PO SUB4) PREVENTING THE INCREASE INCONDUCTIVITY DUE TO THE LIBERATION OF NH SUB3 (BASE LINE). THE METHOD IS EASY, AND TIME SPARING IN COMPARISON TO THE CONVENTIONAL ANAL. METHODS. FACILITY: LENINGRAD. FILIAL VSES. NAUCH.-ISSLED. INST. MED. PRIBOROSTR., LENINGRAD, USSR.

UNCLASSIFIED

USSR UDC 576.8.078.39

MARCHENKO, L. A., ANDREYEV, V. S., MATYKO, N. A., and BASHTANOV, A. V., Leningrad Branch, All-Union Scientific Research Institute of Medical Instrumentation

"The 'Ferment-1', a Device for Identifying Microorganisms by Their Proteolytic Activity"

Moscow, Meditsinskaya Tekhnika, No 1, 1970, pp 16-17

Abstract: The proposed device is based on the release of ammonia microorganisms, E. coli in particular, under the influence of proteolytic enzymes. The amount of ammonia released is recorded in a high-frequency conductometric apparatus that uses a differential scheme of measurement in recording the electrical conductivity of a solution under study. The procedure takes 30-40 min, a fraction of the time required to identify ammonia by the conventional biochemical methods. The device was tested on an E. coli culture that does not form ammonia. The electrical conductivity of solutions with and without a specific reagent did not change.

1/1

USSR

UDC 519.281

GOL'DIN, S. V., MATYS, L. I.

"Regularization of the T^2 Criterion in Problems of Statistical Classification"

Tr. Zap-sib. N-i Geologo-razved. Neft. In-t, [Works of Western Siberian Scientific Research and Geological Prospecting Petroleum Institute], 1970, No 36, pp 109-121, (Translated from Referativnyy Zhurnal Kibernetika, No 5, 1971, Abstract No. 5V162 by the authors).

Translation: Methods are studied, allowing the computational stability of the T^2 criterion to be improved when it is constructed using poorly founded covariation sampling matrices.

1/1

USSR

UDC: 669.017:539.219.3

MATYSINA, Z.A. (Dnepropetrovsk State University imeni The Three Hundred Years of the Union of the Ukraine with Russia)

"The Diffusion in Substitution Alloys of Transition Metals with Nontransition Metals"

Tomsk, Izvestiya Vysshikh Uchebnykh Zavedeniy Fizika, No 8, 1970, pp 146-148

Abstract: The author derives formulas for calculating the diffusion factor which can be used for selecting alloy components, if the energy of interaction relationships is known for pairs of adjacent atoms, with the aim of shifting the diffusion factor of an alloy to the desired side. In addition, one must consider the secondary effects which are manifested in computing interaction energy as a function of the concentration. Use of other models to represent the electrostatic interaction of alloy ions, e.g. the two-zone model or the model considering limitations placed on the donar and acceptor capacity of alloy components, does not result in changing the variation of the activation energy with concentration or the diffusion factor. An experimental study of the variation of the diffusion factor with concentration would make it possible to determine the model fit with respect to real alloys; however, experimental techniques are not adequate at present. Original article: one figure, eight formulas, and nine bibliographic entries.

1/1

1/2 014 UNCLASSIFIED PROCESSING DATE--04DEC70

TITLE--ORIENTATION DEPENDENCE OF LINE PARAMETERS OF THE CHARACTERISTIC X RAY SPECTRUM OF ATOMS OF THE ELEMENTS IN SINGLE CRYSTALS. BASIC LINE

AUTHOR-(02)-BOROVSKIY, I.B., MATYSKIN, V.I.

COUNTRY OF INFO--USSR

SOURCE--DOKL. AKAD. NAUK SSSR 1970, 192(1), 63-6

DATE PUBLISHED--------70

SUBJECT AREAS--CHEMISTRY, PHYSICS

TOPIC TAGS--SINGLE CRYSTAL, VANADIUM PENTOXIDE, CRYSTAL ORIENTATION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3008/1258 STEP NO--UR/0020/70/192/001/0063/0066

CIRC ACCESSION NO--AT0138269

UNCLASSIFIED

2/2 014 UNCLASSIFIED

CIRC ACCESSION NO--AT0138269 PROCESSING DATE--04DEC70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE EFFECT OF A CRYSTAL ORIENTATION ON THE PARAMETERS OF THE CHARACTERISTIC K AND L X RAY LINES OF V IN V SUB2 O SUB5 SINGLE CRYSTALS WAS STUDIED BY MEASURING THE WAVELENGTH, MAX. INTENSITY, WIDTH, AND ASYMMETRY INDEX BY USING THE CRYSTAL AS A ROTATING ANODE OF THE X RAY TUBE. THE SPECIMEN IN FORM OF A PLATE WAS CUT OUT FROM V SUB2 O SUB5 SINGLE CRYSTAL ALONG THE TETRAGONAL AXIS A AND FIXED TO THE ANODE SO THAT IT ROTATES (360DEGREES) IN A PLANE PERPENDICULAR TO THE ELECTRON BEAM. IN ALL CASES (WITH THE EXCEPTION OF THE SATELLITE LINE K BETA PRIME PRIME) THE INTENSITY OF THE LINES DECREASES 8-12PERCENT WHEN THE CRYSTAL DIRECTION CHANGES FROM PARALLEL TO PERPENDICULAR TO THE A AXIS. THIS IS ACCOMPANIED BY A SHIFT IN THE INTENSITY MAX. TOWARD THE LONGWAVE REGION AND INCREASE IN THE WIDTH OF THE LINE K BETA SUB1,3 AND A DECREASE IN THE ASYMMETRY INDEX. MEASUREMENTS MADE ON SPECIMENS CUT FROM V SUB2 O SUB5 SINGLE CRYSTAL PERPENDICULAR TO THE A AXIS, REVEALED THAT IN THIS CASE THE PARAMETERS OF K BETA SUB1,3 LINE REMAIN UNCHANGED (CORRESPOND TO THOSE OBTAINED AT THE ANGLE 75DEGREES FOR THE CRYSTAL SPECIMEN CUT ALONG THE A AXIS). THE OBSD. ORIENTATION EFFECT IS EXPLAINED IN TERMS OF THE SPLITTING OF V LEVELS INTO COMPONENTS X, Y, AND Z IN THE CRYSTAL FIELD.

FACILITY: INST. MET. IM. BAIKOVA, MOSCOW, USSR.

UNCLASSIFIED

MATYUGIN, S. N.

Berezhkov, Ye. A., G. V. Rubin, Yu. V. Kushnevskiy, S. N. Matyugin, N. P. Mosarov, Yu. K. Perekhvatov, and M. D. Fligel'.

Reception of Kosmos-381 signals from a conjugate point region. Kosmicheskiye issledovaniya, no. 2, 1972, 302-303.

An attempt is described to detect satellite r-f signals from magnetospheric or ionospheric modes that may be excited from ground-based transmitters in conjugate point experiments. The tests were done in December, 1970 using the Kosmos-381 satellite which broadcast at 5, 7.2, 9.6, 10.4 and 12.8 MHz. Pulse power was 100w, and pulse width was 150μs at a 48 Hz repetition rate; reception was monitored with wideband delta or rhombic arrays at both the Moscow and Gor'kiy tracking stations. During part of the test period the orbital plane included both the receiver and conjugate points; the remaining orbits included the conjugate point only.

In the 13th recording session with transmission at 12.8 MHz, a signal from the conjugate point (lat. 39.9° S, long. 55° E) was clearly received at Moscow for an interval of 20 seconds, corresponding to a satellite travel of 150 km. The magnetospheric channel width was however somewhat less than this value, since the satellite path was presumably at some inclination to it, and also because the channel tends to "trap" the transmitted signal near its boundaries. Analogous reception at Gor'kiy was only for 0.25 to 0.5 sec, evidently because the satellite only grazed the waveguide channel. In some cases conjugate point reception was obscured by noise in the 12.8 MHz range; however there were cases where clear line-of-sight signals were recorded with no corresponding conjugate point reception.

USSR

UDC 621.371.029.55

BENEDIKTOV, Ye. A., GETMANTSEV, G. G., YEZHOV, A. I., KOROBKOV, Yu. S., MALYSHEV, S. K., MATYUGIN, S. N., MITYAKOV, N. A., SAZONOV, Yu. A., CHERNOV, V. A., REN'KOVA, N. P., BEREZIN, Yu. M., BUKIN, G. V., KOLOKOLOV, L. Ye., and PEREKHVATOV, Yu. K.

"Results of an Experiment in Shortwave Radio Propagation"

Moscow, V sb. X Vses. konf. po rasprostr. radiovoln. Tezisy dokl. Sekts. 3. (Tenth All-Union Conference on the Propagation of Radio Waves; Report Theses; Section 3--collection of works) "Nauka," 1972 pp 73-76 (from RZh--Radiotekhnika, No 10, 1972, Abstract No 10A367)

Translation: Results of experiments on investigating the characteristics of wave propagation in the decameter range (5.7-15.0 MHz) are analyzed; the communications took place between the following magnetically adjacent points: an ionospheric station in Gor'kiy and two science research ships in the Indian Ocean. In particular, the possibility of communication over the Peterson beam was estimated. Two illustrations, bibliography of one. N. S.

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USSR

UDC 621.373.535 (206.3)

BAGAYEV, S. N., VASILENKO, L. S., MATYUGIN, YU. A., KLEMENT'YEV, V. M., TROSHIN, B. I., and CHEBOTAYEV, V. P.

