KONEV, N.

Application of nitrogen fertilizers to rice in California (from "Rice Journal," 1962). Zemledelie 24 no.12:83-85 D '62. (MIRA 16:1)

(California—Rice--Fertilizers and manures)
(Nitrogen fertilizers)

KONEV, N.A.

Devices for winding rope coils. Biul.TSNIICHM no.17:46-47 (325) '57. (MIRA 11:4)

1.Khartsyzskiy staleprovolochnoy-kanatnyy zavod.
(Rope)

KONEV, N.F.

Progress in Australian rainmaking (from "Planters Journal and Agriculturist," vol. 39, nos. 1-2, 1962); a summary by N.F.Konev. Zemledelie 25 no.2:81-84 F '63. (MIRA 16:5)
(Australia--Rainmaking)

KONEV, N.F.

Crop rotations in the U.S.A.; review of literature. Zemledelie 27 no.4:93-96 Ap '65. (MIRA 18:4)

MALYKHINA, T.A., inzh.; KONEV, N.G., inzh.

Testing machines for the placement of mineral fertilizers.
Trakt. i sel'khozmash. no.6:27-28 Je'64 (MIRA 17:7)

1. TSentral'no-Chernozemnaya mashinoispytatel'naya stantsiya.

MUKHINA, V.P.; KONEV, P.N.; SHNEYDER, B.A.; SHUYSKIY, V.P.

Basic characteristics of the paleogeography of the Urals in the Eifelian stage. Dokl. AN SSSR 164 no.3:644-647 S '65.
(MIRA 18:9)

1. Ural'skoye geologicheskoye upravleniye. Submitted December 21, 1964.

KONEV, S., starshiy nauchnyy sotrudnik

Light determines the fat content of milk. Tekh. mol. 31 no.8:18 '63. (MIRA 16:11)

1. Laboratoriya biofiziki i izotopov AN BSSR.

KONEV, S., kand.biol.nauk

Magnetic field and life. IUn.tekh. 4 no.6:22-25 Je '60.
(MIRA 13:9)
(Electromagnetic waves--Physiological effect)

KONEV, S., kand.biol.nauk

Power resources of a living cell. Znan.sila 35 no.3:16-18 Mr '60. (MIRA 13:6)

(CELLULAR METABOLISM)

KONEV, S., kand.biologicheskikh nauk

Attacking a drop of fat. Znan.sila 37 no.3:39 Mr '62. (MIRA 15:4)

(Milk--Analysis and examination) (Butterfat)

KONEV, S., kand.biologicheskikh nauk; VLADIMIROV, P.; PAVLOV, G.; LARIN, O. (g. Nukus)

It so happens that.... IUn. nat. no.11:26-27 N '61.
(MIRA 14:11)

(Nature study)

KONEV, S.V.

PHASE I BOOK EXPLOITATION SOV/4973

Soveshchaniye po lyuminestsentsii, 8th, 1959

Metody lyuminestsentnogo analiza; materialy soveshchaniya (Methods for Luminescence Analysis; Materials of the 8th Conference) Minsk, Izd-vo AN BSSR, 1960. 147 p. 1,000 copies printed.

Sponsoring Agency: Akademiya nauk Belorusskoy SSR. Institut fiziki.

General Ed.: N. A. Borisevich; Ed.: L. Timofeyev; Tech. Ed.: N. Siderko.

PURPOSE: This collection of articles is intended for chemists and physicists interested in molecular luminescence, and for scientific personnel concerned with applications of this and related phenomena in research in the life sciences.

COVERAGE: The collection contains 28 papers read at the Eighth Conference on Luminescence, which took place 19-24 October, 1959 [place of conference not given]. These studies are concerned principally with the development of new luminescence methods for quantitative and qualitative chemical analysis, and with the applications of luminescence in medical and biological research. They discuss luminescence methods for the determination of uranium, mercury, magnesium, aluminum, boron, and other elements, as well as luminescence methods for the diagnosis of skin cancer and the detection of grippe virus, pathogenic microorganisms, etc. The structural design of new instruments for luminescence analysis is described. The conference was not concerned with studies on the phosphorescence of crystal phosphores. There is a discussion of the contributions of Soviet specialists in molecular luminescence in the course of the year and a half preceding the conference. The articles of V. K. Matveyev (p. 75) and of V. V. Patrikeyev (p. 79) have been annotated because of their importance. No personalities are mentioned. References accompany most of the articles.

