GOLENKOV, P. (Nesvizh, Minskoy oblasti); NIKITIN, V.; NALIMOVA, Yu., mladshiy nauchnyy sotrudnik; GUPLEV, A., agronom; PLATONOVA, Ye., agronom; YEGOROVA, L., nauchnyy sotrudnik; NESTERENKO, N., kand. biolog. nauk

From the practices in the use of poisonous chemicals. Zashch. rast. ot vred. i bol. 10 no.5:25-27 '65. (MIRA 18:6)

1. Toksikologicheskaya laboratoriya Nauchno-issledovatel'skogo instituta kartofel'nogo khozyaystva (for Yegorova). 2. Toksikologicheskaya laboratoriya Vsesoyuznogo nauchno-issledovatel'skogo instituta zashchity rasteniy pri Vsesoyuznom nauchno-issledovatel'skom institute [illegible] (for Nesterenko).

L 39770-66 EWT(m) TT/WW/RM

ACC NR: AN6014210 (N) SOURCE CODE: UR/9008/66/000/038/0002/0002

AUTHOR: Nikitin, V. (Lieutenant general of technical engineering corps)

ORG: none

TITLE: Fuel and modern warfare

SOURCE: Krasnaya zvezda, 15 Feb 66, p. 2, col. 1-4

TOPIC TAGS: liquid fuel, fuel storage, pipeline transportation system

ABSTRACT: The problem of supplying liquid fuel to military units in the field is discussed. Fuel is supplied by truck, rail, airplane, helicopter, parachute, and pipeline, with prime emphasis on trucks. The eventual possibility of delivering fuel by tank truck directly to a field unit (i. e., without transferring fuel from one tank truck to another at a midway point) is noted. Particular attention is focused on field pipelines which are described as the most economical and reliable means of delivering fuel. It is concluded that ways must be found to improve fuel storage.

SUB CODE: 15,21/ SUBM DATE: 00/ ORIG REF: 000/ OTH REF: 000

Card 1/1

BYKOV,V.A.; NIKITIN,V.A.

Resistance to multiple bending of steel bars with welded transverse stiffeners. Svar.proizv. no.9:8-10 S'55. (MLRA 8:11)

1. Leningradsiy korablestroitel'nyy institut
(Steel--Fatigue) (Steel bars--Testing)

report presented at the 1st All-Union Congress of Theoretical and Appl Mechanics, Moscow, 27 Jan - 3 Feb 60.

NIKITIN, V.A.

Approximate solution of the problem of action of concentrated forces on a cylindrical shell. Uch.zap.LGU no.280: 87-96 '60. (MIRA 13:7)
(Elastic plates and shells)

GROSVAL'D, V.G.; SVEDE-SHVETS, N.I.; Prinimali uchastiye: CHINAROV, Yu.S.; RYB'YEV, Yu.M.; NIKITIN, V.A.; SERIKOV, I.M.

Investigating unit friction forces and unit pressures along the entire contact surface of the deformation zone during rolling. Izv. vys.ucheb.zav.; chern.met. 4 no.6:75-86 '61. (MIRA 14:6)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii.
(Rolling (Metalwork)) (Deformations (Mechanics))

L 08721-67 EWT(m)/EWP(w)/EWP(v)/EWP(j)/EWP(t)/ETI/EWP(k) IJP(c) JD/WW/HM/RM
ACC NR: AP6021718 SOURCE CODE: UR/0229/66/000/005/0017/0022

AUTHOR: Nikitin, V. A.; Tarasov, I. K.

ORG: none

TITLE: Experimental investigation of the strength of fiberglass-reinforced plastic and steel joints

SOURCE: Sudostroyeniye, no. 5, 1966, 17-22

TOPIC TAGS: plastic strength, polyester plastic, plastic industry, fiber glass, fiberglass, REINFORCED PLASTIC, METAL JOINING, STRESS ANALYSIS

ABSTRACT: Various types of fiberglass-reinforced plastic and steel joints were experimentally investigated for strength under static and sign-changing conditions. Small samples and structures simulating auxiliary-machine foundations of St-3 steel joined with a non-water repellent plastic, fabricated by a cold-hardening method using unsaturated PN-1 polyester resin and T-1 glass fiber, were submitted to tension, compression, and fatigue tests. The results, including breaking forces per unit length of joint and coefficients characterizing the beginning of deformation and rupture, were used for evaluating the strength. Tensile and compression test data are tabulated, and deformation and fatigue curves are shown. Tensile stresses were found to be the most destructive; on composite structures they were found to be

UDC: 629.12: 624.02/.09

Card 1/2

L 08721-67

ACC NR AP6021718

about two times lower than on samples; on tee and corner joints they were about two times lower than on butt joints. It can be anticipated that structures made from fiberglass-reinforced plastics treated with a hydropholic-adhesion compound based on heat-resistant polyester resins will prove to be stronger. Orig. art. has: 4 figures and 5 tables.

SUB CODE: 11/ SUBM DATE: none

Card 2/2 nst

1. NIKITIN, V. A.

2. USSR (600)

4. Botany - Gissar Mountains

7. Formation of the Turkestan hawthorn and its significance in the plant landscape of the Gissar Mountains. Soob. TFAN SSSR no. 22, 1950.

9. Monthly Lists of Russian Accessions, Library of Congress, March 1953, Unclassified.

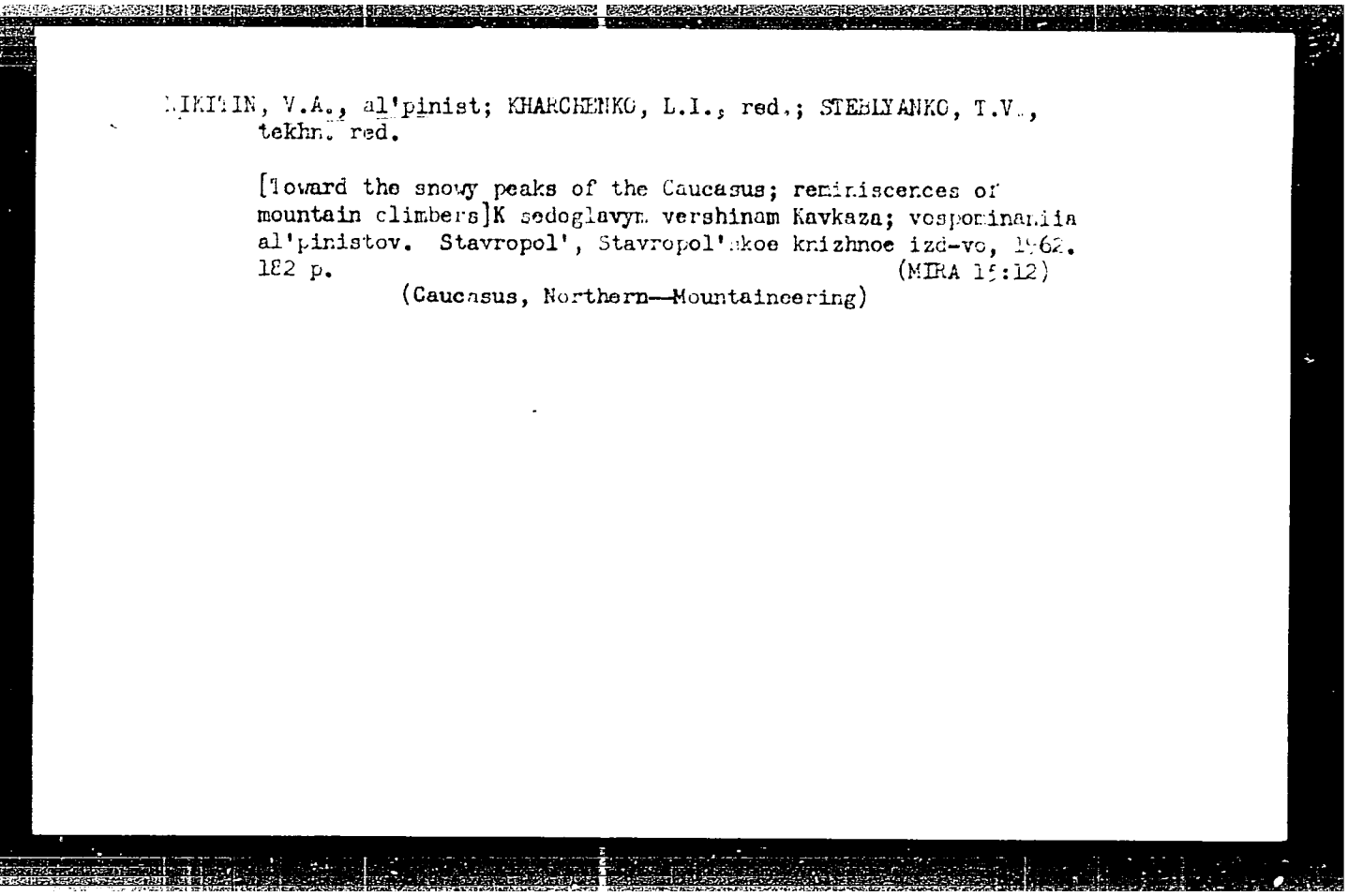
NIKITIN, V. A.

IKONNIKOV, S.S.; ISMAILOV, M.; KNORRING, I.G.; KOROLEVA, A.S.; KUDRYASHEV, S.N.; MALEYEV, V.P.; MASLENNIKOVA, T.I.; NEVSKIY, S.A.; NIKITIN, V.A.; OVCHINNIKOV, P.N.; PLESHKO, S.I.; POPOV, N.G.; SIDORENKO, G.T.; CHUKAVINA, A.P.; SHIBKOVA, I.F.; BORISOVA, A.G., redaktor; VASIL'CHENKO, I.T., redaktor; NEUSTRUYEVA, O.E., redaktor; ZENDEL', R.Ye., tekhnicheskiy redaktor

[Flora of the Tajik S.S.R.] Flora Tadzhikskoi SSR. Moskva, Izd-vo Akad.nauk SSSR. Vol.1. [Pteridophyta - Gramineae] Paporotnikoobraznye-zlaki. Glav.red. P.N.Ovchinnikov. 1957. 547 p. (MIRA 10:9)
(Tajikistan--Botany)

NIKITIN, V.A.

A new species of the genus Cousinia from Tajikistan. Bot.mat. Gerb. 19:385-386 '59. (MIRA 12:8)
(Tajikistan--Cousinia)



LIKIN, V.A., al'pinist; KHARCHENKO, L.I., red.; STEBLYANKO, T.V., tekhn. red.

[Toward the snowy peaks of the Caucasus; reminiscences of mountain climbers]K sedoglavym vershinam Kavkaza; vospominaniia al'pinistov. Stavropol', Stavropol'skoe knizhnoe izd-vo, 1962. 182 p. (MIRA 15:12)

(Caucasus, Northern—Mountaineering)

L 24301-66 EWT(m) DIAAP

ACC NR: AP6006795 SOURCE CODE: UR/0386/66/003/001/0015/0021

AUTHOR: Zolin, L. S.; Kirillova, L. F.; Liu, Ch'ing-ch'iang; Nikitin, V. A.; Pantuyev, V. S.; Sviridov, V. A.; Strunov, L. N.; Khachaturyan, M. N.; Shafranova, M. G.; Korbel, Z.; Rob, L.; Devinski, P.; Zlatanov, Z.; Markov, P.; Khristov, L.; Chernev, Kh., Dalkhazhav, N.; Tuvdendorzh, D.