"Some Results of a Study of the Generation Frequency Stability of Gas Lasers on the 0.63, 1.5, 3.39, and 9.6 Micron Wavelengths"

Leningrad, Optika i Spektroskopiya, Vol 32, No 4, Apr 72, pp 802-808

Abstract: The article gives a brief description of the principal results of the authors' study of the frequency stabilization of gas lasers on the 0.63, 1.5, 3.39, and 9.6-micron wavelengths. Various frequency stabilization methods were used: viz., a stabilization method based on the Lamb dip, stabilization methods according to the peak in the output radiation power (a laser with an internal absorption cell) and with an external gas absorption cell in a variable magnetic field. The main purpose of this work was to show that high frequency stability values can be attained in various lasers by various methods. The experimental setup and the measurement procedures used by the authors, as well as the research results will be described in separate

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USSR

BAGAYEV, S. N., et al., Optika i Spektroskopiya, Vol 32, No 4, Apr 72, pp 802-808

articles. The main emphasis was placed on the physical principles of the stabilization methods used and the results attained. All the principal results are shown in a table which, besides generation-frequency-stability measurement data, also gives parameters which characterize the physicotechnical properties of an optical frequency discriminator.

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USSR

UDC 621.373:535(206.3)

MATYUGIN, Yu. A., TROSHIN, B. I., and CHEBOTAYEV, V. P.

"A Method for Stabilizing the Frequency of an He-Ne Laser on the Basis of Using a Lorentz Loop of Absorption in the External Gas Element"

Leningrad, Optika i Spektroskopiya, Vol 31, No 1, Jul 71, pp 111-115

Abstract: The results of this research were presented at the All-Union Symposium on the Physics of Gas Lasers in Novosibirsk, July 1969. The authors describe a new method for stabilizing the frequency of He-Ne lasers at a wavelength of 0.63 μm. They base their method on the use of the saturation effect in the external absorbing element. Here they examine a specific stabilization circuit. They scan the absorption lines with a variable magnetic field in order to find the error signal. The preliminary test results of this system are given. On a laboratory model they were able to produce a short-term stability better than 10^{-9}. Figure 1 shows a schematic representation of the experimental set up, and Figure 2 gives the strength of generation and coefficient of absorption as functions of laser frequency; it also depicts the error signal as a function of frequency difference of the laser relative to the center of the absorption line and the generation strength as a function of frequency.

USSR

MATYUGIN, Yu. A., et al, Optika i Spektroskopiya, Vol 31, No 1, Jul 71, pp 111-115

The authors estimate that it is very possible to attain a short-term stability on the order of 10^{-11}. They support their findings with 2 figures and a bibliography of 7 titles.

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USSR

BETEROV, I. M., MATYUGIN, YU. A., and CHEVOTAYEV, V. P., Institute of the Physics of Semiconductors of the Academy of Sciences USSR, Siberian Department

"Measurement of the Relaxation Constants of Levels by the Three-Level Laser Spectroscopy Method"

Moscow, Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol. 12, No. 4, 20 Aug 70, pp 174-177

Abstract: A new method of laser spectroscopy using a three-level scheme which makes it possible to measure relaxation constants of individual levels is proposed. The method is based on measuring the widths of the lines of forced (or spontaneous) resonance shift scattering in a gas. The experiments were conducted on neon transitions $2s_2$-$2p_1$ (λ = 1.52 μ) and $2s_2$-$2p_4$ (λ = 1.15 μ) which have a common level $2s_2$. The experimental setup was generally similar to one described earlier for studying the diffusion of excitation in the capture of resonance radiation. An important difference was that the setup provided for recording the form of a line excluding the effect of the Doppler "cushion" arising from capture of resonance radiation. Analysis of the results extrapolating the field to zero gave the following values for the widths of the scattering lines forward Γ_- and back Γ_0 as a function of pressure:

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USSR

BETEROV, I. M., et al, Pis'ma v Zhurnal eksperimental'noy i teoreticheskoy fiziki, Vol. 12, No. 4, 20 Aug 70, pp 174-177

$$\Gamma_0 = (87 + 46p) \pm 3 \text{ MHz},$$

$$\Gamma_- = (32 + 17p) \pm 2 \text{ MHz},$$

where p is the neon pressure in mmHg. This gives for the width of the $2s_2$ level

$$\gamma_{2s_2} (27.5 + 14p) \pm 5 \text{ MHz}.$$

An earlier experiment using multichannel techniques gave a value of 20.5±2.1 MHz for γ_{2s_2}; such good agreement with the direct measurement of the width of the $2s_2$ level demonstrates the applicability of the proposed method.

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1/2 028 UNCLASSIFIED PROCESSING DATE--04DEC70

TITLE--RESONANT EXCITATION EXCHANGE DURING CAPTURE OF THE RESONANT EMISSION OF A NEON LASER -U-

AUTHOR-(03)-BETEROV, I.M., MATYUGIN, YU.A., CHEBOTAYEV, V.P.

COUNTRY OF INFO--USSR

SOURCE--OPTIKA I SPEKTROSKOPIIA, VOL. 28, FEB. 1970, P. 357-368

DATE PUBLISHED----FEB70

SUBJECT AREAS--PHYSICS

TOPIC TAGS--NEON LASER, PARTICLE CAPTURE, PHOTON, MULTIMODE LASER, HELIUM NEON LASER

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1992/1478 STEP NO--UR/0051/70/028/000/0357/0368

CIRC ACCESSION NO--AP0112472

UNCLASSIFIED

UNCLASSIFIED PROCESSING DATE--04DEC70

2/2 028

CIRC ACCESSION NO--AP0112472

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. ANALYSIS OF PHENOMENA ASSOCIATED WITH THE CAPTURE OF RESONANT PHOTONS IN THE EMISSION OF A HELIUM NEON LASER. THE INFLUENCE OF PHOTON CAPTURE ON THE ALSER CHARACTERISTICS IS EXAMINED, AND A QUALITATIVE LASER THEORY WHICH TAKES INTO ACCOUNT THE CAPTURE EFFECT IS DEVELOPED. THE THEORY IS USED AS A BASIS FOR DERIVING AN EXPRESSION FOR THE GAIN AS A FUNCTION OF THE FREQUENCY FOR A THREE LEVEL LASER AND AN EXPRESSION FOR THE OUTPUT POWER AS A FUNCTION OF THE FREQUENCY FOR A TWO LEVEL LASER. EXPERIMENTS ARE DESCRIBED IN WHICH CAPTURE OF RESONANT PHOTONS COULD BE OBSERVED DIRECTLY FOR THREE LEVEL LASER. AN EXPERIMENTAL STUDY OF THE CHARACTERISTICS OF THE LAMB DIP AT VARIOUS PRESSURES INDICATES THAT AT GAS PRESSURES ON THE ORDER OF 1 OR 2 MM HG, THE HOMOTENEITY OF SATURATION IS DUE PRIMARILY TO PHOTON CAPTURE AND NOT TO 'STRONG' ATOMIC COLLISIONS.

UNCLASSIFIED

1/2 031 UNCLASSIFIED PROCESSING DATE--23OCT70
TITLE--ON CAPTURE OF RESONANCE RADIATION IN GAS SUSTEMS -U-

AUTHOR-(04)-BETEROV, I.M., MATYUGIN, YU.A., RAUTIAN, S.G., CHEBOTAYEV, V.P.
COUNTRY OF INFO--USSR

SOURCE--ZHURNAL EKSPERIMENTAL'NOY TEORETICHESKOY FIZIKI, 1970, VOL 58, NR 4, PP 1243-1258
DATE PUBLISHED--------70

SUBJECT AREAS--PHYSICS

TOPIC TAGS--RESONANCE ABSORPTION, RADIATIVE CAPTURE, ELECTROMAGNETIC INTERACTION, COLLISION INTEGRAL, VELOCITY DISTRIBUTION, GAS DENSITY, KINETIC EQUATION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1988/1722 STEP NO--UR/0056/70/058/004/1243/1258

CIRC ACCESSION NO--AP0106454
UNCLASSIFIED

2/2 031 UNCLASSIFIED PROCESSING DATE--23OCT70

CIRC ACCESSION NO--AP0106454

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. A THEORETICAL ANALYSIS AND EXPERIMENTAL INVESTIGATION ARE CARRIED OUT ON THE INTERACTION BETWEEN AN ATOM AND ELECTROMAGNETIC FIELD IN THE PRESENCE OF RESONANCE RADIATION CAPTURE. THE COLLISION INTEGRAL IN THE EQUATION FOR THE DENSITY MATRIX DIAGONAL ELEMENT DUE TO CAPTURE IS SUTDIED. THE INTEGRAL KERNEL IS OF THE KEILSON STORER TYPE. INTEGRATION PERFORMED ON AN ELECTRONIC COMPUTER SHOWS THAT THE WIDTH OF A KERNEL DESCRIBING A SINGLE EMISSION ACT IS OF THE ORDER OF THE MEAN THERMAL VELOCITY BAR V AND THE KERNEL IS ASYMMETRIC. THE SECOND ORDER KERNEL DIFFERS FROM A MAXWELLIAN DISTRIBUTION BY SEVERAL PERCENT. THE KINETIC EQUATION SET UP FOR THE DENSITY MATRIX ELEMENTS IS SOLVED BY TAKING INTO ACCOUNT LEVEL DEGENERACY AND COLLISIONS OF THE RESONANCE EXCHANGE TYPE; THE PRESENCE OF A PLANE MONOCHROMATIC LINEAR POLARIZED STANDING WAVE AND CAPTURE OF RESONANCE RADIAITON ARE ASSUMED. THE VELOCITY DISTRIBUTION OF THE ATOMS IN THE PRESENCE OF THE FIELD HAS A NARROW DIP (OR PEAK) AND BANDS WITH THE USUAL DOPPLER WIDTH K BAR V. AN EXPERIMENT IS DESCRIBED FOR DIRECT OBSERVATION OF EXCITATION DIFFUSION IN VELOCITY SPACE DURING CAPTURE OF RESONANCE RADIATION. THE PARAMETERS OF THE LAMB DIP IN THE GENERATION POWER CURVE ARE ANALYZED FOR X EQUALS 1.15 MU AND LAMBDA EQUALS 0.63 MU. THE STRONG COLLISION HYPOTHESIS CAN BE REJECTED IF RADIATION CAPTURE IS TAKEN INTO ACCOUNT. FACILITY: INST. FIZIKI POLUPROVODNIKOV, SIBIRSK. OTD, AN SSSR.