AVAILABLE: Library of Congress

KONEV, S. V., Cand Bio Sci -- (diss) "Certain pecularities of photochemical transformations in biological systems." Moscow, 1957, 13 pp (Moscow State University im M. V. Lomonosov), 140 copies (KL, 36-57, 104)

VLADIMIROV, Yu.A.; KONEV, S.V.

Possibility of energy transfer in a protein molecule [with summary in English]. Biofizika 2 no.1:3-19 '57. (MLRA 10:3)
(PROTEINS) (FORCE AND ENERGY)

KONEV, S. V.

VLADIMIROV, Yu.A.; KONEV, S.V.; LITVIN, F.F.

Second All-Union Conference on Photosynthesis. Biofizika 2 no.3: 392-399 '57. (MLRA 10:8)
(PHOTOSYNTHESIS--CONGRESSES)

VLADIMIROV, Yu.A.; KONEV, S.V.; LITVIN, F.F.

The Second All-Union Conference of Photosynthesis. Zhur.fiz.khim. 31 no.8:1908-1911 Ag '57. (MIRA 10:12)
(Photosynthesis--Congresses)

KONEV, S. V.

AUTHOR: Konev, S. V. 20-4-19/51

TITLE: Note on the Fluorescence Spectra and the Fluorescence Action Spectra of Some Proteins (Spektry fluorestsentsii i spektry deystviya fluorestsentsii nekotorykh belkov).

PERIODICAL: Doklady AN SSSR, 1957, Vol. 116, Nr. 4, pp. 594-597 (USSR)

ABSTRACT: The present paper contains experimental data on the determination of the centres, which are responsible for the fluorescence of protein and for the intramolecular migration of energy in albuminous substances and in nucleoproteides. In order to clarify these problems the authors determined the spectra of fluorescence and of fluorescence action of albuminous substances and of mixtures of amino acids, of which they are composed. In both cases the fluorescence was excited by mercury quartz lamps of the type ПРК -2 and ПРК -7. The fluorescence radiation was received by the antimony - caesium photo electric cell of the spectral photometer СФ -4. The execution of the measurements is discussed shortly. In the case of a few albuminous substances (which are enumerated here) the author was able to observe qualitatively identical

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fluorescence spectra with two maxima at 313 and 350 mμ. These spectra differ a little from the spectra found in a preceding paper (reference 3). The first of these spectra comes from tyrosine the second from tryptophane. A mixture of aromatic amino acids with the same ratio as in the albuminous substance under investigation furnishes the spectrum of the corresponding albuminous substance in a qualitative respect. Hydrolized albumin also furnished the same spectrum. Albuminous substances containing no tryptophane and dipentidglyziltyrosine furnish a fluorescence spectrum showing only one maximum. These and other facts speak in favour of the fact, that only the aromatic amino acids are responsible for the fluorescence of albuminous substances. For the purpose of studying the problem of the possibility of an energy migration into the aromatic amino acids from other components of the protein molecule (in particular with a peptidic binding) the spectra of the fluorescence action of albuminous substances, of their hydrolysates and of mixtures of the amino acids, of which they are composed. It was established in the case of almost

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KONEV, S. V.

with Yu. A. Vladimirov "Mechanism of energy migration of light quanta in protein"

report presented at the 10th All-Union Conf. on Highly Molecular Compounds, Biologically Active Polymer Compounds, Moscow, 11-13 June 1958. (Vest.Ak Nauk SSSR, 1958, No. 9, pp. 111-113)

KONEV, S.V.

AUTHOR: Konev, S.V., Candidate of Biological Sciences 25-58-3-39/41

TITLE: Estrogens in Livestock Raising (Estrogeny v zhivotnovodstve)

PERIODICAL: Nauka i Zhizn', 1958, Nr 3, pp 78-79 (USSR)

ABSTRACT: Science has established that several organic synthetic substances: "stilbestrol", "dinestrol", "cinestrol", "gexostrol", etc., may have the same effect and at times even a more intensified effect, than the natural hormones. These synthetic estrogens have been successfully used in fattening cattle, sheep and poultry.
There is one sketch.