ORG: [Zolin, Kirillova, Liu, Nikitin, Pantuyev, Sviridov, Strunov, Khachaturyan, Shafranova] Joint Institute of Nuclear Research, Dubna (Ob"yedinennyy institut yadernykh issledovaniy); [Korbel, Rob] Czechoslovakian Higher Technical School, Prague (Cheshskoye vyssheye tekhnicheskoye uchilishche); [Devinski, Zlatanov, Markov, Khristov, Chernev] Physics Institute, Bulgarian Academy of Sciences, Sofia (Fizicheskiy institut Bolgarskoy akademii nauk); [Dalkhazhav, Tuvdendorzh] Institute of Physics and Chemistry, Mongolian Academy of Sciences, Ulan Bator (Institut fiziki i khimii Mongol'skoy akademii nauk)

TITLE: Real part of the pn scattering amplitude in the energy interval 2--10 Gev

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 1, 1966, 15-21

TOPIC TAGS: proton scattering, neutron scattering, scattering amplitude, differential cross section, deuteron reaction

ABSTRACT: On the basis of experimental data obtained by the authors on elastic pd scattering in the energy interval 1--10 Gev, and information on pp scattering amplitude in this energy range, the authors determined the real part of the scattering

Card 1/2

L 24301-66

ACC NR: AP6006795 .0

amplitude by means of an experiment involving registration of slow recoil deuterons from a film target of deuterated polyethylene 0.5--0.6 μ thick. The investigated range of the squared momentum transfer was $0.003 < |t| < 0.2$ (Gev/c)^2. Plots are presented of the differential cross sections vs. the square of the momentum transfer and an empirical formula is given for these plots. The value obtained for the total cross section of elastic pd scattering at 6 Gev is several times smaller than that measured by others. In the small-angle region of pd scattering, constructive interferences were observed between the Coulomb and nuclear scatterings. From the obtained real part of the pd scattering amplitude, and from a comparison of the obtained data with earlier measurements by the authors of the pp scattering amplitude of the same energies (ZhETF v. 50, 76, 1966), the estimated real part of the pn scattering amplitude is +0.2, -0.06, -0.45, and -0.40 for 2, 6, 8, and 10 Gev respectively. The small nonzero real part of the pn scattering amplitude agrees with data obtained at CERN (G. Bellettini et al., Internat. Conf on Elementary Particles, Oxford, 1965). Orig. art. has: 2 figures, 3 formulas, and 2 tables.

SUB CODE: 20/ SUBM DATE: 12Nov65/ ORIG REF: 005/ OTH REF: 005

Card 2/2

1. NIKITIN, V. A.; KARYAKIN, A. V.

2. USSR (600)

4. Metals-Testing

7. Fluorescent method of defectoscopy of surfaces and determination of depth of cracks. Izv. AN SSSR. Ser. fiz. 15, No. 6, 1951.

9. Monthly List of Russian Accessions, Library of Congress, January 1953. Unclassified.

NIKITIN, V.A.

Chemical Abstracts
May 25, 1954
Electronic Phenomena
and Spectra

Infrared absorption spectra of organic peroxides and their detection during photooxidation. A. V. Karyakin and V. A. Nikitin. *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 17, 630–43(1953).—The infrared spectra of 9 hydroperoxides (H_2O_2; "alexol," $PhCMe_2OOH$, 1,2,3,4-tetrahydro-1-naphthyl hydroperoxide, $Me(CH_2)_4CHMeOOH$, $HOCH_2OOH$, Me_3COOH, 1-cyclohexen-3-yl hydroperoxide) and 7 peroxides ($(PhCMe_2O)_2$, $PhCMe_2OOBu$, peroxide of acetone, Bz_2O_2, peroxide of glycerol, *tert*-butyl peroxide, Et_2O_2) are tabulated. The following absorption bands are identified for :COOH compds.: 840 (OOH); 880 (OO); 1150 (CO); 1310 (OH deformed); 3450 (OH valency vibration); 6800 cm.$^{-1}$ (1st overtone of OH valency vibration). There are no vibrations characteristic of :COOC:, although there are 3 frequently appearing frequencies 860 (OO), 940 and 1200 cm.$^{-1}$ (CO). The knowledge of peroxide bands was helpful in the study of intermediary oxidation products during photooxidation of BzH, toluene, ethylbenzene, isopropylbenzene, pinene, and myrcene in dry O. In a BzH soln. in CCl_4 during oxidation the CH group is replaced by an OOH group and a H bond on CO. The peroxide is unstable, and disappears after 24 hrs. Toluene does not oxidize, ethylbenzene only very little, isopropylbenzene, pinene, and myrcene oxidize considerably. S. Pakswer

USSR/Chemistry - Peroxides, organic Dec 53

"Infrared Spectra of Peroxides," A. V. Karyakin, V. A. Nikitin, K. I. Ivanov

Zhur Fiz Khim, Vol 27, No 12, pp 1856-66

Detd the typical infrared spectrum frequencies for the peroxide groups COOH and COOC.

275T15

NIKITIN, V. A.

USSR/Physical Chemistry - Photochemistry. Radiation Chemistry. Theory of the Photographic Process, B-10

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 61105

Author: Karyakin, A. V., Nikitin, V. A.

Institution: None

Title: Spectral Investigation of Photoxidation of Organic Compounds

Original Periodical: Zh. fiz. khimii, 1953, 27, No 12, 1867-1876

Abstract: Use of previously obtained data on infrared spectra of some organic peroxide compounds (Referat Zhur - Khimiya, 1956, 46040) made it possible to apply the method of infrared spectroscopy for the detection of intermediate products of the reaction of photoxidation with oxygen, of benzaldehyde (I), isopropylbenzene (II), pinene (III) and myrcene (IV). Toluene and ethylbenzene are not oxidized under the conditions of the experiment. On oxidation of I (25% solution in CCl_4, time of illumination: 1 hour) the following spectral changes were noted: disappears band 7,940 cm^{-1} -- second

Card 1/3

USSR/Physical Chemistry - Photochemistry. Radiation Chemistry. Theory of the Photographic Process, B-10

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 61.05

Abstract: overtone valency oscillation $CH^{(al)}$; appears new band 6,250 cm^{-1} -- first overtone valency oscillation O-H; appears band 6,250 cm^{-1} first overtone hydrogen bond OH...O; considerable reduced band 5,650 cm^{-1} -- first overtone $CH^{(al)}$; appears band 875 cm^{-1} -- main frequency valency oscillation O-O; band appertaining to benzene ring are not changed, while band of carbonyl group C = O is shifted from 1,715 to 1,680 cm^{-1}. These changes indicate that aliphatic group CH is replaced by peroxide group O-O-H with formation of hydrogen bond with group C = O, and this hydroperoxide is unstable; after 24 hour standing of oxidized solution in its spectrum disappears 875 cm^{-1} and the spectrum is converted to a set of frequencies of I and benzoic acid. Absence of band 837 cm^{-1} characteristic of hydroperoxide chain C-O-O-H is due to formation of h oxyperoxide I with appearance of band 875 cm^{-1} characteristic of group O-O. On the basis of comparison of experimental material on spectroscopy of I frequencies 1,200 and 1,309 cm^{-1} in spectrum of I are related to oscillations of carbonyl group in excitated state with open π-bond. Oxidation of II results in appearance of a set of frequencies

Card 2/3

USSR/Physical Chemistry - Photochemistry. Radiation Chemistry. Theory of the Photographic Process B

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 61105

Abstract: characteristic of hydroperoxide. For III consisting of α- and β-fractions formation of hydroperoxides on photoxidation is proved by occurrence of bands: 844 cm^{-1} (OOH), 3,390 cm^{-1} (OH), 6,410 cm^{-1} (2νOH), considerable widening and shift of latter band in relation to its usual position (6,900 cm^{-1}) is due to formation of strong hydrogen bond. Band 1,695 cm^{-1} (C = O) appertains to products of decomposition of hydroperoxides, appearance of band 722 cm^{-1} so far cannot be explained. Appearance in infrared spectrum of IV (after 4 hours of illumination) of bands 833 and 3,500 cm^{-1} indicates the formation of hydroperoxide, while band 1,710 cm^{-1} indicates presence of compounds containing the group C = O. The hydroperoxide formed is little stable, its concentration is low and it decomposes rapidly with formation of carbonyl-containing compounds and H_2O.

Card 3/3

NIKITIN, V. A.

USSR/Miscellaneous - Production Quality

Card 1/1

Authors : Karyakin, A. V., and Nikitin, V. A.

Title : Luminescent analysis in national economy

Periodical : Priroda, 5, 87 - 92, May 1954

Abstract : Methods of investigating or discovering of various objects by means of fluorescence (or any other form of luminescence) were combined under one general name "luminescent analysis". The fluorescent method of defectoscopy is now in use by many Soviet industries, in plant laboratories, technical control offices etc. The luminescent analysis method made it possible to reduce the number of factory rejects and to improve the technology and quality of products. The introduction of the great scientific achievements in the field of fluorescence and luminescence into the national economy serves as a lustrous example of the creative cooperation between science and industry. Photos of objects to which the luminescent analysis method can be applied are included.

Institution : ....

Submitted : ....

~~Alekseyev, V.A.~~ NIKITIN, V.A.

USSR/Physical Chemistry - Photochemistry. B-1C
Radiation Chemistry. Theory of the Photographic Process

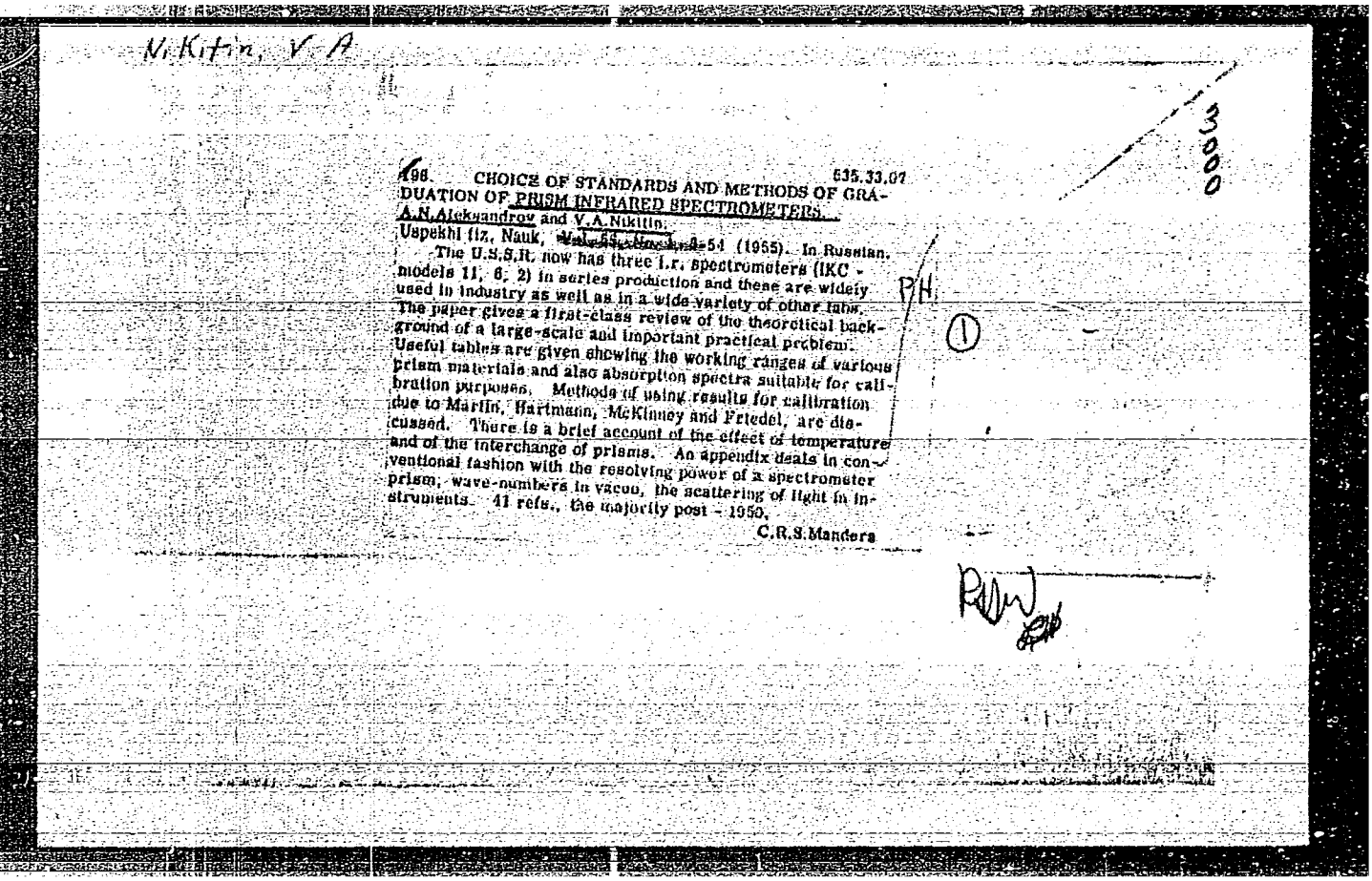
Abs Jour : Referat Zhur - Khimiya, No 2, 1957, 3875