UNCLASSIFIED

USSR

UDC: 621.375.9:535

BETEROV, I. M., MATYUGIN, Yu. A., MILUSHKIN, G. A., TROSHIN, B. I., and CHEBOTAYEV, V. P.

"Highly Stable Gas Laser Based on Nonlinear Absorption ($\lambda = 0.63\mu$)"

Novosibirsk, Avtometriya, No 5, 1972, pp 59-70

Abstract: This is the first part of a series, entitled "Frequency Stabilization Methods for Powerful Gas Lasers" and is devoted to a detailed description of the design principles for a powerful, highly frequency-stable He-Ne laser operating at a wavelength of 0.63 microns. The structural and technical characteristics of the laser, electronic systems for stabilizing its frequency, and the results of tests made on it are also discussed. The diagram of an experimental apparatus for obtaining narrow resonances in an external absorption cell is given together with various expressions derived on the basis of it. Various methods for stabilizing the frequency of the lasers are shown in three diagrams and are analytically compared using expressions for the sensitivity of the optical discriminators in each. It is emphasized that the choice of optical discriminator is the result of a compromise between technological and physical requirements.

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USSR

UDC: 621.375.9:535

BETEROV, I. M., MATYUGIN, Yu. A., MILUSHKIN, G. A., TROSHIN, B. I., and CHEBOTAYEV, V. P.

"Highly Stable Gas Laser Based on Nonlinear Absorption ($\lambda = 0.63\,\mu$)"

Novosibirsk, Avtometriya, No 5, 1972, pp 71-85

Abstract: This is the second part of a series with the title given above, and subtitled "Selection of Oscillation Types in an He-Ne Laser, $\lambda = 0.63\,\mu$," the first part of which appears in this same journal, same issue (pp 59-70). In this part, an analysis is given of two methods for selecting the types of oscillation in gas lasers: the first consists in modifying the optical resonator such that the condition of operation is satisfied for only one type of oscillation; the second consists in using amplification saturation and absorption in the gas under the effects of a strong monochromatic field. A short review of the methods of selecting longitudinal types of oscillation in gas lasers with heterogeneous expansion of amplification lines is discussed. Some results are given of experiments in the investigation of the He-Ne laser spectral radiation at $\lambda = 0.63\,\mu$ ($3s_2$-$2p_4$ Ne transition) together with their

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USSR

UDC: 621.375.9:535

BETEROV, I. M., et al, Avtometriya, No 5, 1972, pp 71-85

analysis. The technical characteristics of each element of the laser -- the amplification tube, the inner absorption cell, and the optical laser -- are summarized.

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USSR UDC 389.6:620.113:543.42

MATYUGINA, I. V., SPIRIDONOVA, M. P., and SHIKHALEVA, T. V.

"Standards for the Spectroscopic Determination of Hydrogen and Oxygen in Titanium Alloys"

Sverdlovsk, VII Uralsk. konf. po spektroskopii (Eighth Ural Conference on Spectroscopy) Vyp. 1, 1971, pp 79-81 (from Referativnyy Zhurnal -- Metrologiya i Izmeritel'naya Tekhnika, No 9, 1972, Abstract No 9.32.35)

Translation: It is reported that the All-Union Scientific Research Institute of Standards, during the years 1965 to 1970 put out standard sets 72, 72a and 72b for the determination of hydrogen in titanium alloy VT-14, and sets 58 and 108 for the determination of oxygen in titanium alloys type VT-6 and titanium VT-1-1. The technology of the preparation of standards with a given concentration of gases and the results of investigations of their homogeneity were reported earlier (1-4). Data concerning the establishment of the hydrogen and oxygen concentrations in the latter sets of standards and analysis of them by the spectroscopic method are reported in the present work. Certification of the hydrogen concentration of set 72-b was based on the data of seven laboratories. The methods used were vacuum-heating, spectral-isotope and spectroscopic (using set 72-a). Certification of the oxygen content of sets

1/2

USSR

MATYUGINA, I. V., et al., VII Uralsk. konf. po spektroskopii, Vyp. 1, 1971, pp 79-81.

52 and 108 was based on the data of eight laboratories. Methods used: vacuum-fusion, isotope dilution of fast neutrons and impulse heating. Regression analysis (5) of set 72-b led to the results of the spectroscopic method with the photographic and photoelectric registration of the hydrogen lines -- H 656.3nm. The regression line was constructed with the coordinates logarithm of hydrogen concentration versus width of the hydrogen absorption line. S for the photographic method of registration, the logarithm of the hydrogen concentration was plotted versus the reading on the photoelectric instrument fototoka N, proportional to the logarithm of the hydrogen line intensity. (3 tables; 6 bibliographic entries)

2/2

USSR UDC 523.164.83

MATYUGOV, S. S., YAKOVLEV, O. S., GRITSAYCHUK, B. V.

"The Energy Spectrum of Radio Waves Emitted by a Lunar Satellite in the Case of Reflection From the Surface of the Moon"

Moscow, Radiotekhnika i Elektronika, Vol 26, No 9, Sep 71, pp 1545-1553

Abstract: The authors study the energy spectra of radio waves transmitted by lunar satellites, reflected by the lunar surface and received on Earth. Relations are found for spectral shapes as determined by the position of the satellite and the degree of unevenness of the reflecting surface. The results of the "Luna-14" program of studying the spectra of scattered radio waves are described. The spectra of radio waves scattered by different regions of the moon are discussed, as well as the relationship between the type of spectrum and surface relief. A comparison of experimental data on various wave bands shows that the width of the energy spectrum is directly proportional to the signal frequency. These results show that minor irregularities in the reflecting surface play a minor role in shaping the spectrum for wavelengths

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USSR

MATYUGOV, S. S. et al., Radiotekhnika i Elektronika, No 9, 1971, pp 1545-1553

greater than 10 cm. On shorter wavelengths, the theory requires some refinements to account for surface irregularities. Numerical analysis showed a complex relationship between the shape of the energy spectra and the satellite position and surface unevenness. Experimental data show that the spectrum of scattered radio waves is sensitive to the degree of surface roughness in the region which is important for scattering in the direction of the Earth. The rms values of the slopes of irregularities on the moon differ strongly for various regions.

2/2

USSR

UDC 632.954:547.495.1

BAKUMENKO, L. A., MATYUK, L. N., SHVETSOVA-SHILOVSKAYA, K. D., STONOV, L. D., NEL'NIKOV, N. N., All-Union Scientific Research Institute for Chemical Means of Plant Protection, Moscow, State Committee for Chemistry USSR

"Herbicidal Activity of Some Derivatives of Carbamic Acids"

Moscow, Khimiya v Sel'skom Khozyaystve, Vol 8, No 6, Jun 70, pp 51-52

Abstract: A series of β-dialkylaminoethyl esters of N-alkyl- (or aryl) carbamic acids and their quaternary ammonium salts with trimethyl (or triethyl) thiophosphate was synthesized and investigated in regard to their herbicidal activity under laboratory conditions. It was determined that an increase in the chain length of the alkyl radical from 2 to 8 carbon atoms increased the herbicidal activity. The chlorosubstituted arylcarbamic esters were found to be more active than the respective nonchlorinated analogues. The activity of β-dialkylaminoethyl esters of N-alkylcarbamic acid was higher than the activity of the N-aryl carbamic acid esters.

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USSR

BAKUMENKO, L. A., et al, Khimiya v Sel'skom Khozyaystve, Vol 8, No 6, Jun 70, pp 51-52

Introduction of the thiophosphoric acid anion increased the herbicidal activity somewhat, keeping the relationship of the chain length to activity.

2/2

USSR UDC: 621.315.612.5

MATYUKHIK, V. F., ABURAMOYTO, I., MADRICHENKO, G. F.

"Determination of Losses of SHF Energy in Ceramic-to-Metal Seals"

Elektron. tekhnika. Nauch.-tekhn. sb. Elektron SVCh (Electronic Technology. Scientific and Technical Collection. SHF Electronics), 1971, vyp. 2, pp 111-115 (from RZh-Radiotekhnika, No 6, Jun 71, Abstract No 6V477)

Translation: A method is described for SHF measurement of the surface resistivity of metal-ceramic junctions by means of a double T-shaped bridge. It is shown that the surface resistivity of metal-to-ceramic seals is approximately an order of magnitude greater than for silver. Resumé.