AVAILABLE: Library of Congress

Card 1/1 1. Estrogens-Synthetics 2. Estrogens-Applications

SOV-26-58-11-43/49

AUTHOR: Konev, S.V., Candidate of Biological Sciences (Dubrovitsy, Moskovskaya Oblast')

TITLE: On Photoperiodism (O fotoperiodizme)

PERIODICAL: Priroda, 1958, Nr 11, pp 119 - 120 (USSR)

ABSTRACT: The author gives a review of the book "Svet i Zhizn'" (Light and Life) by A.M. Emme, published by the Sel'khozgiz Publishing House, 1958, 128 pages.

1. Light--Biochemical effects

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BRAYNES, S.N., prof., red.; NAPALKOV, A.V., red.; KONEV, S.V., red.; KORZHOV, V.A., red.; FEDYANIN, G.P., red.; KOBRINSKAYA, O.Ya., red.; KUCHINA, Ye.V., red.

[Problems in experimental pathology; collection of articles from the experimental pathology laboratory] Voprosy eksperimental'noi patologii; sbornik rabot laboratorii eksperimental'noi patologii. Pod obshchei red. S.N.Braineea. Moskva, 1959. 339 p.
(MIRA 14:2)

1. Akademiya meditsinskikh nauk SSSR. Institut psikhiatrii.
(NERVOUS SYSTEM--DISEASES)

VLADIMIROV, Yu.A.; KONEV, S.V.

Possible mechanisms of energy migration in the protein molecule.
Biofizika 4 no.5:533-540 '59. (MIRA 14:6)

1. Biologo-pochvennyy fakul'tet Moskovskogo gosudarstvennogo universiteta imeni M.V.Lomonosova.
(PROTEINS) (FORCE AND ENERGY)

24(7) SOV/48-23-1-19/36

AUTHOR: Konev, S. V.

TITLE: The Activity Spectrum of the Fluorescence of Albumins (Spektry deystviya fluorestsentsii belkov)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 1, pp 90 - 93 (USSR)

ABSTRACT: The author had shown that the fluorescence of albumins is composed of the fluorescence of the aromatic amino acids phenyl alanine, tyrosine and tryptophane, that in native (untreated) albumins the intensity of tryptophane by far surpasses that of the others, and that this effect becomes weaker in hydrogenized albumins. From the invariability of the fluorescence intensity of casein in the case of excitation with various wave lengths, it was concluded that the quanta absorbed by various amino acids excite one and the same fluorescence center of the albumin, i.e. that in the interior of the macromolecule a migration of energy between the amino acids mentioned takes place. A table shows the spectral composition of casein fluorescence in the case of an excitation of fluorescence by light of different wave

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lengths. The spectrum activity of casein in a phosphate buffer solution pH=8.2 for the native (untreated) casein and after heating to 55, 56, 75°C (in units I/n, where I - intensity of fluorescence, n-intensity of the exciting light), the spectrum of activity for casein at various pH values, and the absorption spectrum for casein, native (untreated) in phosphate buffer, pH=8.2, and after 3 minutes' denaturation at 62°, are shown by figures 1,2,3. The following experimental specialities were found: in native (untreated) casein there is a maximum at point 243 mμ which vanishes both in slightly denaturated casein and also at a pH value > 9. The absorption spectra of native (untreated) and denaturated casein are nearly identical. In no case is there any shifting of bands. The following conclusions are drawn from these facts: Absorption of light having a wavelength of 240-245 mμ by the peptide binding with transition of an atomic group -CO-NH- to an excited singlet level. Transition from the singlet level to a triplet level (conductivity zone) of the albumin. Passing of an electron from the conductivity zone to the aromatic amino acid, emission of a light quantum. Thus, it is possible in the case of albumins, to speak of

a resonance migration of energy between the individual amino acids, as well as of an electron migration of the type of activated semiconductors from the peptide binding to the aromatic amino acid. There are 3 figures, 1 table, and 6 references, 2 of which are Soviet.

KOMEV, S.V., kand.biol.nauk

Proteins are emitting signals. Nauka i zhizhn' 27 no.2: 28-30 F '60. (MIRA 13:6)
(Proteins) (Fluorescence)

KONEV, S. V., TROITSHIY, N.A., KATIBNIKOV, M. A., (USSR)

"The Chemiluminescence of Yeast Cells in the Visible and Ultra-Violet Spectral Regions."