Author : Karyakin A.V., Nikitin V.A., Sidorov A.N.
Title : Photochemical Decomposition of Organic Hydroperoxides.

Orig Pub : Zh. fiz. khimii, 1955, 29, No 9, 1624-1633

Abstract : By means of color indicators (leucobase of malachite green and PbO) it was ascertained that vapor of cumene hydrogen peroxide(I), alexole and hyperole are decomposed, at 50-150°, by action of ultraviolet radiation, (shorter than 366 mμ) with formation of products that have greater oxidizing power than molecular oxygen. By the method of infrared absorption spectra, it was ascertained that the principal product of the photodecomposition of I is dimethyl phenylcarbinol (II). As a sensitizer of photodecomposition of liquid I is proposed $K_4Fe(CN)_6$. In such a case the product of the reaction is also II.

Card 1/1 - 159 -



Nikitin, V.A.

3000

P/H

(1)

RWJ

498. CHOICE OF STANDARDS AND METHODS OF GRADUATION OF PRISM INFRARED SPECTROMETERS. 535.33.07

A.N.Aleksandrov and V.A.Nikitin.

Uspekhi fiz. Nauk, [illegible]-54 (1955). In Russian.

The U.S.S.R. now has three I.r. spectrometers (IKC - models 11, 6, 2) in series production and these are widely used in industry as well as in a wide variety of other labs. The paper gives a first-class review of the theoretical background of a large-scale and important practical problem. Useful tables are given showing the working ranges of various prism materials and also absorption spectra suitable for calibration purposes. Methods of using results for calibration due to Martin, Hartmann, McKinney and Friedel, are discussed. There is a brief account of the effect of temperature and of the interchange of prisms. An appendix deals in conventional fashion with the resolving power of a spectrometer prism, wave-numbers in vacuo, the scattering of light in instruments. 41 refs., the majority post - 1950.

C.R.S.Manders

NIKITIN, V.A.

USSR / Physical Chemistry. Molecules. Chemical Bond. B-4

Abs Jour : Ref Zhur - Khimiya, No 8, 1957, 25789

Author : V.A. Nikitin
Title : Infrared Spectrum of Intermediate Product of Benzaldehyde Photooxidation.

Orig Pub : Optika i spektroskopiya, 1956, 1, No 4, 580-582

Abstract : The results of photochemical oxidation of bezaldehyde by molecular O_2 and of the spectral identification of the intermediate product are cited. The oxidation was carried out at ± 15 and ± 50° by bubbling O_2 into, and irradiation of a 10% benzaldehyde solution in acetone with light of mercury vapor lamp (RZhKhim, 1954, 37339; 1956, 45540, 61105). The comparison of obtained spectra of two fractions with the spectra of benzaldehyde and benzoic acid permitted to establish the existence of absorption bands

Card : 1/2 - 31 -

Nikitin, V.A. K-6

USSR/Optics - Spectroscopy

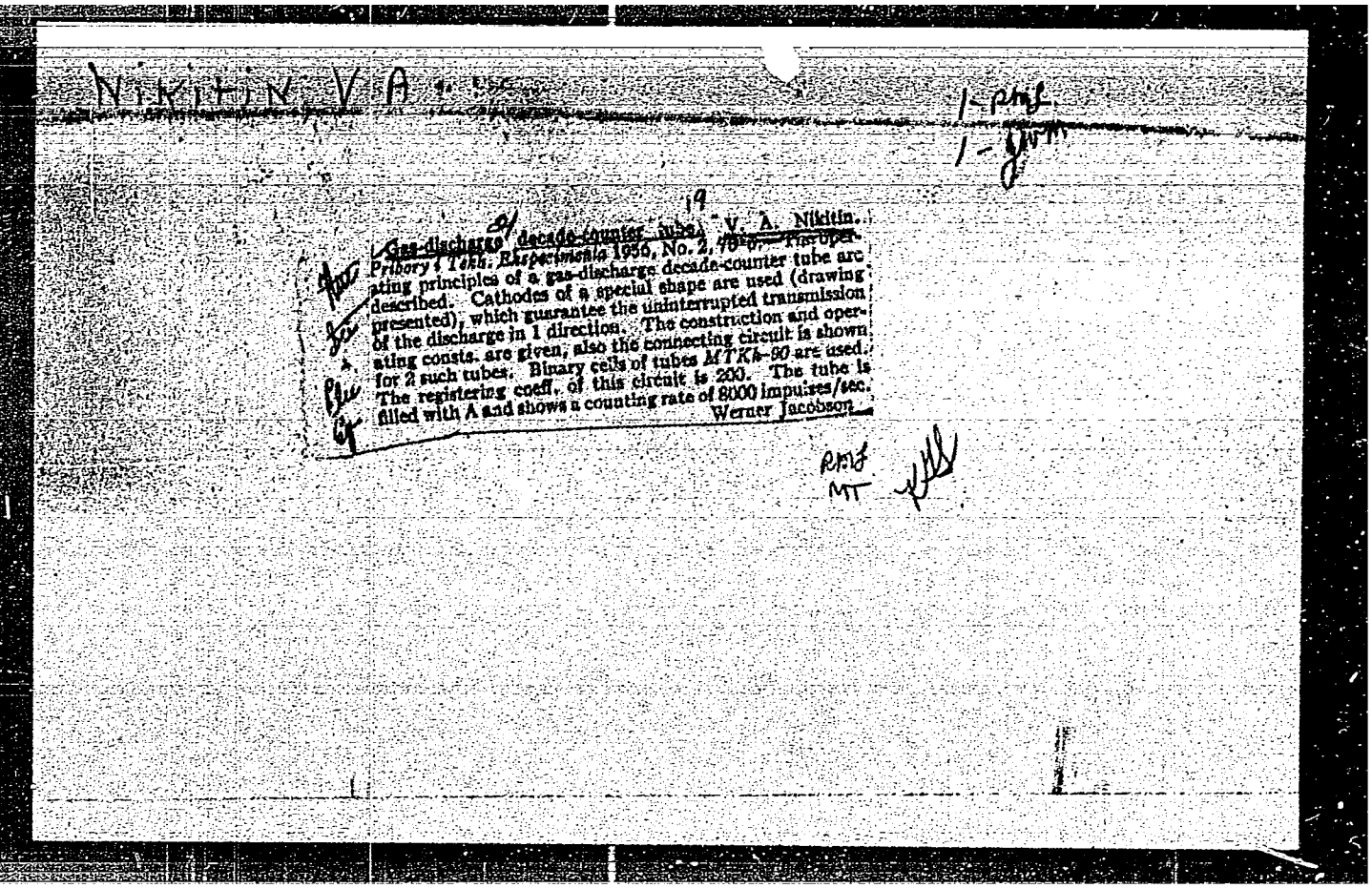
Abs Jour : Referat Zhur - Fizika, No 5, 1957, 13044

Author : Nikitin, V.A.
Inst :
Title : Infrared Spectrum of Pyridine, Adsorbed by Deuterized Micro-porous Glass.

Orig Pub : Optika i spektroskopiya, 1956, 1, No 4, 593-594

Abstract : The infrared spectrum of pyridine, adsorbed on ordinary and deuterized micro-porous glass, was measured in the range from 2000 to 4000 cm^{-1}. It was shown, that the molecules of the pyridine form a strong hydrogen bond with the surface groups OH and OD of the micro-porous glass, causing a shift in the band of the OH-groups by 850 cm^{-1} and of the OD groups by 560 cm^{-1}. There is observed simultaneously a change in the frequency of the vibrations of the CH groups of the adsorbed molecules of pyridine, on the average by + 0.25% ($\Delta \nu \leq 8$ cm^{-1}). The

Card 1/2



NIKITIN, V.A.

1-phys.
1-Gen

19 V. A. Nikitin.
Gas-discharge decade-counter tube. *Pribory i Tekh. Eksperimenta* 1956, No. 2, 76-8. The operating principles of a gas-discharge decade-counter tube are described. Cathodes of a special shape are used (drawing presented), which guarantee the uninterrupted transmission of the discharge in 1 direction. The construction and operating consts. are given, also the connecting circuit is shown for 2 such tubes. Binary cells of tubes *MTKh-90* are used. The registering coeff. of this circuit is 200. The tube is filled with A and shows a counting rate of 8000 impulses/sec.
Werner Jacobson

RMS
MT

NIKITIN, V A

USSR/Physical Chemistry - Surface Phenomena. Adsorption. Chromatography. Ion Exchange, B-13

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 61209

Author: Nikitin, V. A., Sidorov, A. N., Karyakin, A. V.

Institution: None

Title: Investigation of the Adsorption of Ordinary and Heavy Water on Microporous Glass by Means of Infrared Absorption Spectra

Original Periodical: Zh. fiz. khimii, 1956, 30, No 1, 117-128

Abstract: Measured were infrared absorption spectra of microporous glass (MG), in the frequency interval 2,000-10,000 cm^{-1}, after adsorption thereon of vapors of H_2O and D_2O. In the case of H_2O in the previously not investigated region of basic frequencies of valence oscillations of OH groups (3,100-3,800 cm^{-1}) there are observed the bands 3,749 (free OH of MG surface) and 3,450 cm^{-1} (molecules of liquid or capillary condensed H_2O). In the case of D_2O there are observed the bands 2,761, 2,725 (of adsorbed HOD 2,676 cm^{-1}), respectively.

Card 1/2

USSR/Physical Chemistry - Surface Phenomena. Adsorption. Chromatography. Ion Exchange, B-13

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 61209

Abstract: By 3 times repeated injection of D_2O (H_2O) vapor into MG covered by OH(OD) group and subsequent calcination it is possible fully to replace them by OD(OH) groups; and the exchange proceeds very rapidly. On adsorption the bands 3,749 and 2,761 cm^{-1} are retained even with excess of liquid phase, i.e., principal part of OH(OD) groups at MG surface remains undisturbed. On this basis the authors assume that adsorption of H_2O and D_2O occurs not at OH and OD groups but at the O or Si atoms of the MG surface which is contrary to the previous work of other authors.