1/1

Theoretical Automation

USSR

UDC 8.74

KRAYZMER, L. P., MATYUKHIN, S. A., and MAYORKIN, S. G.

"Memory of Cybernetic Systems (Principles of Mnemonics)"

Pamyat' kiberneticheskikh sistem (osnovy mnemologii) (cf. English above), Moscow, "Sov. Radio," 1971, 399 pp, ill. 1 r. 29 k. (from RZh-Matematika, No 5, May 72, Abstract No 5V479K by V. MIKHEYEV)

Translation: The work sets forth the principles of mnemology -- the body of knowledge about the memory of cybernetic systems. Questions of the organization, structure, and functioning of the memory of technical and biological systems are dealt with. The book consists of 12 chapters. In Chapter I the authors note the important role of the memory in cybernetic systems and examine the principles of information accumulation and certain questions of terminology. Chapter II gives a general survey of ideas about memory and data-storage devices, beginning with the precybernetic period. Chapter III presents basic parameters, a classification, and comparative characteristics of technical storage devices with human memory. Chapter IV discusses the question of a material medium as an information file. Chapter V is devoted to the classification and general characteristics of biological and technical storage elements. Chapter VI presents concepts of the neuron networks of living organisms and the

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USSR

KRAYZMER,L. P., et al., Pamyat' kiberneticheskikh sistem (pamyat' mnemologii) "Sov. Radio", 1971, 399 pp.

idea of a trace in biological neuron networks and artificial networks of formal neurons. It also presents basic circuits of technical storage units. Chapter VII considers the structural peculiarities of the memory of computers, and questions of the localization and hierarchy of human memory. Chapter VIII discusses questions of data input and output in biological and technical memory systems. Chapter IX gives a characterization of read-only memories (ROM's) considers the question of employing holographic methods of data representation in ROMs, and gives a description of genetic memory. Chapter X is devoted to questions of information retrieval in the memory. Chapter XI sets forth questions of the operating stability of storage units, informational reliability of the memory, and structural redundancy in storage units. Chapter XII considers the prospective lines of further research and development in the field of technical and biological memory devices.

2/2

USSR

UDC: 8.74

KRAYZMER, L. P., MATYUKHIN, S. A., MAYORKIN, S. G.

"Memory in Cybernetic Systems (Principles of Mnemology)"

Pamyat' kiberneticheskikh sistem (osnovy mnemologii) (cf. English above), Moscow, "Sov. radio", 1971, 399 pp, ill. 1 r. 29 k. (from RZh-Kibernetika, No 5, May 72, Abstract No 5V479 K)

Translation: The book presents the principles of mnemology -- the study of memory in cybernetic systems. Problems of the organization, structure and functioning of memory in technical and biological systems are considered from common procedural standpoints. The book consists of twelve chapters. In chapter I the authors note the important part played by memory in cybernetic systems, consider the principles of accumulating information, and discuss certain questions of terminology. Chapter II contains a general survey of the concepts of memory and data storage devices beginning with the precybernetic period. Chapter III gives the basic parameters, classification and comparative characteristics of technical storage devices and the human memory. In chapter IV the problem of a material medium as an accumulator of information is discussed. Chapter V is devoted to classification and to the common characteristics of biological and technical

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USSR

KRAYZMER, L. P. et al., Pamyat' kiberneticheskikh sistem (osnovy memorologii), Moscow, "Sov. radio", 1971

memory elements. Chapter VI deals with the concepts of neuron networks in animate organisms, the idea of a trace in networks of biological neurons and artificial networks of formal neurons, as well as presenting basic circuits for technical memory units. Chapter VII examines the particulars of memory structure in cybernetic systems, memory structure in computers, and problems of localization and hierarchy in the human memory. In chapter VIII, problems of input and output of information in biological and technical memory systems are discussed. Chapter IX gives the characteristics of permanent memory devices, examines the question of using holographic methods of data representation in permanent memories, and describes the genetic memory. Chapter X deals with problems of data retrieval in a memory. Chapter XI takes up problems of operational stability of a memory device, informational reliability of a memory, and structural redundancy in a memory device. Chapter XII examines prospects for the development of further research and advance in the field of technical and biological memory units. V. Mikheyev.

2/2

USSR

UDC: 537.74

GRUZDEV, S. V., DUBOVOY, N. D., KARPOV, R. G., MATYUKHIN, Yu. D., OSOKIN, V. I., and YUDINA, V. P.

"UHF Power Meter With Automatic Selection of the Measurement Limit"

Leningrad, Priborostroyeniye, No 1, 1972, pp 13-17

Abstract: Most UHF power meters of the self-balancing type, in which some of the measuring operations are automatic, have a manually operated method of setting the measurement limit. The authors, members of the Ryazan Radio Engineering Institute, have devised a method of automating that adjustment as well. Where the measurements are based on the method of replacing the UHF power by the varying frequency pulse power, and especially in digital readout instruments, this can be done fairly easily, as the authors demonstrate. A block diagram of the device is given together with an explanation of its operation. The essence of the system is a power-frequency converter for representing the output information in frequency form.

1/1

USSR UDC 632.95

BLIZNYUK, N. K., LEVSKAYA, G. S., KVASHA, Z. N., MATYUKHINA, Ye. N.

"Procedure for Obtaining Bis-thiolphosphonates"

USSR Author's Certificate No 319605, filed 16 Mar 70, published 17 Jan 72 (from RZh-Khimiya, No 2 (II), Feb 73, Abstract No 2N530)

Translation: Fungicides with the formula $A[CH_2SP(O)(OR')R]_2$ (I) (R = alkyl, aryl, aralkyl; R' = alkyl or aryl, A = arylene) are obtained by the reaction $RP(O)(OR')SR''$ (II) (R'' = alkyl) with xylylendihalogenide at a temperature of 140-200° in an organic solvent. As an example, a mixture of 0.05 moles of II (R = r-ClC_6H_4, R' = R'' = Me) and 0.025 grams of 1.4-$(BrCH_2)_2$-C_6H_4 in 5 ml of xylol is boiled to completion of precipitation of MeBr, it is evaporated and the I (A = 1,4-C_6H_4, R = 4-ClC_6H_4, R' = Me) is separated. The yield is 67.3%, the melting point 167-8°. The I is synthesized analogously (R, R', yield in %, $n^{20}D$ or melting point in °C are presented) A = 1,4-C_6H_4: Et, Me, 96, 1.5580; Me, Et, 97.4, 1.5330; 4-MeC_6H_4, Me, 68, 160-2 (acetone); $PhCH_2$, Me, 95.7, 1.6075; A = 4-MeC_6H_3-1,3: 4-ClC_6H_4, Me, 92.4, 152-4 (acetone).

1/1

USSR

UDC 632.95

BLIZNYUK, N. K,. LEVSKAYA, G. S., MATYUKHINA, YE. N., KVASHA, Z. N.

"Procedure for Obtaining Bisanilidophosphonates or Thiophosphonates"

USSR Author's Certificate No 298592, filed 23 Jan 70, published 25 May 71 (from RZh-Khimiya, No 6 (II), Jun 72, Abstract No 5N611)

Translation: Substances with the general formula $A[OP(X)(R)NR'R'']_2$ (I; R = alkyl, aryl, aralkyl; R' = lowest alkyl; R'' = aryl; A = 2-valent aromatic or aliphatic aromatic radicals; X = O or S) are obtained on interaction of di-N-alkylanilides of phosphonic or thiophosphonic acid with aromatic dioxy compounds at a temperature of 150-180° and a pressure of 10-30 mm with simultaneous distillation of the N-alkylaniline formed. The mixture of 0.01 moles of di-N-methylanilide of phenylphosphonic acid and 0.005 moles of 2,2-bis-(4'-oxy-phenyl)-propane (II) is heated to 170-180°, PhNHMe is distilled off simultaneously at a pressure of 20-30 mm, the residue is ground with ether and I is obtained [R = Ph, R' = Me, R'' = Ph, X = O, A = $4\cdot C_6H_4C(Me_2)C_6H_4$-4'], with a yield of 90.6% and a decomposition temperature of 45-62°. The I is obtained analogously (R, R', R'', X, A, the yield in %, and the melting point in °C are presented): Ph, Me, Ph, S, $4(3.5\text{-}Cl_2C_6C_2(C(Me_2)(3.5\text{-}Cl_2C_6H_2)$-4', 97.5, 140-5; $PhCa_2$, Me, Ph, O, $4\text{-}Ca_6H_4C$

USSR

BLIZNYUK, N. K., et al., USSR Author's Certificate No 296592, filed 23 Jan 70, published 25 May 71

$(Me_2)C_6H_4$-4', 91.6, 122-6; Me, Me, Ph, S; 4-$C_6H_4C(Me_2)C_6H_4$, 4', 98.1, 78-80; Me, Me, Ph, S, 4,4'-$(3\text{-}NH_2C_6H_3)_2SO_2$ 95, 185-7. A mixture of 0.02 moles of $PhCH_2P(O)Cl_2$ and 0.08 moles of $PhNEt_2$ (III) are boiled to cessation of separation of EtCl, 0.01 moles of dichlorodiphenylolpropane are added, it is heated, simultaneously driving off the residue of III and PhNHEt at a pressure of 10-20 mm. The residue is ground with petroleum ether and I is obtained [R = $PhCH_2$, R' = Et, R" = Ph, X = O, A = $ClC_6H_3C(Me_2)C_6H_3Cl$] with a yield of 97.8% and a melting point of 124-5°. The I can be used as fungicides.