Report presented at the 5th Int'l. Biochemistry Congress, Moscow, 10-16 Aug 1961.

KONEV, S. V., KATIBNIKOV, M. A.

"Prolonged Excited States in a Protein Macromolecule."

report presented at the Intl. Biophysics Congress, Stockholm, Sweden, 31 July - 4 August 1961.

Laboratory of Biophysics and Isotope A.S.B. SSR, Minsk, USSR.

TROITSKIY, N.A.; KONEV, S.V.; KATIBNIKOV, M.A.

Study of ultraviolet chemiluminescence in biological systems.
Biofizika 6 no. 2:238-240 '61. (MIRA 14:4)

1. Laboratoriya biofiziki i izotopov AN BSSR, Minsk.
(LUMINESCENCE)

KONEV, S.V.; KATIBNIKOV, M.A.; PETROVA, M.A.

Possibility of energy migration among tryptophan molecules. Biofizika 6 no.3:375 '61. (MIRA 14:6)

1. Laboratoriya biofiziki i izotopov AN Belorusskoy SSR, Minsk.
(TRYPTOPHAN) (FORCE AND ENERGY)

KATIBNIKOV, M.A.; KONEV, S.V.

Multipurpose attachment to the SF-4 spectromphotometer.
Prib. i tekh.eksp. 6 no.4:166-167 Jl-Ag '61. (MIRA 14:9)

1. Laboratoriya biofiziki i izotopov AN BSSR.
(Spectrophotometer)

KONEV, S.V.; KATIBNIKOV, M.A.

Prolonged afterglow of proteins and amino acids at room temperature. Report No. I. Kinetics of the afterglow of proteins and amino acids. Biofizika 6 no.6:638-644 '61. (MIRA 15:1)

1. Laboratoriya biofiziki i izotopov AN BSSR, Minsk.
(PROTEINS) (AMINO ACIDS chem) (PHOSPHORESCENCE)

KONEV, S.V.; KATIBNIKOV, M.A.

Polarization of ultraviolet fluorescence of the keratin of wool.
Dokl. AN SSSR 136 no.2:472-475 '61. (MIRA 14:1)

1. Predstavleno akademikom A.N. Tereninym.
(Fluorescence) (Polarization (Light))
(Wool)

KATIBNIKOV, M.A.; KONEV, S.V.

Prolonged afterglow of proteins and amino acids at room temperature. Report no.2: Spectra of the afterglow and spectra of the agitation of the afterglow of proteins. Biofizika 7 no.2:150-153'62. (MIRA 16:8)

1. Laboratoriya biofiziki i izotopov Belorusskoy Akademii nauk, Minsk.
(PROTEINS--SPECTRA) (TRYPTOPHAN)
(FLUORESCENCE)

CHERNITSKIY, Ye.A.; KONEV, S.V.; BOBROVICH, V.P.

Polarization spectra of the fluorescence and phosphorescence of tryptophan and indole. Dokl. AN BSSR 7 no.9:628-632 S '63. (MIRA 17:1)

1. Laboratoriya biofiziki i izotopov AN BSSR. Predstavleno akademikom AN BSSR A.N. Sevchenko.

KONEV, S.V.; LYSKOVA, T.I.; BOBROVICH, V.P.

Nature of the ultraviolet luminescence of cells. Biofizika 8 no.4: 433-440 '63. (MIRA 17:10)

1. Laboratoriya biofiziki i izotopov AN BSSR, Minsk.

KONEV, S.V.; SALOSHENKO, P.N.

Effect of urea on the accuracy of the luminescent express method for determining protein in milk. Dokl. AN BSSR 7 no.10:696-699 O '63. (MIRA 16:11)

1. Laboratoriya biofiziki i izotopov AN BSSR. Oredstavkebi akademikom AN BSSR T.N. Godnevym.

KONEV, S.V. [Koneu, S.V.]; TROITSKIY, N.A. [Troitski, N.A.]; KATIBNIKOV, M.A. [Katsibnikau, M.A.]

Chemiluminescence of proteins and biological systems in the visible and ultraviolet sections of the spectrum. Vestsi AN BSSR. Ser. biial. nav. no.1:76-79 '64. (MIRA 17:6)

KONEV, S.V.; LYSKOVA, T.I.; SALOSHENKO, P.N.