Card 2/2

Category : USSR/Optics - Spectroscopy K

Abs Jour : Ref Zhur - Fizika, No 2, 1957, No 5086

Author : Nikitin, V.A., Sidorov, A.N., Karyakin, A V

Title : Investigation of the Adsorption of Ordinary and Heavy Water on Micro Porous Glass Using the Infrared Absorption Spectra.

Orig Pub : Zh fiz. khimii, 1956, 30, No 1, 117-128

Abstract : An investigation of the adsorption of H_2O and D_2O vapor by micro-porous glass of the silica-gel type with the aid of the infrared absorption spectra in the 2000 -- 10,000 cm^{-1} region has shown the following: 1) the fundamental frequency of the valent oscillation of the free groups of OH of the surface of the micro-porous glass corresponds to a narrow, intensive absorption bandwidth 3749 cm^{-1} (and its first and second harmonics 7326 and 10680 cm^{-1}). The presence of the OH groups causes also the 4540 and 8135 cm^{-1} bands. The remaining bands in the investigated region belong to the structure of the micro-porous glass (SiO_2) 2) Upon adsorption of D_2O there occurs a deuterization of the surface of the micro-porous glass with a formation of Si-OD groups. The fundamental frequency of the free SiOD groups on the surface correspond to the

Card : 1/2

Category USSR/Optics Spectroscopy K-6

Abs Jour : Ref Zhur - Fizika, No 2, 1957, No 5086

2761 cm^{-1} band (and to the first harmonic 5431 cm^{-1}). The presence of the OD groups causes also the 3370 cm^{-1} band. 3) By removing the HOD and H_2O molecules forming during the isotopic exchange by roasting the micro-porous glass in vacuum and by repeated adsorption of D_2O it is possible to produce deuterized micro-porous glass with any relative content of the Si-OH and Si-OD groups on the surface. 4) The adsorbed H_2O and D_2 molecules have the following characteristic adsorption bands ν OH = 3670 cm^{-1}, ν OD = 2725 cm^{-1}, the adsorbed HOD yields νOD = 2676 cm^{-1}. 5) The H_2O and D_2O molecules are adsorbed not by the OH and OD groups on the surface of the micro-porous glass, but on other centers (Oxygen or silicon atoms).

Card : 2/2

NIKITIN, V. A.

51-2-10/15

AUTHORS: Dmitriyevskiy, O.D., Neporent, B.S. and Nikitin, V.A.
TITLE: A high-speed infrared spectrometer for the 0.8-3.0 μ region. (Skorostnoy infrakrasnyy spektrometr dlya oblasti 0.8-3.0 μ).
PERIODICAL: "Optika i Spektroskopiya" (Optics and Spectroscopy) 1957, Vol.3, No.2, pp.180-181 (U.S.S.R.)

ABSTRACT: Complete translation. The usual methods of measurement of the infrared (i.r.) spectra require considerable time and can therefore be used to study only sufficiently stationary objects. There exists a number of problems where rapid measurement of the i.r. spectra would yield important theoretical and practical results. We constructed a laboratory model of a high-speed spectrometer with a PbS receiver for the region 0.8-3.0 μ. In the monochromator interchangeable dispersing elements were used: a lithium fluoride prism and an echellette reflection diffraction grating. Rapid scanning of the spectrum was achieved by means of an oscillating plane mirror. A wide-band amplifier (with a time constant $\tau \approx 5 \times 10^{-6}$ sec) and vibration (string) and electron (cathode-ray) oscillographs were used for recording the spectra. The vibration-oscillograph record represents a succession of "mirror" pairs of spectra of a selected portion of an object, as shown in Fig.1. Pulses from an additional source /Ref.1/ are used for wavelength calibration (as in oscillogram 2 in Fig.1); the time scale is given by a 2000 c/s sinusoidal trace (shown in Fig.1, 1 and 2). The

Card 1/2

AUTHOR: Nikitin, Y.A. Sov/51-4-4-15/24

TITLE: The Relationship between the Scanning Speed and the Resolving Power of a Spectral Instrument (Svyaz' mezhdu skorost'yu skanirovaniya i razreshayushchey sposobnost'yu spektral'nogo pribora)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol IV, Nr 4, pp 523 - 525 (USSR).

ABSTRACT: Many authors have reported (Ref 1) that the optimum scanning speed v is proportional to the fifth power of the spectral slit width s, when the time constant of the receiver system τ can be varied. The present note shows that for real spectrometers, the relationship $v \sim s^5$ is correct only in the case of measurements of absorption spectra using wide slits ($s > a$, where a is the half-width of spectral lines) and when the time constant τ can be varied. For the other cases the relationship between v and s is given in the table on p 525. This table shows that for narrow slits ($s < a$) when the time constant τ can be varied, the relationship is $v \sim s^4$ and when the time constant τ cannot be varied, the relationship is $v \sim a$ (i.e. v is independent of s). For wide slits ($s > a$) for measurements of the

Card1/3

The Relationship between the Scanning Speed and the Resolving Power of a Spectral Instrument

emission spectra on apparatus with variable τ, we have $v \sim s^3$ and for measurements of absorption or emission on apparatus whose τ is constant, we have $v \sim s$. The relationships given in this table were obtained on the assumption that the noise level at the output of the receiver system is inversely proportional to the square root of the time constant τ. Such a dependence, however, holds only for receivers with "white" noise, whose density does not depend on frequency. In semi-conducting receivers, such as PbS, PbSe, etc., the hyperbolic dependence of the noise density on frequency was observed (Ref 3). The author considers in particular the case of a semi-conducting receiver with a wideband amplifier and a variable time constant τ. It is found that, in fact, the value of τ has to be held constant in this case and, consequently, the same relationships as for receivers with "white" noise apply: $v \sim a$ for narrow slits ($s < a$) and $v \sim s$ for wide slits ($s > a$). There are 1 table and 3 references, 1 of which is Soviet, 1 in English and 1 mixed (Italian, English and Swiss).

Sov/51-4-4-15/24

The Relationship between the Scanning Speed and the Receiving Power of a Spectral Instrument

ASSOCIATION: Gosudarstvennyy opticheskiy institut imeni S.I. Vavilova (State Optical Institute imeni S.I. Vavilov)

SUBMITTED: July 13, 1957

Card 3/3 1. Spectrometers--Design

AUTHORS: Nikitin, V.A. and Cherkasov, A.S.

TITLE: Infrared Spectra of Photooxides of Anthracene Derivatives (Infrakrasnyye spektry fotooksidov proizvodnykh antrasena)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol IV, Nr 5, pp 701-703 (USSR)

ABSTRACT: To elucidate the structure of photo-oxides of anthracene derivatives the authors measured infrared spectra of some compounds produced by photo-oxidation in H_2S. The samples were prepared by sublimation. On comparison of the spectra of photo-oxides and the original compounds in the region 600-1800 cm^{-1} the authors concluded that: (1) the studied samples of photo-oxides of anthracene, 9-methylanthracene, 9,10-dimethylanthracene and 9,10-diphenylanthracene were obtained in pure form and did not contain noticeable amounts of the original compounds; (2) photo-oxides are not hydro-peroxides or peroxy compounds; (3) photo-oxides, in contrast to the original compounds, have absorption bands in the regions 800 - 900 and 1100 - 1300 cm^{-1} which are due to vibrations of the peroxide chain C—O—O—C. Comparison of the results given in a table on p. 703 with the results

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Infrared Spectra of Photo-Oxides of Anthracene Derivatives [illegible]

obtained for other peroxides (ref 2) showed certain peculiarities in vibrations of the C—O—O—C in anthracene photo-oxides, which confirm the existence of an oxygen "bridge" outside the plane of photo-oxide molecules. The authors thank A.V. Maryakin who suggested this work. There are 1 table and 2 references, 1 of which is Soviet and 1 mixed (Western and Soviet).

ASSOCIATION: Gosudarstvennyy Opticheskiy Institut imeni S.I. Vavilova (State Optical Institute im. S.I. Vavilov)

SUBMITTED: November 16, 1957

Card 2/2 1. Compounds - Spectrum analysis

DMITRIYEVSKIY, O.D.; NIKITIN, V.A.

Interrelation of parameters of recording spectrometers. Part 2: Signal-to-noise ratio and general energetic conditions. Opt.-mekh. prom. 25 no. 2:26-30 F '58. (MIRA 11:7)
(Spectrograph--Noise)

DMITRIYEVSKIY, O.D.; NIKITIN, V.A.

Interrelations of parameters of recording spectrometers. Part 3: Relationship between optical, time, and energy characteristics. Opt.-mekh.prom. 25 no.6:25-27 Je '58. (MIRA 11:10)
(Spectrometer)

AUTHORS: Nikitin, V. A., Karyakin, A.V. 76-32-6-13/46

TITLE: The Sensitization of the Photooxidation of Benzaldehydes by Acridine Derivatives (Sensibilizatsiya fotookisleniya benzal'degida proizvodnymi akridina)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 6, pp 1431-1432 (USSR)

ABSTRACT: In the elaboration of an earlier paper experiments were carried out at -50°C with solutions of benzaldehyde on acetone in the visible light with the addition of acridine- or anthraquinone derivatives (or without them) at the passage of dry oxygen and at a simultaneous illumination for 7 hours. The absorption of the solutions was measured prior to and after the experiment by means of an infrared spectrometer IKS-11 within the range of 650-900 cm^{-1}. The used sensitizers as well as the results obtained are given in a table from which may be seen that: 1. The elimination of the fluorescence by oxygen must be considered as a requirement for the sensitization of the photochemical oxidation, and 2. In spite of this phenomenon a sensitizing

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effect may not occur, as was found in the case of 9-aminoacridine. The sensitization can also take place when the stored excitation energy of the sensitizer is insufficient to transform the molecules of benzaldehyde into the biradical state; when, however, the stored energy ΔE is sufficient the strongest sensitizing effect can be noticed. However, as was assumed by A.N. Terenin (Ref 5) the photosensitization can take place by a dehydration of benzaldehyde. Finally the authors thank A. N. Terenin Member of the Academy of Sciences. There are 1 table and 5 references, which are Soviet.

SUBMITTED: November 10, 1957

1. Benzaldehydes--Oxidation 2. Acridines--Chemical reactions
3. Sensitization 4. Fluorescence--Chemical effects

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001137010016-1"

AUTHORS: Sidorov, A. N., Nikitin, V. A. SOV/76-32-7-[illegible]

TITLE: A Reply to the Paper by S. P. Zhdanov "On the Part Played by the Surface Hydroxyl Groups of Porous Glass in the Adsorption of Water" (Otvet na stat'yu S. P. Zhdanova "K voprosu o roli poverkhnostnykh gidroksil'nykh grupp poristogo stekla v adsorbtsii vody")

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 7, pp. 1667-1668 (USSR)

ABSTRACT: It is pointed out that in a second paper the results criticized by Zhdanov will be specified as the amount of experimental data has increased. Thus, the author found, for instance, a decrease of the intensity of the absorption band of free OH-surface groups at 3479 cm^{-1} in the water adsorption. In spite of the fact that Zhdanov pointed out the second paper he did not take into account the new data and exact definition contained therein. It is stressed that the experiments of the investigation of the adsorption were carried out by means of infrared spectroscopic methods on samples of porous glass, that the surface was dehydrated to a great extent by a thermal pretreatment, and that the explanations given main-

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53-54-3-4/8

AUTHORS: Dmitriyevskiy, C. D., Neporent, B. S., Nikitin, V. A.