2/2

UDC 632.95

USSR

BLIZNYUK, N. K., MATYUKHINA, YE. N., LEVSKAYA, G. S., All-Union Scientific Research Institute of Phytopathology, Moscow, Ministry of Agriculture USSR

"Method of Obtaining O-Alkyltrichloromethyl Thiophosphonates"

USSR Author's Certificate No 251576, Cl. 12o, 26/01, (C 07 f), filed 8 Apr 68, published 20 Feb 70 (from RZh-Khimiya, No 19 (II), 10 Oct 70, Abstract No 19 N578P by G. V. KUZNETSOVA)

Translation: Compounds of formula $Cl_3CP(S)(OH)OR$ (I) (R = alkyl) are obtained by the reaction of $Cl_3CP(S)Cl_2$ with lower alcohols at 60-120° in the presence of catalytic quantities of C_5H_5N. To 0.2 mole absolute MeOH containing 20 mg C_5H_5N 0.06 mole $Cl_3CP(S)Cl_2$ is added. The mixture is boiled 3-5 hours, the excess MeOH distilled and I (R = Me) is obtained, yield 93.6 percent, d_4^{20} 1.6431, $n^{22}D$ 1.5450; NH_4 salt, $C_2H_7Cl_3NO_2PS$, decomposition temperature > 185°; K salt, $C_2H_3Cl_3KO_2PS$, decomposition temperature > 300°. Analogously obtained are the following I (enumerated are R, yield

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USSR

BLIZNYUK, N. K., et al, USSR Author's Certificate No 251576, Cl. 12o, 26/01, (C 07 f), filed 8 Apr 68, published 20 Feb 70 (from RZh-Khimiya, No 19 (II), 10 Oct 70, Abstract No 19 N578P by G. V. KUZNETSOVA)

in percent, d_4^{22} and $n^{22-23}D$): Et, 94.6, 1.5669, 1.5360; and Pr, 84.5, 1.5436, 1.5350. I are intermediates of the synthesis of biologically active substances.

2/2

UDC 547.341.26'118.07

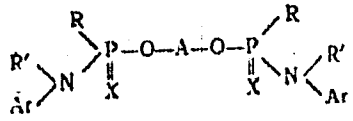
USSR

BLIZNYUK, N. K., LEVSKAYA, G. S., MATYUKHINA, Ye. N., and KVASHA, Z. N., All-Union Scientific Research Institute of Phytopatholdgy

"A Method of Making Bisanilido Phosphonates or Bisanilidothiophosphonates"

Moscow, Otkrytiya, izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, No 11, Apr 71, Author's Certificate No 298592, division C, filed 23 Jan 70, published 16 Mar 71, p 87

Translation: This Author's Certificate introduces: 1. A method of making bisanilidophosphonates or bisanilidothiophosphonates of the general formula



where R is an alkyl, aryl, or aralkyl, R' is a lower alkyl, Ar is an aryl, A is an aromatic or aromatic-aliphatic hydrocarbon radical, and X is oxygen or sulfur. As a distinguishing feature of the patent, a di-N-alkylanilide of phosphonic or thiophosphonic acid is treated with an aromatic dihydroxy compound with the application of heat, followed by isolation of the product

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USSR

BLIZNYUK, N. K., et al., Otkrytiya, izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, No 11, Apr 71, Author's Certificate No 298591, division C, filed 23 Jan 70, published 16 Mar 71, p 87

by conventional methods. 2. A modification of this method consists of heating to 150-180°C. 3. A modification of this method distinguished by the fact that the process is carried out at a residual pressure of 10-30 mm Hg with simultaneous distillation of the N-alkylaniline formed in the reaction. 4. A modification of this method distinguished by the fact that the reaction mass produced by heating the corresponding phosphonic or thiophosphonic acid dichlorides with N,N-dialkylanilines to 200-250°C is used as the di-N-alkylanilide of phosphonic or thiophosphonic acid.

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USSR

UDC: 547.26'118.07

BLIZNYUK, N. K., LEVSKAYA, G. S., MATYUKHINA, Ye. N., and VARSHAVSKIY, S. L., All-Union Scientific Research Institute of Phytopathology, Moscow, Ministry of Agriculture USSR

"A Method of Synthesizing 1,4-bis-(O-alkyl-O-arylthiophosphoryl)-benzenes"

Moscow, Otkrytiya, Izobretdniya, Promyshlennyye Obraztsy, Tovarnyye Znaki, No 14, 1970, Author's Certificate No 268420, filed 22 May 68, p 23

Abstract: This Author's Certificate introduces: 1. A method of synthesizing 1,4-bis-(O-alkyl-O-arylthiophosphoryl)-benzenes of the general formula 

where Ar is a substituted or unsubstituted phenyl or napthyl, and R is an alkyl. As a distinguishing feature of the patent, the appropriate 1,4-bis-(O-arylchlorothiophosphoryl)-benzenes are interacted with alcohols in an organic solvent such as benzene with the application of heat in the presence of an organic base such as pyridine as a catalyst, with subsequent isolation of the

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USSR

BLIZNYUK, N. K., et al., Otkrytiya, Izobretneiya, Promyshlennyye Obraztsy, Tovarnyye Znaki, No 14, 1970,

goal product by conventional methods. 2. The method described in (1) is distinguished by the fact that the temperature reaches 60-90°C.

USSR

UDC: 621.396.677.71

KOVALEV, I. S., MATYUKOV, G. F., MEL'NIKOV, V. A.

"Effect of Frequency Variation on the Polar Pattern of a Slotted Strip Antenna"

Minsk, Novyye razrabotki elementov radiotekhn. ustroystv--sbornik (New Developments in Elements for Electronic Equipment--collection of works), vyp. 1, "Vysheysh. shkola", 1972, pp 140-143 (from RZh-Radiotekhnika, No 12, Dec 72, abstract No 12B27 [résumé])

Translation: The article gives the results of a study of the operation of a linear slotted strip antenna with traveling-wave supply. On the basis of the ideas of antenna theory an expression is derived for the angle of inclination of the main lobe from the normal as a function of frequency. A comparison is made with a slot array in a rectangular waveguide. Two illustrations, bibliography of two titles.

1/1

1/2 022 UNCLASSIFIED PROCESSING DATE--09OCT70

TITLE--ANALYSIS OF THE SPECTRUM AT THE OUTPUT OF A NONLINEAR ACTIVE ELEMENT -U-

AUTHOR-(03)-MATYUKOV, G.F., MOSKVICHEV, V.N., TISHUK, N.S.

COUNTRY OF INFO--USSR

SOURCE--AKADEMIIA NAVUK BSSR, VESTSI, SERYIA FIZIKA-TEKHNICHNYKH NAVUK, NO. 1, 1970, P. 75-78

DATE PUBLISHED-------70

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CIRC ACCESSION NO--AP0110211

UNCLASSIFIED

2/2 022 UNCLASSIFIED PROCESSING DATE--09OCT70

CIRC ACCESSION NO--AP0110217

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. ANALYSIS OF THE SPECTRAL COMPOSITION OF THE OUTPUT SIGNAL DURING MODULATION OF A NONLINEAR ACTIVE ELEMENT IN THE PRESENCE OF NONLINEAR STATIC MODULATION CHARACTERISTICS. THE CALCULATION OF THE SIGNAL SPECTRUM IN THE PRESENCE OF DISTORTIONS OF THE MODULATING VOLTAGE IS REPRESENTED IN THE FORM OF A MODULATION BY MULTIPLE FREQUENCIES. ANALYTICAL EXPRESSIONS ARE OBTAINED FOR THE AMPLITUDE COEFFICIENTS OF THE SPECTRUM COMPONENTS IN THE CASE OF AMPLITUDE, FREQUENCY, AND COMBINED AMPLITUDE AND FREQUENCY MODULATION.

FACILITY: MINSKII RADIOTEKHNICHESKII INSTITUT, MINSK, BELORUSSIAN SSR.

UNCLASSIFIED

MATYUNIN V.S.

AA0052569 UR 0482

Soviet Inventions Illustrated, Section III Mechanical and General, Derwent, 1-70

243461 CUMULATIVE CHARGES OF EXPLOSIVES are obtained by charging the explosive into an elastic shell, e.g. of polyethylene provided with an inserted body of the corresponding shape and an overall length equal to the length of the above shell, and subsequent sealing and subjecting to the action of compressed air of a liquid under elevated pressure. 6.12.67. as 1201819/40-23. Add to 210724. N.L.ROSINSKII et alia. Safety in the Mining and Metallurgical Ind. Res. Inst. (30.9.69.) Bul.16/5.6.69. Class 78c. Int.Cl.C06b.

19821254

AA0052569

Rosinskiy, N. L.; Matyunin, V. S.; Tolstykh, K. S.; Morozov, A. M.; Kuznetsov, N. M.

Makeyevskiy Gosudarstvennyy Nauchno-Issledovatel'skiy Institut po Bezopasnosti Rabot v Gornoy Promyshlennosti

19821255

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USSR

UDC 546.185

SHOKOL, V. A., MOLYAVKO, L. I., MATYUSHA, A. C., MIKHAYLYUCHENKO, N. K., and DERKACH, G. I. (deceased)

"Diisocyanates of Phosphorus Thioacids"

Leningrad, Zhurnal Obshchey Khimii, Vol 41, No 11, Nov 1971, pp 2,380-2,383

Abstract: Twenty-four derivatives of alkyl- and aryl diisocyanothiophosphates $ROP(S)(NHCOR')_2$, and the diisocyanate of phenylthiophosphonic acid, were synthesized by reacting alkyl- and aryl diisocyanophosphites and diisocyanate of phenylphosphonic acid with phosphorus thiochloride. The isocyanate groups of these compounds were found to react with substances containing active hydrogen atoms. Details of experimental procedures and tables of physical constants are given.