Accuracy in determining protein in selected milk samples by the luminescence method. Dokl. AN BSSR 8 no. 1:51-52 Ja '64.
(MIRA 17:5)

1. Laboratoriya biofiziki i izotopov AN BSSR. Predstavleno akademikom AN BSSR T.N.Godnevym.

KONEV, S.V.; KATIBNIKOV, M.A.; LYSKOVA, T.I.

Possibility of the intertryptophan migration of energy in protein systems. Biofizika 9 no. 1:124-127 '64. (MIRA 17:7)

1. Laboratoriya biofiziki i izotopov AN BSSR, Minsk.

BOBROVICH, V.P.; KONEV, S.V.

Characteristics of the luminescence of amylase in the crystal state. Dokl. AN SSSR 155 no.1:197-200 Mr '64. (MIRA 17:4)

1. Laboratoriya biofiziki i izotopov AN BSSR. Predstavleno akademikom A.N.Tereninym.

CHERNITSKIY, Ye.A.; KONEV, S.V.

Effect of solvents and temperature on the electronic spectra of carbazole. Dokl. AN BSSR 8 no.4:258-262 Ap '64. (MIRA 17:6)

1. Laboratoriya biofiziki i izotopov AN BSSR. Predstavleno akademikom AN BSSR T.N. Godnevym.

BOBROVICH, V.P.; KONEV, S.V.

Tyrosine-tryptophan energy migration in protein molecules. Dokl. AN BSSR 9 no.2:118-121 F '65. (MIRA 18:5)

1. Laboratoriya biofiziki i izotopov AN BSSR.

KONEV, S.V.; BOBROVICH, V.P.; CHERNITSKIY, Ye.A.

Polarizing emission spectra of protein fluorescence and the possibility of the intertryptophan migration of energy. Biofizika 10 no.1:42-47 '65. (MIRA 18:5)

1. Laboratoriya biofiziki i izotopov AN BSSR, Minsk.

KONEV, S.V.; CHERNITSKIY, Ye.A.

Effect of formaldehyde on the quantum yield of the fluorescence of tryptophan and its derivatives. Biofizika 9 no.4:520-522 '64. (MIRA 18:3)

1. Laboratoriya biofiziki i izotopov AN BSSR, Minsk.

KONEV, S.V.; KATIRNIKOV, M.A.

Characteristics of bioluminescence of plant tissues. Trudy MOIP. Otd. biol. 21:69-74 '65. (MIRA 18:6)

KONEV, S.V.

Nature and biological significance of ultraweak cell luminescences. Trudy MOIP. Otd. biol. 21:181-183 '65.

(MIRA 18:6)

CHERNITSKIY, Ye.A.; KONEV, S.V.

An oscillator model of molecules of indole and its derivatives.
Zhur. prikl. spekt. 2 no.3:261-266 Mr '65. (MIRA 18:6)

KONEV, S.V.; LYSKOVA, T.I.

Effect of a glycolysis rate increase in yeast cells by ultraviolet light of mitogenetic intensity. Dokl. AN BSSR 9 no.3:190-193 Mr '65. (MIRA 18:6)

1. Laboratoriya biofiziki i izotopov AN BSSR.

KONEV, S.V., LYSKOVA, T.I.

Relation of the quantum output of fluorescence of mitochondria proteins to the intensity of respiration. Biofizika 10 no.4:694-696 '65. (MIRA 18:8)

1. Laboratoriya biofiziki i izotopov AN BSSR, Minsk.

KONEV, S.V.; BOBROVICH, V.P.

Polarization spectra of fluorescence and phosphorescence based on emitting mitochondria and cell nuclei. Biofizika 10 no.5:813-816 '65. (MIRA 18:10)

1. Laboratoriya biofiziki i izotopov AN BSSR, Minsk.

KONEV, S.V. [Koneu, S.V.]

Effect of quaternary protein structure on the quantum yield of fluorescence. Vestsi AN BSSR. Ser. biial. nav. no.4:59-68 '64.
(MIRA 18:12)

KONEV, S.V.; CHERNITSKIY, V.A.