TITLE: High-Speed Spectroscopy (Skorostnaya spektrometriya)

PERIODICAL: Uspekhi Fizicheskikh Nauk, 1956, Vol. 64, Nr 3, pp. 447-492 (USSR)

ABSTRACT: The present survey is divided into parts as follows: the main rules for the registration of the spectra in scanning, i.e. of the development of the spectrum with respect to time to be investigated (the general time equation of the spectrometer, the distortions in form of bands by the monochromator, as well as by the receiving- and recording system, of the resolving power of the spectrometer as a whole, the mutual connection of the energy and time characteristics of the spectrometer, the relations for high-speed recording of the spectra in scanning). The apparatus for high-speed spectroscopy (the apparatus for the infrared region with thermal receivers, and with photo-resistances, apparatus with photo-multipliers and photo-cells with external photo-effect, apparatus with electronic scanning, multi-channel spectral

Card 1/2

High-Speed Spectroscopy

analysers and cinespectrographs, the comparison between the parameters of high-speed spectral apparatus). The highest speed of recording is obtained with the best inertialess PbS-receivers using a circuit breaker. The tendency to develop higher registration speed with given (thermal or semiconductor-)receivers inevitably leads to a decrease of the resolving power, as well as to an increase of temporal distortions, which is tolerable, however, only in exceptional cases. According to the authors' opinion the so-called apparatus Nr 8 is best approximated to optimal operational conditions. For a PbS-receiver this apparatus has a rather high speed ($v \sim 10^5$) and also the resolving power remains sufficiently good. Above all, the distortions in this apparatus are not great. A table gives the published data on high speed spectral apparatus of various types. There are 29 figures 2 tables, and 71 references, 18 of which are Soviet.

1. Spectroscopy--USSR 2. Spectrographic analysis--Equipment

Card 2/2

NIKITIN, V. A., Candidate Phys-Math Sci (diss) -- "The use of methods of infrared spectroscopy to investigate photo-oxidation of organic compounds by molecular oxygen". Moscow, 1959. 10 pp (State Order of Lenin Optical Inst im S. I. Vavilov), 150 copies (KL, No 23, 1959, 160)

68319

SOV/51-8-1-20/40

24.3420

AUTHORS: Dmitryevskiy, O.D. and Nikitin, V.A.

TITLE: Measurements of the Apparatus Function of an IKS-11 Spectrometer

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 1, pp 117-118 (USSR)

ABSTRACT: This is a summary of a paper presented at the Conference on the Theory of Spectroscopic Instruments (Leningrad, March 5-7, 1959). Using the 1.014 μ (9859 cm^{-1}) line from a mercury lamp as a monochromatic source, the authors determined the apparatus-function contour of an IKS-11 spectrometer Nr 530032. The factory adjustment of this monochromator was not disturbed, but the agreement between the slit widths and the slit scale readings was checked and the parallelity of the exit slit and the entry-slit image was verified. It was found that to obtain true values of the slit width the scale readings should be increased by 0.02 mm. Reproducibility of the slit settings was found to be $|\Delta s| = 0.01$ mm. The differences between the widths of the entry and exit slits were not greater than 0.01 mm. The apparatus function contour was recorded using an F-1 prism, the full height of the slit (20 mm) and a scanning rate of 4.6 cm^{-1}/sec. A PbS photoresistor was used as a receiver; it was connected to an a.c. amplifier and a recorder (the effective time constant of the system was $\tau \simeq 0.5$ sec). The results are shown in Fig 1 as a dependence of the apparatus-function

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AUTHORS: Dmitryevskiy, O.D. and Nikitin, V.A. SOV/51-6-1-22/40

TITLE: Scanning Distortions with Single-Beam Spectrometers

PERIODICAL: Optika i spektroskopiya, 1959, Vol 6, No 1, pp 140-143 (USSR)

ABSTRACT: This is a summary of a paper presented at the Conference on the Theory of Spectroscopic Instruments (Leningrad, March 5-7, 1958).

The authors and B.S. Neporent (Ref 1) have shown that distortions on scanning of lines and bands of Gaussian form using receiver-recorder systems with exponential rise and decay can be represented uniquely by a parameter K which shows how many times the time-interval required to record a band (Δt) is greater than the time constant of the receiver-recorder system τ.

$$K = \frac{\Delta t}{\tau} = 0.88\frac{b}{v\tau}$$

where b is the band half-width separated out by a monochromator and v is the scanning rate. Representing relation of the intensities at band maxima by I_{ob}/I (I denotes true intensity and I_{ob} - the observed intensity), band broadening by b_{ob}/b and shift of the maxima by Δ (in cm^{-1}), we find the following simple relationships when $K > 1$

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Scanning Distortions with Single-Beam Spectrometers

$$(I_{ob}/I) \simeq (b/b_{ob}) \simeq 1 \quad \text{and} \quad \Delta \simeq v\tau.$$

The first of the above expressions shows that the integral intensity is independent of the scanning rate, and the second shows that displacements of the maxima are independent of the band widths (when $K > 1$, i.e. $\Delta t > \tau$). Dependence of the ratios (I_{ob}/I) and (b_{ob}/b) on the parameter K may be given approximately by:

$(b/b_{ob}) = (I_{ob}/I) = 1 - (2/K^2)$ when $10 < K < \infty$,

$(b/b_{ob}) = (I_{ob}/I) = 1.03 - (1/2K)$ when $1 < K < 10$.

A check of the above formulae, using an IKS-spectrometer, showed that they are in good agreement with experiment. Consequently by taking such values of the ratios (I_{ob}/I) and $b_{ob}/b)$ which ensure the required precision in measurements, the experimenter can determine the corresponding values of the parameter K and the permissible scanning rate from the condition:

$$v = 0.65\frac{b}{\tau K} \approx 0.65\frac{\sqrt{s^2 + b_o^2}}{\tau K} \qquad (1)$$

Card 2/4 where s is the effective spectral width of the slits, b_o is the true

Scanning Distortions with Single-Beam Spectrometers

band width. Simultaneously the following energy condition should be fulfilled:

$$s^2 \geq s^2_{min} = \frac{M\bar{U}_n}{\sigma CB}, \text{ where } \bar{U}_n \sim \frac{1}{\sqrt{\tau}} \qquad (2)$$

where $\bar{U}_n$ is the noise level at the receiver output (it is inversely proportional to the square root of the time constant of a receiver with "white noise"); σ is the receiver sensitivity; B is the source luminance; C is a constant which represents transmission of the monochromator and its dispersion in the spectral interval s; M is the noise/signal ratio. Expressions (1) and (2) describe fully the relationships between the three main quantities: s, τ and v which determine the experimental conditions at given values of K and M; the latter two parameters represent quantitatively the systematic and random experimental errors. Since the three quantities s, τ and v are related by two conditions (Eqs 1 and 2), then one of these quantities can be selected by the experimenter; then the other two quantities are given uniquely by the conditions (1) and (2). In contrast to τ and v, the choice of s is limited by one more independent condition: the spectral

Card 3/4

NIKITIN, V.

Decisions of the International Commission on Molecular Spectroscopy.
Opt. i spektr. 8 no.5:739-740 My '60. (MIRA 13:9)
(Spectrum, Molecular--Congresses)

NIKITIN, V.A.; SMIRNOVA, Ye.P.

The IKP-2 ultraoptimeter. Izm. tekh. no.6:6-8 Je '63.
(MIRA 16:8)

(Optical instruments)

DANILEVICH, F.M.; NIKITIN, V.A.

The KM-8 cathetometer. Izm. tekh. no.7:5-7 Jl '63.
(MIRA 16:8)
(Cathetometers)

ACCESSION NR: AP4037572 S/0056/64/046/005/1608/1611

AUTHORS: Nikitin, V. A.; Sviridov, V. A.; Strunov, L. N.; Shafranova, M. G.

TITLE: On the possibility of studying interference between Coulomb and nuclear scattering during the collisions of particles with energies above 10 GeV

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 5, 1964, 1608-1611

TOPIC TAGS: particle scattering, proton scattering, elastic scattering, elastic recoil angle, cloud chamber, nuclear cross section, Coulomb scattering, nuclear scattering

ABSTRACT: It is shown first that at high energies the elastic scattering of particles by protons cannot be investigated by recording the scattered particle, and that the recoil proton must be recorded. Two ways are proposed for eliminating the difficulties connected with the

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ACCESSION NR: AP4037572

fact that at small angles the recoil proton has a low energy, and that scattering by the target material distorts strongly the value of its velocity and direction, so that the elastic cases cannot be discriminated by their kinematics. The two methods are: 1. Use of multiple passages of particles through a thin target. 2. Investigation of elastic scattering at small angles by means of extracted beams. The experiments and methodological results involved with the first method have been described elsewhere (International Conference on High Energy Physics at CERN, 1962, p. 582; preprint OIYaI, No. 1084 and O-1329, Dubna, 1962 and 1963). The second method consists of passing a well-shaped beam of pions (10^4 per pulse) through a cloud chamber filled with hydrogen. The chamber operates in a mode not sensitive to relativistic pions but to recoil protons with momenta 30--150 MeV/c. Both methods have no upper energy limit, and can be used to investigate elastic scattering in the region of low momentum transfer in which the Coulomb scattering cross section is comparable with the nuclear cross section. In particular, to make

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ACCESSION NR: AP4037572

it possible to obtain information on the real part of the elastic scattering cross section by investigating the interference between Coulomb and nuclear scattering. "We are pleased to thank V. I. Veksler and I. V. Chuvilo for continuous interest in the experiments." Orig. art. has: 1 figure and 4 formulas.

ASSOCIATION: Ob"yedinenny*y institut yaderny*kh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: 13Dec63 DATE ACQ: 09Jun64 ENCL: 00

SUB CODE: NP NR REF SOV: 003 OTHER: 001

Card 3/3

L 39281-65 EWT(d)/EWT(m)/EWP(w)/EWA(d)/EWP(v)/EPR/EWP(k)/EWA(h) Pf-4/Peb
EM/GS
ACCESSION NR: AT5000820 S/0000/64/000/004/0063/0073

33
32
B+1

AUTHOR: Nikitin, V. A. (Leningrad); Pis'mennaya G. I. (Leningrad)

TITLE: Determination of thermal stresses and deformations in spherical and cylindrical shells with unequal distribution of temperature along the meridian (generatrix)

SOURCE: Nauchnoye soveshchaniye po teplovym napryazheniyam v elementakh konstruktsiy, 4th, Teplovyye napryazheniya v elementakh konstruktsiy (Thermal stresses in construction elements); doklady soveshchaniya, no. 4, Kiev, Naukova dumka, 1964, 63-73

TOPIC TAGS: shell design, shell thermal stress, spherical shell, cylindrical shell, shell strain

ABSTRACT: The paper considers the axiosymmetrical problem of determining the thermal stress and deformation of spherical and cylindrical shells under the influence of an unequal temperature field along the meridian (generatrix). The following temperature field is given: the temperature is constant in the upper part of the shell; in the middle part the temperature is a smooth function of angle

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ACCESSION NR: AT5000820

theta, while in the lower part the temperature is again constant but different from that in the upper part. It is assumed that the temperature does not vary with the wall thickness. The modulus of elasticity and elongation remain constant within the limits of the given temperature changes. Equations are derived for a spherical shell indicating all moments, forces and deformations in all three parts of the shell. Curves are plotted of the maximum bending moment and maximum annular force, depending on the size of the middle part. Even a slight variation in size causes sharp changes of maximum moment and annular force. The problem is solved in the same way for a cylindrical shell, with similar results. Therefore, the same equations may be used. Orig. art. has: 5 figures and 31 formulas.