1/1

USSR

UDC 547.241

MATYUSHA, A. G., KOLOTILO, M. V. and DERKACH, G. I. (deceased), Institute of Organic Chemistry, Academy of Science, Ukrainian SSR

"Derivatives of Isocyanates of Phosphorus Thioacids"

Leningrad, Zhurnal Obshchey Khimii, Vol 41, No 5, May 1971, pp 996-1003

Abstract: Dialkyl(diaryl)isocyanatophosphites when allowed to react with thiophosphoryl chloride or elemental sulfur to form the corresponding dialkyl (diaryl) isocyanatothiophosphites and dialkyl(diaryl)isocyanatophosphine sulfides.

Dialkyl(diaryl)isocyanatophosphates and thiophosphates, oxides and sulfides of dialkyl(diaryl)isocyanatophosphines, react with amines, alcohols and mercaptans to give the corresponding addition products at the isocyanato group.

The yields, melting points, and other physical data are presented in tabular form.

1/1

USSR UDC 547.26'118

GUBNITSKAYA, Ye. S., MATYUSHA, A. G., DERKACH, G. I. (deceased) Institute of Organic Chemistry, Academy of Sciences Ukrainian SSR

"Derivatives of Isocyanatophosphites"

Leningrad, Zhurnal Obshchei Khimii, Vol 40, No 6, Jun 70, pp 1205-1210

Abstract: Acyl azides react with $(C_2H_5O)_2PNCO$ to form $RCON{=}P(OC_2H_5)_2NCO$ (I). The reaction rate is relatively slow. For instance, in benzene at room temperature, the reaction is completed after 5 days, whereas at 70-80° it is completed within 6-8 hrs. I are dense, viscious liquids and can not be vacuum distilled without decomposition. With aromatic amines and dilute hydrochloric acid, I yield N-phosphorylated ureas. The following ureas were prepared: AlkOPO(X)NHCONHAr, where (alk, Ar, X given) C_2H_5, p-ClC_6H_4, Cl; C_2H_5, C_6H_5, C_6H_5; iso-C_3H_7, C_6H_5, Cl; iso-C_3H_7, p-ClC_6H_4, Cl; iso-C_3H_7, p-$C_6H_4COOC_2H_5$, Cl; iso-C_3H_7, p-$C_6H_4COOC_2H_5$, p-$C_6H_4COOC_2H_5$; iso-C_4H_9, C_6H_5, Cl; iso-C_4H_9, p-$C_6H_4OCH_3$, Cl; C_6H_{13}, C_6H_5, Cl; C_6H_{13}, p-$C_6H_4OCH_3$, Cl; C_6H_{13}, C_6H_5, C_6H_5; C_6H_{13}, p-$C_6H_4OCH_3$, p-$C_6H_4OCH_3$.

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UDC: 547.239 - 661.718.1

USSR

KOLOTILO, M.V., MATYUSHA, A.G., and DERKACH, G.I., (Deceased), Institute of Organic Chemistry, Kiev, Academy of Sciences Ukrainian SSR

"Derivatives of Isocyanates of Trivalent Phosphorus Acids"

Leningrad, Zhurnal Obshchey Khimii, Vol 40, No 4, Apr 70, pp 758-766

Abstract: Dialkyl-, diaryl-, diamidophosphorous, dialkyldithiophosphorous and dialkyl(diaryl)phosphinous acid chlorides react with sodium cyanate to give the corresponding isocyanates of trivalent phosphorus acids, which are monomers or dimers depending on the nature of the substituents at the phosphorus. Isocyanates of phosphorous and phosphinous acids react with nitrogen dioxide to give isocyanates of phosphoric and phosphinic acids. Isocyanates of dialkyl-(diaryl)phosphorous and dialkyl(diaryl)phosphinous acids add amines to form N-phosphorylated ureas. Chlorine atoms react in the action of amines on isocyanatophosphorous acid dichloride. Consecutive displacement of the second chlorine atom by a dialkylamido group results

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USSR

KOLOTILO, M. V., et al., Zhurnal Obshchey Khimii, Vol 40, No 4, Apr 70, pp 758-766

in instant dimerization of the isocyanate. Isocyanatophosphorous acid dichloride also reacts on the chlorine under the action of alcohols in the presence of bases to give isocyanates of dialkylphosphorous acids.

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USSR

UDC 547.26'118

SHOKOL, V. A., MOLYAVKO, L. I., MATYUSHA, A. G., and DERKACH, G. I.

"Tetraisocyanato-*p*-phenylene Diphosphite and Its Derivatives"

Leningrad, Zhurnal Obshchey Khimii, Vol XLIII (CV), No 1, 1973, pp 29-32

Abstract: Heretofore, only the synthesis of tetraisocyanatodiphosphine with a yield of 5% [M. Baudler, et al., Z. Naturforsch, No 20b, 494, 1965] and 3,9-diisocyanato-2,4,8,10-tetraoxy-3,9-diphosphaspiro-(5,5)-undecane, its dioxides, mono and dithiooxides [P. M. Pivaner, et al., J. Heterocyclic. Chem., No 4, 599, 1967] has been described. On interaction of tetrachloro-n-phenylene diphosphite with sodium cyanate, tetraisocyanato-*p*-phenylene diphosphite is formed. The tetraisocyanato-n-phenylene diphosphite is easily oxidized by nitrogen oxides into tetraisocyanato-n-phenylene diphosphate, and on reacting with phosphorus thiooxychloride, it is converted into tetraisocyanato-n-phenylene phosphitophionphosphate or tetraisocyanato-*p*-phenylene-bis-thionphosphate. On storing tetraisocyanato-n-phenylene diphosphite and phosphate, they polymerize, apparently, with the formation of uretidine dionic rings. The tetraisocyanates reacting easily with alcohols and amines with the formation of the corresponding urethanes and ureas.

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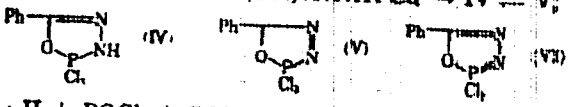
Acc. Nr AP0048821 · Abstracting Service: CHEMICAL ABST. Ref. Code: UR0346

90373n **Reaction of hydrazides of carboxylic acids with phosphorus pentachloride. I. Solvent effects.** Mikhailov, V. S.; Matyushecheva, G. I.; Derkach, G. I.; Yagupol'skii, L. M. (Inst. Org. Khim., Kiev, USSR). *Zh. Org. Khim.* 1970, 6(1), 149–51 (Russ). Heating $BzNHNH_2$ (I) with PCl_5 at 80–120° in CCl_4, C_6H_6, PhCl, $POCl_3$, $MeNO_2$, *o*-$O_2NC_6H_4Cl$, or tetrahydrothiophene *s,s*-dioxide gave mixts. of $PhCHCl_2$ (II) and $PhCCl_3$ (III). The proportion of III in the mixt. increased with the temp. and the amt. of PCl_5. In polar solvents more II than III was formed. The formation of II and III proceeds as follows: I → $BzNHNHPCl_4$ ⇌ $PhC(OH):NNHPCl_4$ → IV ⇌ V; V →



PCl_5 → II + $POCl_3$ + PCl_3 + N_2; IV.HCl → stable VI, which reacts with PCl_5 to give III, $POCl_3$, PCl_3, and N_2. Only the end products (II and III) of the above sequence were identified.

CPJR

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19800584

USSR

UDC: 547.339.2

MIKHAYLOV, V. S., MATYUSHECHEVA, G. I., DERKACH, G. I. (DECEASED), and YAGUPOL'SKIY, L. M., Institute of Organic Chemistry, Academy of Sciences Ukrainian SSR

" A Study of the Reactions Between Carboxlynic Acids and Phosphorus Pentachloride, 1. The Effect of Solvents"

Leningrad, Zhurnal Organicheskoy Khimii, Akademiya Nauk SSSR, Vol VI, No 1, Jan 70, pp 149 - 151

Abstract: The hydrazides of certain aromatic carboxylic acids react with phosphorus pentachloride to form benzal chloride and benzotrichloride.

Experiments run by the authors indicate that the particular solvent used (benzene, CCl_4, chlorobenzene, etc.) has a marked influence on the relative proportion of the two products indicated. In general, use of polar solvents increases the content of benzal chloride.

A table, and also structural formulation of the reactions, accompany the paper.
1/1

USSR

UDC 547.539.2

YAGUPOL'SLIY, L. M., MIKHAYLOV, V. S., and MATYUSHECHEVA, G. I., Institute of Organic Chemistry, Kiev, Academy of Sciences Ukrainian SSR

"Investigation of the Reaction Between Carboxylic Acid Hydrazides and Phosphorus Pentachloride"

Leningrad, Zhurnal Organicheskoy Khimii, Vol 6, No 8, Aug 70, pp 1648-1651

Abstract: Benzoic acid hydrazide is interacted with phsophorus pentachloride to give a mixture of benzal chloride and benzotrichloride. Electron donor substituents in the para-position promote the formation of benzal chloride derivatives, while electron acceptor substituents increase the concentration of benzotrichloride derivatives. Substituents in the meta-position have almost no effect on the ratio of dichloromethyl and trichloromethyl compounds in the mixture of reaction products. When substituents are present in the ortho-position, it is the size of the substituent rather than its nature which has a decisive significance. Interaction of ortho-substituted benzoic acid hydrazides with phosphorus pentachloride in polar solvents leads to synthesis of practically pure benzal chloride derivatives.