ASSOCIATION: None

SUBMITTED: 02Jun64 ENCL: 00 SUB CODE: AS, ME

NO REF SOV: 002 OTHER: 000

Card 2/2

NIKITIN, V.A.; NOMOFILOV, A.A.; SVIRIDOV, V.A.; SLEPETS, L.A.; SITNIK, I.M.; STRUNOV, L.N.

Measurement of the real part of the amplitude of elastic $\Pi^- p$-scattering at an energy of 3.5 Bev. IAd. fiz. 1 no.1:183 Ja '65. (MIRA 18:7)

1. Ob"yedinennyy institut yadernykh issledovaniy.

KIRILLOVA, L.F.; NIKITIN, V.A.; PANTUYEV, V.S.; SVIRIDOV, V.A.; STRUNOV, L.N.; KHACHATURYAN, M.N.; KHRISTOV, L.G.; SHAFRANOVA, M.G.; KORBEL, Z.; ROB, L.; DAMYANOV, S.; ZLATEVA, A.; ZLATANOV, Z.; YORDANOV, V. [Iordanov, V.]; KANAZIRSKI, Kh.; MARKOV, P.; TODOROV, T.; CHERNEV, Kh.; DALKHAZHAV, N.; TUVDENDORZH, D.

Elastic pp and pd-scattering at small angles in the energy range 2 - 10 Bev. IAd. fiz. 1 no.3:533-539 Mr '65. (MIRA 18:5)

1. Ob"yedinennyy institut yadernykh issledovaniy. 2. Vysshaye tekhnicheskoye uchilishche, Praga (for Korbel, Rob). 3. Fizicheskiy institut Bolgarskoy Akademii nauk, Sofiya (for Damyanov, Zlateva, Zlatanov, Yordanov, Kanazirski, Markov, Todorov, Chernev). 4. Institut khimii i fiziki, Ulan-Bator, Mongol'skaya Narodnaya Respublika (for Dalkhazhav, Tuvdendorzh).

NIKITIN, V. A.

Testing and measuring equipment in petroleum refining Moskva, Gos. nauch.-tekhn. izd-vo neftianoi i gorno-toplivnoi lit-ry, 1948. 431 p. (49-26930)

TP690.N5

PA 56/49T88

NIKITIN, V. A.

USSR/Petroleum — May 49
Refining
Instruments

"Announcement of Newly Published Book, 'Control-Measuring Instruments in Oil Refining,' by V. A. Nikitin" 1 p

"Nefteget Byul" No 5

Book (432 pp, published in 1948) gives basic theoretical and practical data on subject instruments, with operational diagrams and regulation systems for individual instruments. Suitable as a handbook. Book is intended for engineers, technicians and foremen involved in installation and

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USSR/Petroleum (Contd) — May 49

operation of such instruments, and for students of petroleum engineering.

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NIKITIN, V. A.

Izmereniye raskhoda i urovnya zhidkostey i gazov v neftepererabotke
(Measuring of consumption and level of liquids and gases in petroleum
processing, by) V. A. Nikitin. Moskva, Gostoptekhizdat, 1951.
222 p. diagrs., tables.
"Literatura": p. (221)

NIKITIN, V. A.

PHASE X TREASURE ISLAND BIBLIOGRAPHICAL REPORT AID 718 - X

BOOK

Call No.: AF638700

Author: NIKITIN, V. A.
Full Title: MEASUREMENT OF TEMPERATURE IN THE PROCESS OF OIL REFINING
Transliterated Title: Izmereniye temperatur v protsessakh nefte-pererabotki

PUBLISHING DATA

Originating Agency: None
Publishing House: State Scientific and Technical Publishing House of Petroleum and Mineral Fuel Literature (Gostoptekhizdat)
Date: 1954 No. pp.: 246 No. of copies: 4,000
Editorial Staff
Appraiser: L'vov, M. A., Kand. of Tech. Sci.

The author expresses thanks to Nemtsov, N. Yu. and Astakhov, V. A. for their assistance.

PURPOSE AND EVALUATION: This is a textbook approved by the Educational Board of the Ministry of the Petroleum Industry for students of technical colleges in their course on temperature-measuring instruments which includes: a. theoretical principles on which those instruments are based and built, b. their classification according to their temperature range, nomenclature, and industrial applications, c. rules governing the choice of proper instruments and of methods

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for their mounting and operation, d. methods for accuracy verification, e. sources of errors in temperature-measuring instruments and methods of their correction, f. practical hints in servicing instruments. Those topics are covered in this textbook, which, however, does not present the specific applications of temperature-measuring instruments in the various stages of the petroleum industry as is done in Ch. II ("Oil Industries") of the book Temperature, Its Measurement and Control in Science and Industry, published under the auspices of the American Institute of Physics by the Reinhold Publishing Corp., 1941. As a textbook on temperature-measuring instruments this book is more complete and compares favorably with some similar American textbooks like Weber, R. L., Heat and Temperature Measurement, Prentice-Hall, 1950, and even with more specialized books like Royds, R., The Measurement and Control of Temperatures in Industry. Lately several books on very similar subjects have been published in Russia, namely: Murin, G. A., Teplotekhnicheskiye izmereniya (Heat Engineering Measurements) Gosenergoizdat, 1951, which takes into accout not only temperature measurements, but also calorimetric and heat transfer measurements and contrcl, especially in power installations; Gordov, A. N., Arzhanov, A. S., et. al., Metody izmereniya temperatur v promyshlennosti (Methods of Temperature

Izmereniye temperatur v protsessakh neftepererabotki AID 718 - X

Measurement in Industry) Metallurgizdat, 1952 which deals more with temperature measurements in the metallurgical industry and includes the measurements of low, medium and very high temperatures; Preobrazhenskiy V. P., Teplotekhnicheskiye izmereniya i pribory (Heat and Temperature Measurements and Instruments) 2nd ed., Gosenergoizdat, 1953 which is intended more for heat-and power-plant engineers. All those books, however, with small differences and additions, cover the same field.

TEXT DATA

Coverage: This textbook presents the theoretical principles which serve as a basis for temperature measurements. It describes methods, principles of operation, and design as well as setting, servicing and accuracy verification of temperature-measuring instruments for general use and in special engineering processes of the petroleum industry. Automatic temperature control and temperature controllers are not covered. The instruments described are of Russian make. Their design is sometimes a little different from those manufactured in this country, but the basic principles of their construction are the same. Many Russian-made temperature-measuring instruments are described, their markings given, and some of the data on their characteristics quoted. Diagrams, tables, charts.

Izmereniye temperatur v protsessakh neftepererabotki AID 718 - X

Table of Contents

Izmereniye temperatur v protsessakh neftepererabotki AID 718 - X

No. of References: 11 Russian (1948-1953)
Facilities: None

NIKITIN, Viktor Aleksandrovich; GOR'KOVA,A.A., redaktor; KLEYMENOVA,K.F., redaktor; TROFIMOV,A.V., tekhnicheskiy redaktor

[Pressure measurement and specialized instruments for oil and gas refineries] Izmerenie davleniia i pribory spetsial'nogo naznacheniia v neftegazopererabotke. Moskva, Gos.nauchno-tekhn.izd-vo neftianoi i gorno-toplivnoi lit-ry, 1955. 255 p. (MLRA 9:3)
(Petroleum--Refining)(Petroleum industry--Equipment and supplies)

NIKITIN, V. A. (Engr.)

"Complex Automation of the Moscow Oil Refinery,"

paper read at the Session of the Acad. Sci. USSR, on the Scientific Problems of Automati Production, 15-20 October 195[illegible].
Avtomatika i telemekhanika, no. 2, p. 182-192, 195[illegible].

9015[illegible]

5(0), 8(0) SOV/112-58-3-4528

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1958, Nr 3, pp 162-163 (USSR)

AUTHOR: Nikitin, V. A.

TITLE: Complex Automation of Production Processes at the Moscow Oil Refinery, and Extending This Experience Over Existing and Newly Designed Refineries in the USSR (O kompleksnoy avtomatizatsii proizvodstvennykh protsessov Moskovskogo neftepererabatyvayushchego zavoda i rasprostraneniye etogo opyta na deystvuyushchiye i vnov' proyektiruyemyye zavody SSSR)

PERIODICAL: V sb.: Sessiya AN SSSR po nauchn. probl. avtomatiz. proiz-va. Kompleksn. avtomatiz. proizv. protsessov. M., AS USSR, 1957, pp 176-187

ABSTRACT: The present state of automation of Soviet oil refineries and the objectives in this domain are briefly examined. A blueprint of the complex automation of the Moscow Oil Refinery (MNPZ) is described. A part of supervisory and automation means provided by the blueprint has already been

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5(0), 8(0) SOV/112-58-3-4528

Complex Automation of Production Processes at the Moscow Oil Refinery, and . . .

mounted at the refinery and put in operation; the balance is being put in operation or is still under development. The equipment provided by the blueprint is briefly characterized. Devices and controllers of the pneumatic unit standardized system based on the principle of compensation of forces have a high rated accuracy, are simple and reliable in operation, and can be combined to produce any complicated control scheme, such as an intercoupled cascade regulation scheme; the system has a range up to 300 m. The following apparatus is expected to be installed: (a) automatic analyzers of the quality of petroleum and oil products in the process flow, such as automatic devices for fractional distillation of clear oil products, for measuring specific gravity, viscosity, flashpoint, congelation point, vapor pressure, water and mineral contents in the oil, hydrocarbon composition (chromatographs, mass-spectrometers); (b) industrial TV outfits; (c) electron scanning counting machines. 210 automatic regulators are planned for 9 processing MNPZ plants.

Card 2/3

5(0), 8(0)

SOV/112-58-3-4528

Complex Automation of Production Processes at the Moscow Oil Refinery, and . . . .

About 75% of the regulators or controllers, mainly those requiring resetting to suit the process, will be installed in the dispatcher's room of the plant and will be combined with recorders and with acoustic and visual signaling. Other controllers, mainly those of pressure and level, will be located on the apparatus and pipelines. A considerable part of the systems has coupled controls. Examples of improving the technology by automation are cited. Engineering-and-economic data expected include: reduction of personnel by 330, that is by 25% of the service personnel; annual wage savings of 2,510,000 rubles; annual saving of 2,150,000 rubles because of better processing; increase in labor productivity by 23.7%; total wages will constitute 3.42% of the gross plant production; capital investment will be 18,000,000 rubles; the installation will pay for itself in 3.9 years Some information on certain foreign automated oil refineries is supplied.

A.N.G.

Card 3/3

AUTHOR: Nikitin, V.A. 65-6-1/13

TITLE: For complex automation in the petroleum oil refining industry. (Za kompleksnuyu avtomatizatsiyu v nefteperera-botke).

PERIODICAL: "Khimiya i Tekhnologiya Topliva i Masel" (Chemistry and Technology of Fuels and Lubricants), 1957, No.6, pp. 1 - 12, (USSR).

ABSTRACT: The term "complex automation" means the maximum possible automation of technological processes utilising new inter-linking aggregates. As examples of a high degree of auto-mation Canadian refineries in Montreal (Fena) and Ontario (Sarnce) are outlined. In order to introduce automation in the U.S.S.R. it was necessary to obtain some practical experience on one of the operating refineries. On the author's suggestion, the Moscow refinery was chosen for the experimental automation and an agreement was made between Giprogastopprom, Moscow Refinery, the Design Office of the Refining Industry of the Ministry of Petroleum Industry of the U.S.S.R. as well as with NII Teplobribor and the "Tiz-pribor" works on the carrying out of the necessary work. A short description of the Moscow refinery is given (fig.1). After studies and discussions in which over 500 men parti-

Card 1/2

NIKITIN V A

AUTHOR: Semikova, A. I.

130-58-6-35/45

TITLE: Discussion of Problems of Pneumatic-Hydraulic Automation (Obsuzhdeniye problem pnevmogidroavtomatiki)

PERIODICAL: Vestnik Akademii nauk SSSR, 1958 Nr 6, pp. 123-124 (USSR)

ABSTRACT: At the Institute of Automation of the AS USSR the second conference in this field was held from March 17 - 19. It was attended by scientific collaborators and engineers dealing with problems in various branches of Soviet industry as well as by foreign specialists. 32 lectures and reports were delivered on theoretical and practical problems in this field. Among others the following reports were delivered:

1) V. A. Nikitin: On the pneumatic aggregate (AUS).
2) V. V. Volgin: On the results obtained by investigations of the dynamic characteristics of pneumatic controls.
3) V. N. Veller: On hydraulic rational control schemes.
4) Ye. F. Alekseyev: On the dynamics of the rotating-piston hydro-drives.

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Discussion of Problems of Pneumohydroautomation

SOV/30-58-6-35/45

5) I. Z. Zaychenko: On problems concerning the dynamic stability of pneumatic and pneumohydraulic drives.
6) E. M. Nadzhafov and A. A. Tal': On the production of computers.
7) L. A. Zalmanzon: On works for the production of an aerodynamic oscillation generator.
8) V. D. Mironov: On the operation of an electronic hydraulic regulator.
9) V. I. Gusakov: On hydraulic mechanisms.
10) B. L. Korobochkin: On automatic control.
11) D. Kveton, chief constructor of the "Regula-vivoy" works (Czechoslovakia): On the general direction followed by the works there.
12) Ya. Khampl: On the construction of electro-hydraulic control of the "Křižik-Smichov" works in Prague.
13) V. Britall: On two control mechanisms produced in the German Democratic Republic.
14) V. Ferner (German Democratic Republic): On the advantages of a pneumatic system for low pressure.
15) Lu Yuan'-tsin: On the development of work in this field in the Chinese People's Republic.

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Discussion of Problems of Pneumohydroautomation

Various models and apparatus were shown at an exhibition organized in conjunction with this conference.

ASSOCIATION: Institut avtomatiki i telemekhaniki
(Institute of Automation and Telemechanics)

1. Pneumatic systems--Control systems 2. Hydraulic systems--Control systems 3. Industrial production--Theory

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PHASE I BOOK EXPLOITATION SOV/4671

Akademiya nauk SSSR. Institut avtomatiki i telemekhaniki. Seminar po pnevmogidravlicheskoy avtomatike. 2d and 3d session

Voprosy pnevmo- i gidro- avtomatiki (Problems in Pneumatic and Hydraulic Automation) Moscow, 1960. 211 p. Errata slip inserted. 4,500 copies printed.

Resp. Ed.: M.A. Ayzerman, Doctor of Technical Sciences, Professor; Ed. of Publishing House. A.A. Tal'; Tech. Ed.: S.G. Tikhomirova.

PURPOSE: This collection of articles is intended for scientific workers, industrial designers and engineers interested in automation and telemechanics.

COVERAGE: The collection of 23 articles is a continuation of an earlier work of the Academy of Sciences USSR, on pneumatic and hydraulic automation systems, published in 1959. A wide range of problems connected with the design and operation of pneumatic and hydraulic automation equipment is described. In addition to problems based on experiments, the collection also contains discussions of new trends in the field, such as the possibility of using very low pressure for the operation of pneumatic devices. Some articles of this collection were written in the German Democratic Republic and in Czechoslovakia and reflect a somewhat different approach to automation problems. No personalities are mentioned. References accompany most of the articles.

PNEUMATIC AND HYDRAULIC DEVICES AND SYSTEMS OF AUTOMATIC REGULATION

PNEUMATIC COMPUTING-SOLVING AND SCANNING DEVICES

PNEUMATIC AND HYDRAULIC AUTOMATION DEVICES
IN
THE GERMAN DEMOCRATIC REPUBLIC AND CZECHOSLOVAKIA

AC/dem/gmp
1-10-61

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27

Nikitin, V.A

NIKITIN, V. A.

Spectral apparatus for automatic control and regulation in the chemical industry (survey). Zav. lab. 28 no.12:1497-1504 '62. (MIRA 16:1)

(Spectrum analysis)
(Chemical industries—Equipment and supplies)
(Automatic control)

S/115/63/000/001/005/017
E194/E155

AUTHORS: Danilevich, F.M., and Nikitin, V.A.

TITLE: A new electrical contact head type GK-3 (GK-3)

PERIODICAL: Izmeritel'naya tekhnika, no.1, 1963, 14-16

TEXT: Electrical contact head type GK-3 is an additional fitting for several types of length meter in series production and is intended for measuring the internal diameter of holes of from 1 to 15.5 mm either directly or by difference methods. The improvements over the previous type are: a device for accurately setting the measuring tip in a diametral section of the hole; an improved signal-indicator device provided with a plane-parallel glass plate for lapping gauges and maintaining temperature conditions during measurements; and a better method of holding the measurement tip in the correct position. The measuring tip is connected to the grid of a magic eye tube type 6E5C (6Ye5S) which has a germanium-diode supply unit with negative earthed and connected to the test piece. Contact between the spherical measuring tip and the test piece makes the magic eye flicker.

Card 1/2

A new electrical contact head ...

S/115/63/000/001/005/017
E194/E155

Formulae are derived for errors in the measurement head readings during difference measurements, for the temperature error, for calibration errors of the reference gauges and for errors in measurement pressure. The greatest expected error when using head GK-3 with the difference method, the RMS sum of all the above errors, is ± 2 microns, and this is confirmed by tests. There are 2 figures.

Card 2/2

5(1)

AUTHORS: Kunin, T. I., Nikitin, V. A. SOV/153-58-3-17/30

TITLE: Thermographic Investigation of the Reduction Process of Sodium Sulfate (Termograficheskoye issledovaniye protsessa vosstanovleniya sul'fata natriya)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 3, pp 93 - 99 (USSR)

ABSTRACT: At present, sodium sulfate is reduced by solid reducing agents at 850 - 1100°. The main mass of the sulfate is reduced in the melt. Its reduction is, however, also possible at temperatures considerably below the melting point. The sodium sulfide formed can form a eutectic with the sulfate, the melting point of which is at 650 - 750°. Thus, the liquid phase, which under certain conditions promotes the acceleration of the process, can also be obtained at lower temperatures. The decrease in temperature of the sulfate reduction can be of great practical importance: a) For saving fuel. b) For decreasing foreign additions, and c) For increasing the life of the refractory material in the reaction furnaces. The optimum temperatures of the reduction process can be chosen on the basis of thermographic investi-

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gations. The problem of the initial temperatures of the sulfate reduction by pit coal remained unexplained, apart from single hints at working conditions (Refs 6 - 8). The thermographic method of determining the beginning of the Na_2SO_4 reduction process applied by the authors makes the clarification of the effect of the degree of dispersion upon the temperatures mentioned with sufficient accuracy possible. The self-levelling mirror galvanometer of the type "FI", system A. V. Ulitovskiy was used for the measurement of the temperature difference in the sample. Based on the results obtained, the authors arrive at the following conclusions: 1.-The thermographically determined temperature of the beginning reduction of sodium sulfate was: a) through the coal of the type "Antratsit" 760°, b) through coal of the type "DZh" it was 720°. The decreased temperature in the latter case is explained by the catalytic effect of small amounts of sodium sulfide that had been formed by the volatile carbon components due to the reduction. 2.-It was proved that the fineness of the coal grinding decreases the temperature of

the reaction beginning . This is explained by the authors by the change of the isochor-isotherm potential in the coal dispersion. 3.-The reduction process of sodium sulfate by pit coal takes place under an absorption of heat. There are 3 figures and 19 references, 17 of which are Soviet.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut (Ivanovo Institute of Chemical Technology). Kafedra obshchey knimicheskoy tekhnologii (Chair of General Chemical Technology)

SUBMITTED: September 10, 1957

5(1, 2, 3)

SOV/153-58-5-10/28

AUTHORS: Kunin, T. I., Nikitin, V. A.

TITLE: On the Problem of the Reduction of Sodium Sulfate by Peat (K voprosu o vosstanovlenii sul'fata natriya torfom)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 5, pp 61-64 (USSR)

ABSTRACT: As most substances are too expensive (some gases) for the reduction of sodium sulfate to the sulfide, or their use is connected with difficulties concerning the apparatus employed, the least expensive suitable substance for this purpose - peat - is interesting. Its deposits are found in many areas of the USSR. The difficulties hitherto existing in the utilization of peat for this purpose were the fact that peat as the lighter substance appeared on the surface of the mass and burned. When briquetting the charge this process should be excluded. Although the organic substance in peat contains about 56% carbon and 7% hydrogen (Ref 5) the whole carbon can be used in the Na_2SO_4 reduction, due to high yields of volatile components. These volatile components as a whole consist of H_2, CH_4 and CO and could act as reducing agents themselves.

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On the Problem of the Reduction of Sodium Sulfate by [illegible]

The problem is made more complicated by the relative low temperature of peat pyrolysis. Taking into account that H_2 and CH_4 contents in volatile gases of peat increase at higher temperatures, and that the beginning of the Na_2SO_4 reduction by H_2 and CH_4 is at 500-550°, it may be maintained that part of the volatile substances is utilized in the reduction process. With peats from deep moors a certain increase of the pyrolysis temperature may be expected (Ref 8). As there are no data in publications the present special investigation was carried out. Figure 1 shows the experimental results (I series) which were to explain the effect of the peat mass upon the completeness of the reduction of sodium sulfate. The experiments were carried out in a nitrogen atmosphere. The curves obtained (Fig 1) show a maximum dependent upon the peat mass in the charge, and which corresponds to the ratio of the weights of peat: sulfate = 1 : 0.6. With a larger amount of peat the thermal conductivity of the briquette is expected to decrease rapidly. This will cause the rate of the process to decrease.

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On the Problem of the Reduction of Sodium Sulfate by Peat

as the reactions themselves require heat addition. Curves of figure 2 show the results of the comparative experiments with peat and coal as reducing agents (II series). The rate of the reduction by peat is at 750 and 800° considerably higher than by coal (anthracite). Since under the conditions of practical work always a certain amount of air enters the reaction space the above-mentioned regularities may change there. Figure 3 shows results of the experiment with a certain amount of air penetrating to the briquettes (at a ratio of Na_2SO_4 : peat = = 1 : 2.4). The degree of reduction was then lower than without oxygen entering. From the curves in figures 2 and 3 it may be seen that oxygen addition has a higher influence upon the reduction of peat than of coal. From all experiments it may be seen that inspite of the high degree of reduction no melting of the briquettes occurs if the amount of peat does not exceed 1.6 g per 1 g Na_2SO_4. Mixtures from pit coal and peat or another substance with a higher yield of volatile substances than of coal would offer good prospects. Table (p 63) shows the effect of the volatile substances from peat upon the rate of reduction of Na_2SO_4 at 700°. Anthracite did in this case not

On the Problem of the Reduction of Sodium Sulfate by [illegible]

reduce Na_2SO_4. Only a partial substitution of anthracite [illegible] led to the formation of certain amounts of Na_2S. Iron oxide increases these amounts. There are 3 figures, 1 table, and 10 references, 8 of which are Soviet.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut, Kafedra obshchey khimicheskoy tekhnologii (Ivanovo Chemico-Technological Institute, Chair of General Chemical Technology)

SUBMITTED: November 28, 1957

S/153/60/003/02/21/034
B011/B006

5,1000(A)

AUTHORS: Kunin, T. I., Nikitin, V. A.