1/1

UDC 635.21:635.28

USSR

AMBROSAW, A. L., and MATYUSHENKA, L. A.,

"The Effect of Nutrition Conditions on Virus Diseases of Potatoes and Productive Qualities of Potato Tubers"

Minsk, Izvestiya Akademii Nauk BSSR, Seriya Sel'skokhozyaystvennykh Nauk, No 1, 1971, pp 57-60

Abstract: Experimental data are presented of a three-year study of potato yield and potato virus diseases in relation to nutrients in different soils and the kind of fertilizers used. The best combination of nutrients for potato sets is 3 tons manure/ha plus N-45, P-60, K-60 kg/ha for mineral soils; and P-60, K-120 kg/ha for peat-bog soils. However, if potatoes are already infected with a virus, the growing conditions on peat-bog and mineral soils in the presence of the above doses of fertilizers facilitate the spread of disease.

1/1

USSR

MATYUSHICHEV, V. B., and ASHMARIN, I. P., Leningrad State University

"Concentration and Storage of Preparations of 026 Coliphage"

Moscow, Voprosy Virusologii, No 5, 1971, p 623

Abstract: The effectiveness of some chemical methods of precipitating bacteriophages by concentrating lysates of 026 coliphage were compared. The maximum effect was achieved by precipitating virus with 2.0 to 2.3 M ammonium sulfate. A centimolar solution of magnesium sulfate in an 0.9% NaCl solution is recommended as a protein-free stabilizing diluent for resuspending phage precipitates.

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USSR

UDC 539.1.073/074

KARZHAVIN, Yu. A., MATYUSHIN, A. T., MATYUSHIN, and KACHATURIAN, M. N., Joint Institute of Nuclear Research, Dubna

"A New Method for Sampling Data from a Spark Chamber"

Moscow, Pribory i Tekhnika Eksperimenta (Instruments and Experimental Technology), No. 5, Sept-Oct 1970, p 60-63

Abstract: Experiments were conducted to find a new method of sampling data from a spark chamber with solid electrodes. A piezoelement was used as a passive detector of ultrasound generated in the electrode by the spark. The detector was attached directly to the electrode or to a sound conductor attached to the electrode. An emitter-follower was used to transmit the detected signal into an acoustic channel. The amplitude of the signal depends on the material of the electrode, its thickness, the distance between the detector and spark, the spark energy, the length of the spark gap, and the acoustic matching of the piezoelement and the sound conductor or electrode. The best common material is duraluminum, and especially dural foil, which gives an amplitude of one order higher than does a plate. The spark chamber was used to record particle track signals. Curves of the detector signal amplitude for thyratron generator voltages of 20

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KARZHAVIN, Yu. A., et al, Pribory i Tekhnika Eksperimenta, No 5, Sept-Oct 1970, p 60-63

and 25 kv are plotted. Two vibration frequencies of the plate were selected as optimum for measurement. Interesting effects were found when a high voltage pulse was transmitted to the plate through a needle point pressed directly on the plate or on a mylar film placed on the plate. The method yields data from the ends of the sparks in the gap. The signal propagation rate is constant, and both X and Y coordinates can be picked off from the same electrode. The method can be used with various chamber configurations, large and small gaps, and magnetic fields, as well as with photographic recording of results. A spherical chamber is suggested with a target at the center. Such a chamber can accomodate many spark gaps and 20 to 30 detectors or more. A block diagram is shown of a detector hookup to a computer for storing data during the time a beam is striking the target and partially processing the data during the pauses. Approximately 10 to 20 words of 11 to 12 bits can be passed during the dead time of the beam to a computer that can accept a number in less than 250 microsec. The BESM-4, M220, Dnepr-I, Dnepr-II, Minsk, and other computers are recommended. Counting circuits, consisting of an amplifier, shaper, and trigger, are used to register and store the data. The operation of the computer linking circuits is described. Orig. art. has 5 figs. and 4 refs.
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USSR

UDC 539.1.073/074

KARZHAVIN, Yu. A., MATYUSHIN, A. T., MATYUSHIN, and KACHATURYAN, M. N., Joint Institute of Nuclear Research, Dubna

"A New Method for Sampling Data from a Spark Chamber"

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USSR

KARZHAVIN, Yu. A., et al, Pribory i Tekhnika Eksperimenta, No 5, Sept-Oct 1970, p 60-63

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UDC 542.91:547.722

USSR

NIKOLAYEVA, A. D., NATYUSHIN, YU. N., PEPEKIN, V. I., SHELOT, V. S., VULIDOROV, V. V., BULIDOROVA, T. I., and APIN, A. YA., Institute of Chemical Physics, Acad. Sc. USSR

"Synthesis and Study of the Detonation Properties of 3-Methyl-4-nitrofuroxane"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 4, Apr 72, pp 965-967

Abstract: A safe and simple synthesis of 3-methyl-4-nitrofuroxane (MNF) has been developed. The synthesis is based on the reaction of sodium nitrite mixed with H_2SO_4 with a solution of metacrylic acid in dichloroethane at 50°. MNF can also be obtained in a 24% yield from a mixture of acetone, nitroacetone, and nitropropylene treated with a mixture of nitrogen tetroxide and nitric acid. Experimentally the thermochemical and detonational properties of MNF have been determined: heat of combustion ΔH^0_{comb} = 408.7 ± 0.2 kcal/mole; enthalpy of the formation of MNF ΔH^0_f 24.1 ± 0.2 kcal/mole. The detonation rate with a 1.60 g/cm^3 density of the charge was found to be $D_{1.6}$ = 7430 m/sec. With charge densities 0.64 and 1.64 g/cm^3 the heats of explosive detonation of MNF were 1180 and 1330 kcal/kg respectively. MNF is a crystalline material, m.p. 67-68°; it has high thermal stability and can be recrystallized from hot water.

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USSR

KOZYREV, V. P., MATYUSHINA, I. I.

"Combinatorial Study of Expert Evaluations for Separation of Significant Factors Influencing the Wear of Steel Subjected to Impacts with Rock"

Vopr. Kibernetiki. Nekotor. Vopr. Planir. Eksperimenta [Problems of Cybernetics. Some Problems of Experimental Planning -- Collection of Works], Moscow, 1972, pp 55-61 (Translated from Referativnyy Zhurnal Kibernetika, No 6, 1973, Abstract No 6V354, by I. Sigal).

Translation: A set of factors is studied influencing the degree of damage to rock working tools. The list of factors and their ranking are based on a questionnaire distributed to experts, listing 21 factors. The factors are ranked according to the increasing sum of ranks assigned by the experts. A factor is considered more significant, the less the corresponding sum of ranks. It is demonstrated that with this type of ranking of factors, the first 6 are the most significant. This results from the fact that the concordation factor for the number of factors over 6 (with the ordering of factors used) is practically constant.

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USSR

UDC 613.63:[615.285.42+615.285.7

BURKATSKAYA, N. Ye., MATYUSHINA, V. I., and IVANOVA, Z. V., Kiev Institute of Industrial Hygiene and Occupational Diseases

"Hygienic Evaluation of the New Insecticide and Acaricide Dicresyl Ester of N-Methylcarbamic Acid"

Moscow, Gigiyena i Sanitariya, No 8, 1973, pp 99-101

Abstract: Dicresyl is used to protect cattle against certain insects and ixodid ticks. The LD_{50} for rats and mice is 471 and 271 mg/kg, respectively. It is readily absorbed through the skin and exerts a systemic toxic effect. The symptoms of poisoning after injection into the stomach or application to the skin in toxic and lethal doses include salivation and tearing, head and body tremors, fibrillar twitching of muscles, and clonic-tonic spasms similar to those induced by poisoning with organophosphorus compounds and, like the latter, it markedly inhibits cholinesterase activity. Dicresyl is also toxic when inhaled. Despite the similarity of its chemical structure to that of urethan, it did not have a tumorigenic effect when administered to a high-cancer mouse strain (A). Dicresyl was found to penetrate the protective clothing (cotton robes and rubber gloves) of workers handling it (the

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BURKATSKAYA, N. Ye., et al., Gigiyena i Sanitariya, No 8, 1973, pp 99-101

cholinesterase level was 24 to 43% below normal the first day of use although it did not provoke subjective complaints). The recommended maximum permissible concentration in the air of work places is 0.5 mg/m^3.

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Acc. Nr: AP0041914 Ref. Code: UR 0245

PRIMARY SOURCE: Voprosy Psikhologii, 1970, Nr 1, pp 70-78

ON THE MODELLING OF THINKING PROCESS IN A SELF — INSTRUCTING SYSTEM

Matyushkin, A. M.; Mikheyev, V. I.

Summary

The paper describes the process of self — instruction under problem situation conditions as a result of which the schoolchild gains a meaningful unit of academic information. A probability — information model was used for the description of the process of solving the problem in the indicated conditions. Indices characterizing the possibility of acquiring independently new knowledge and indices determining the limits of possibilities of performing the acquired action in new conditions are proposed as indicators of acquisition.