TITLE: 'tilization of Sodium Thiosulfate in Waste Water of Several Plants

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1960, Vol. 3, No. 2, pp. 324-329

TEXT: The waste water of several plants which produce semiproducts and dyes contain large quantities of valuable sulfur-containing salts, which contaminat the waters. The authors investigated methods for the utilization of waste water of the productions of α-naphthylamine and the dye "Fur Black" (mekhovoy chernyy), with a view to utilizing the sulfur as quantitatively as possible without appreciable amounts escaping into the atmosphere. Sodium salts of various sulfur-containing acids which can be transformed to sodium sulfite are contained in the above-mentioned waste water. Organic compounds contained in these waste decompose at the temperatures employed for the reduction (850-1100°C), so that contamination of the

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reaction product does not occur. The decomposition products also have a reducing effect and lower the amount of reducing agent required. The authors used several samples of thiosulfate (the term used to denote the evaporated waste water residues). The analytical data of these samples are given in Table 1. Anthrazite was applied as reducing agent. Both the thiosulfate and coal were finely ground. The tests were carried out in dry N atmosphere which was free of oxygen. The authors found that the thermal treatment of sodium thiosulfate from waste water of the above-mentioned plants is possible without losing appreciable amounts of sulfur due to vaporization. The effect of the temperature on the reduction of thiosulfate from the α-naphthylamine production is illustrated in Table 2. Sodium sulfide formation increases somewhat with a rise in temperature. Sulfur losses during reduction amount to about 50%. Polysulfides are largely decomposed at reduction temperatures, as was proved by the authors' experiments using anthracite at 750°C (see Fig. on p.326). For reduction of thiosulfates containing no basic substances, it is adviced to admix the charge with industrial soda or caustic soda. Basic waste water is particulary suitable for this purpose. Reduction data of thiosulfate containing admixtures (NaOH, Na_2CO_3, NaCl) are shown in

Table 4. An admixture of the two first-mentioned substances rapidly increases the formation of sulfide sulfur and considerably decrease vaporization losses of sulfur, particularly at 850°C. NaCl does not promote sulfide formation, but accelerates the melting process and reduces sulfur losses by about 1/2. In Table 5, the reduction data of a 1:1 mixture of the thiosulfates from the waste of the two first-mentioned plants are listed. This procedure increased the yield of sulfur. On reducing thiosulfate with coal, sodium polysulfides are hardly contained in the melt. The decomposition occurs during the reduction and is all the more complete, the higher the temperature and the longer the time of reduction. The authors mention R. I. Levenzon, V. V. Kafarov, Ya. S. Demikhovskiy, I. P. Yermolayev, G. P. Luchinskiy, M. I. Popov, V. S. Kaminskiy, V. A. Seredkina, N. N. Polyakov, A. F. Lozhkin, Z. S. Bannykh, Ye. M. Polyakova. The experiments were carried out in collaboration with V. A. Gnedina and N. A. Gerasimova. There are 1 figure, 5 tables, and 15 references, 9 of which are Soviet.

3/063/60/005/003/027
A051/A029

AUTHORS: Nikitin, V.A., Kunin, T.I.

TITLE: On the Mechanism of Sodium Sulfate Reduction With Carbon

PERIODICAL: Zhurnal Vsesoyuznogo Khimicheskogo Obshchestva im. D.I. Mendeleyeva, 1960, Vol. 5, No. 3, pp. 350-352

TEXT: The reduction process of Na_2SO_4 to Na_2S with solid carbon takes place according to some authors (Refs. 1-4) by the following reactions:

$$Na_2SO_4 + 2C = Na_2S + 2CO_2 \quad (1)$$
$$Na_2SO_4 + 4C = Na_2S + 4CO \quad (2)$$
$$Na_2SO_4 + 4CO = Na_2S + 2CO_2 \quad (3)$$

The possibility of all three reactions taking place is assumed, depending on the conditions of the reduction process. It is considered that the main portion of the sodium sulfide is formed in reaction (1) since the escaping

On the Mechanism of Sodium Sulfate Reduction With Carbon

gases contain little carbon monoxide (Ref. 4). Since the equilibrium in the reaction $CO_2 + C \rightleftarrows 2CO$ (4) at reduction temperatures of 850-1,100°C is shifted into the direction of the carbon monoxide formation, the possibility of the reduction of sodium sulfate according to Equation (3) is not excluded. Reaction (1) is most probable according to Ref. 4, where the thermodynamic analysis of the main reactions of the process was studied up to 700°C. At higher temperatures reaction (2) should predominate. According to some investigators the reaction of Na_2S formation is a step-like process passing through the stage of sodium sulfite formation which later decomposes to Na_2O and SO_2. Experimentally it was shown (Ref. 5) that at reduction temperatures pure sodium sulfite decomposes according to the reaction $4Na_2SO_3 = Na_2S + 3Na_2SO_4$ (5), whereby it is noted that at the given temperatures the decomposition of Na_2SO_3 with the formation of Na_2O and SO_2, contrary to the opinion of Tammann and Ölsen (Ref. 6) hardly takes place at all. The authors of the present article conducted kinetic experiments with the purpose of clarifying the ratio between the reduction and

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On the Mechanism of Sodium Sulfate Reduction With Carbon

decomposition of the sulfite. Fig. 1,2 give the results of the reduction and decomposition of Na_2SO_4. The initial products were "Photo" grade sulfite and charcoal from sugar. The experiments were conducted at 650 and 700°C in a nitrogen atmosphere. The rate constants were calculated from the results and also the activation energies of decomposition and reduction of the sodium sulfite. It was established that the decomposition of the sodium sulfite is a reaction of the first order. The calculated activation energy for the decomposition process of the Na_2SO_4 was found to be equal to 80.2 kcal/mole. Fig. 1 and 2 show that the transformation process of Na_2SO_4 is noticeably accelerated with the introduction of a reducing agent. The large quantities of sulfur found in the batch decrease with an increase in the duration of the experiments. The analysis of the experimental data showed that the transformation of the sulfite in the presence of carbon follows the kinetics of a second-order reaction. The activation energy is hereby lowered to 53.1 kcal/mole. The drop in the activation energy and the change in the reaction order is explained by the change in the mechanism of the process and

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S/063/60/005/003/008/011/XX
A051/A029

On the Mechanism of Sodium Sulfate Reduction With Carbon

by the catalysis of decomposition of the sulfite with carbon. The authors also conducted a thermographic investigation of the behavior of the pure sulfite and sulfite with a reducing agent, in order to establish the true cause for the change in the activation energy. Fig. 3 and 4 show the results of these investigations. The thermograms were taken with a MK-56 (PK-56) Kurnakov pyrometer. The minimum on the differential curve, corresponding to 770°C, is explained by the melting process of the decomposition products. In the presence of a reducing agent an exothermal and endothermal effect is noted on the differential curve (Fig. 4, curve 2), which are explained by the decomposition reaction of the sulfite and the melting of the batch, respectively. It is assumed that carbon catalyzes the decomposition reaction of the sodium sulfite and lowers the temperature of the beginning of the reaction, which is seen from Fig. 4. Work was further carried out by the authors on the effect of the pressure in the briquetting of the batch on the rate of reduction of the sodium sulfate, in order to clarify the role played by the gas phase in the reduction process. Experiments were conducted with

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On the Mechanism of Sodium Sulfate Reduction With Carbon

chemically pure Na_2SO_4 at a constant temperature and duration in a nitrogen atmosphere. Coal with a low yield of volatile substances (anthracite) was used as the reducing agent. Sulfate and coal were ground to the fraction 0.125-0.21 mm. Fig. 5 is the obtained relationship curve. Experiments were conducted at relatively low temperatures (750°C) at a low content of Na_2S in the melt to avoid melting. The reduction time in all the experiments was 30 min and the maximum degrees of reductions did not exceed 50%. It was shown that there is no limiting role of the gas phase in the formation process of the sodium sulfite. It is stated that part of the Na_2SO_4 is reduced by the gaseous reducing agent, including carbon monoxide, but the entire process does not take place according to only one equation (3). The authors conclude that the reduction reaction of sodium sulfate with carbon is a complex heterogeneous autocatalytic process. The first quantities of sodium sulfite are formed as a result of the reduction of Na_2SO_4 by the volatile components, separating out in the heating of carbon (H_2, CH_4, CO, etc.), or by carbon monoxide. The reduction of Na_2SO_4 takes place through the

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On the Mechanism of Sodium Sulfate Reduction With Carbon

formation of sodium sulfite with its subsequent decomposition to Na_2S and Na_2SO_4. Sodium sulfite which is formed catalyzes the reduction reaction of Na_2SO_4 with carbon. There are 5 graphs, 5 equations and 7 references: 6 Soviet, 1 German.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut (Ivanovo Institute of Chemical Technology)

SUBMITTED: November 23, 1959

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S/063/60/[illegible]
A051/A029

On the Mechanism of Sodium Sulfate Reduction With Carbon

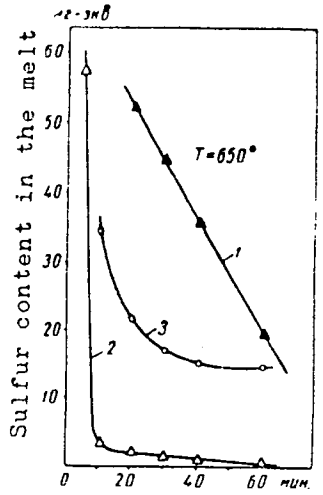

Figure 1:

Sulfur content depending on the duration of calcination. T = 650°C.

1.- in the form of sodium sulfite in the absence of carbon; 2.- in the form of sodium sulfite in the presence of carbon; 3.- in the form of sodium sulfate in the presence of carbon.

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S/063/60/005/003/008/011/XX
A051/A029

On the Mechanism of Sodium Sulfate Reduction With Carbon

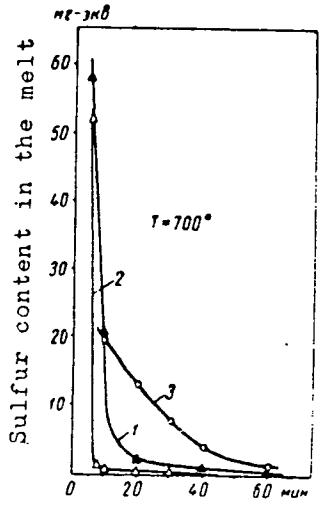

Figure 2:

Sulfur content depending on the duration of calcination. T = 700°C.

1.– in the form of sodium sulfite in the absence of carbon; 2.– in the form of sodium sulfite in the presence of carbon; 3.– in the form of sodium sulfate in the presence of carbon.

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