Two main cases of new knowledge acquisition are considered: 1) acquisition by a schoolchild and 2) acquisition by a group of schoolchildren. Characteristics are given of the difficulty of problem situations in the process of the independent acquisition of study program by schoolchildren with different possibilities of acquiring new knowledge.

REEL/FRAME
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USSR UDC 621.791.052:530.151.1:620.192.7:669.295

MATYUSHKIN, B. A., Candidate of Technical Sciences, and GORSHKOV, A. I., Candidate of Technical Sciences

"Effect of Weld Patching on the Resistance of Titanium Alloy Weld Joints to Slow Failure"

Moscow, Svarochnoye Proizvodstvo, No 11, 1973, pp 28-30

Abstract: Purpose of this work was to investigate the use of weld patching to eliminate defects resulting during the original welding process and to determine the role of weld patching in the formation of cold cracks and develop recommendations for eliminating cold cracking. Samples of titanium alloys OT4, VT20, and VT14 were weld patched using 2-mm diameter wire grades OT4, VT20-lsv, and SPT-2, respectively. Results from visual inspection and x-ray examination showed that after the first patching there were cracks in the form of fine grids on the seam metal surface of alloy VT14 which had been subjected to maximum stresses (equal to 0.8 of the yield strength) for 80 days and 180 days for VT20. No cracks were found on alloy OT4. After a second patching, small cracks were found in the heat-affected zone for alloy VT14 which had been subjected to maximum stresses equal to 0.7 YS for 180 days and, strusses equal to 0.6 YS for 75 days in the seam metal. No cracks were found on alloy

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MATYUSHKIN, B. A. and GORSHKOV, A. I., Svarochnoye Proizvodstvo, No 11, 1973, pp 28-30

VT20 after the second patching. After the third patching cracks were found on practically all the samples tested, primarily in the heat-affected zone. Additional tests were conducted on the samples after annealing in argon for 1.5 hours at 750°C and furnace cooling. It was found that the annealing procedure increased the resistance of the weld joints to the formation of cold cracks. As a result of this, after three patchings, no cracks were detected on any of the alloys which had been subjected to maximum stresses equal to 0.8 YS for 2.5 years. Thus it was concluded that repeated heatings of weld joints for patching purposes impair the structural state of the seam and heat-affected zone metal and reduce the resistance of joints to slow failure, and that annealing of weld joints having been subjected to patching lowers the danger of crack formation and development. 3 figures, 2 tables, 2 bibliographic references.

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UDC 621.791:62-784.5:621.78.066.3:669.295

USSR

GORSHKOV, A. I., and MATYUSHKIN, B. A., Candidates of Engineering Sciences; OL'KHOVIK, R. G., AFANAS'YEV, P. S. (deceased), and NEKRENEVA, YE. V., Engineers

"Some Problems of Welding Alloy VT20 in a Controlled Atmosphere"

Moscow, Svarochnoye Proizvodstvo, No 3, Mar 73, pp 20-22

Abstract: The mechanical properties of weld joints and the effect of the protective atmosphere on the gas content in the seam metal during manual welding in a chamber with a controlled atmosphere were investigated in this work. Alloy VT20 sheet, 1-5 mm thick, was used in which the alloying element content and impurity content were found in the following limits (in %): 5.7-6.4 Al, 0.8-1.2 Mo, 0.55-1.22 V, 1.9-2.4 Zr, 0.005-0.01 H_2, 0.07-0.1 O_2, and 0.02-0.03 N_2. Welding rods VT20-2sv of the Ti-Al-Zr-Mo-V system and SPT-2 of the Ti-Al-Zr-V system with a diameter of 2.5 mm were used which had the following chemical composition: VT20-2sv -- 3.98 Al, 2 Zr, 0.83 Mo, 0.91 V, 0.0015 H_2, 0.11 O_2 and 0.02 N_2; SPT-2 -- 4.74 Al, 1.35 Zr, 1.92 V, 0.004 H_2, 0.07 O_2 and 0.04 N_2. It was determined that weld joints of alloy VT20 made by automatic and manual welding are close to the base metal in strength and

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GORSHKOV, A. I., et al, Svarochnoye Proizvodstvo, No 3, Mar 73, pp 20-22

surpass the base metal in impact strength and bend angle. Weld joints 3-5 mm thick made by manual and automatic welding with welding rods VT20-2sv and SPT-2 have a tensile strength equal to 90% of the base metal strength and an impact strength 1.6-2 kgm/cm^2 higher then the base metal impact strength. When welding in chambers without an auxiliary system of argon purification the values of partial oxygen and nitrogen pressures exceed equilibrium values so that there is an additional increase in the oxygen and nitrogen content in the seam metal and a decrease of hydrogen content. 2 figures, 4 tables.

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Titanium

UDC 621.88.085:669.295:620.17

USSR

GORSHKOV, A. I., MATYUSHKIN, B. A., CHUGUNOVA, R. S., and KIRYUKHINA, G. N.

"Properties of VT20 Weld Joints After Annealing"

Moscow, Metallovedeniye i Termicheskaya Obrabotka Metallov, No 4, Apr 73, pp 62-63

Abstract: The mechanical properties of weld joints from VT20 alloy with and without a filler metal after annealing at 400-800°C were investigated. It was found that annealing of weld joints made using VT20-1sv or VT20 2sv filler wire and without the filler wire increases ductility although joints made with VT20-1sv wire had greater ductility. An annealing temperature of 80[illegible]°C was recommended for increasing ductility and removing residual welding stresses. This increase in ductility is explained by the formation of an equilibrium structure of the metal in the heat-affected zone and weld seam and also, possible, by the precipitation of the beta-phase along the boundaries of the alpha- and alpha-prime phases. One figure, two tables.

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UDC 621.791.011

USSR

GORSHKOV, A. I., MATYUSHKIN, B. A., MESHCHERYAKOV, V. N., and SHORSHOROV, M. Kh., Moscow

"Effect of Hydrogen on the Kinetics of Cold Crack Growth in Titanium After Welding"

Moscow, Fizika i Khimiya Obrabotki Materialov, No 5, Sep-Oct 72, pp 140-143

Abstract: OT4, OT4-2, VT14 and VT20 titanium alloys in the form of disks 130 mm in diameter and 3 mm thick, were welded and tested to trace the development of cracks under a biaxial stress state and the effect of hydrogen on cold cracking. Test data showed that at high rates of crack development the hydrogen content at the crack surface is lowered. This indicates that the higher the level of stresses and the lower the ductility of the titanium alloys, the smaller the hydrogen concentration required for crack development. The effect of oxygen and nitrogen on cold crack development was also investigated which showed that with increased content of these two elements the rate of crack growth also increases. 3 figures, 1 table, 6 bibliographic references.

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UDC 539.4:621.791

USSR

SHORSHOROV, M. Kh., MATYUSHKIN, B. A., MESHCHERYAKOV, V. N., and GORSHKOV, A. I.
Moscow

"On the Role of Hydrogen in the Mechanism of Retarded Disintegration of Titanium After Welding"

Moscow, Fizika i Khimiya Obrabotki Materialov, No 5, Sep-Oct 71, pp 115-120

Abstract: Data are presented from an investigation of the role of hydrogen in the mechanism of the development of cold cracks in welded joints of titanium by retarded disintegration. Experiments were carried out with specimens, 2 X 20 X 80 mm, of the OT4 titanium alloy which, after preliminary lateral bending at angles of 15-90 deg., were subjected to hydrogenation. The relationship between the time up to the destruction of the specimen and the hydrogen concentration on the head of the crack was established experimentally and through calculation. The investigation results are discussed by reference to diagrams showing the effect of the bending angle of the specimen on the H-content of the metal, the H-content on the crack head and the crack length depending on its development time up to disintegration, and the crack length as a function of stress. The retarded disintegration mechanism is essentially affected by the

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USSR

SHORSHOROV, M. Kh., et al., Fizika i Khimiya Obrabotki Materialov, No 5, Sep-Oct 71, pp 115-120

hydrogen diffusion caused by the stress gradient. Hydrogen diffuses into the region of maximum stress concentrations and absorbs on defects of the crystalline lattice of the metal, decreasing the surface energy and increasing the development rate of cracks. Six illustr., four formulas, one table, nine biblio. refs.

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UDC 612.851.014.423

USSR

YURKYANETS, Ye. A., and MATYUSHKIN, D. P., Laboratory of Neuromuscular Physiology, Physiological Institute, Leningrad State University

"Electrical Activity of the External Ear Muscles of Man at Rest and During Differentiation of Acoustic Signals"

Moscow, Byulleten' Eksperimental'noy Biologii i Meditsiny, Vol 75, No 3, 1973, pp 16-19

Abstract: Electromyograms were recorded from the superior and posterior auricular muscles in 15 healthy human subjects while they were listening to pairs of sounds (2,000±40 Hz, 20-30 db, either sound lasting 500 msec and separated from the other by 25 msec) delivered at 8-sec intervals and, by pressing one of three buttons, immediately stated that the second sound was identical with or higher or lower than the first sound. Significant activation of the superior and inhibition of the posterior auricular muscles lasting 1.1-1.6 sec were observed in all subjects. The reaction began less than 0.2 sec after delivery of the signal in 64% and 0.3-1.5 sec prior to signal delivery in 36% (conditioned reflex). A good correlation was found between the magnitude of the averaged integrated potentials and the number of erroneous evaluation of the pitch, that is, the more difficult it was to differentiate the two

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