Tryptophan and indole luminescence in a highly alkaline medium. Dokl. AN BSSR 9 no. 5:328-330 My '65 (MIRA 19:1)

1. Laboratoriya biofiziki i izotopov AN BSSR. Submitted March 4, 1964.

KONEV, S.V.; LYSKOVA, T.I.

Effect of extremely weak intensity of ultraviolet rays on cell division and glycolysis. Biofizika 10 no.6:1000-1002 '65.
(MIRA 19:1)

1. Laboratoriya biofiziki i izotopov AN Belorusskoy SSR, Minsk.
Submitted July 1, 1964.

KONEV, S.V.; BOBROVICH, V.P.; CHERNITSKIY, Ye.A.

Possibilities and mechanisms of the energy migration in proteins. Dokl. AN SSSR 165 no.4:937-939 D '65.

(MIRA 18:12)

1. Laboratoriya biofiziki i izotopov AN BSSR. Submitted January 27, 1965.

L 41649-66

ACC NR: AP6031121 SOURCE CODE: UR/0217/66/011/002/0361/0363

AUTHOR: Konev, S. V.; Lyskova, T. I.; Nisenbaum, G. D. 27 B

ORG: Biophysics and Isotope Laboratory, AN BSSR, Minsk (Laboratoriya biofiziki i izotopov AN BSSR)

TITLE: Question of superweak bioluminescence of cells in the ultraviolet region of the spectrum and its biological role

SOURCE: Biofizika, v. 11, no. 2, 1966, 361-363

TOPIC TAGS: biochemistry, chemiluminescence, biologic reproduction, cell physiology, UV spectrum

ABSTRACT: Previously one of the authors (S. V. Konev), together with N. A. Troitskiy and M. A. Katienikov, used a Geiger tube-type photon counter to record superweak bioluminescence of animal and plant cells in the ultraviolet region of the spectrum. However, the results obtained did not indicate whether this bioluminescence accompanies oxidation processes in general, as happens in the case of superweak luminescence in the blue-green region of the spectrum, or whether it is causally related to the process of cell division and coincides specifically with certain stages of a cell's ontogenetic cycle. The clearest way to solve the second part of the question is through the use of a synchronized cell culture. The authors used a culture of Torula utilis which was

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ACC NR: AP6031121

synchronized by the elimination of ammonium sulfate for 3 hours from Rieder's medium. Two hours after the removal of the block (i.e., the addition of ammonium sulfate) cell division began. During the starvation period and in the first 10-15 minutes after removal of the block no luminescence of the culture was noted in the visible or ultraviolet region of the spectrum. This was followed by the appearance of luminescence and a gradual increase in its intensity with time. Maximum intensity was observed 50-60 minutes after removal of the block and preceded morphological cell division by approximately one hour. Then there was a gradual fading of the intensity of the luminescence to almost zero, followed by a second, less intense flash corresponding to a second wave of cell divisions. The authors conclude that radiation occurs in the cells at the moment when preparation is under way for cell division at the molecular level -- before the appearance of the resultant morphological elements. Orig. art. has: 1 figure and 2 tables. [JPRS: 36,932]

SUB CODE: 06 / SUBM DATE: 28Apr65 / ORIG REF: 009 / OTH REF: 003

Card 2/2 mT

Konev, V.

SKVERCHAK, D., inzhener; KONEV, V., inzhener.

Assembling a prefabricated silo-top floor by an assembly-line method. Muk.-elev.prom. 23 no.5:28-30 My '57. (MIRA 10:9)

1. Trest TSentrokhlebostroy.
(Grain elevators)

KOLESNIK, A., doktor tekhn.nauk; OGNEVA, O., kand.tekhn.nauk; KONEV, V.

New method of storing grapes. Sov. torg. 33 no. 9:41-44 S '60.
(MIRA 14:2)
(Grapes—Storage)

AMIYAN, V.A.; SHTYRIN, V.F.; KONEV, V.D.; NOZDREV, A.Ye.; KALICHENKO, B.V.; ZHETLUKHIN, Yu.L.

Determination of the nature of flooding of well IV in the Mneotic horizon of the Anastasiyevka-Troitskoye field based on the parameters of production performance. Neftepром. delo no.8:3-5 '65. (MIRA 18:9)

1. Institut geologii i razrabotki goryuchikh iskopayemykh, Moskva, i Nefteprомyslovoye upravleniye "Priazovneft'"

KONEV, Vsevolod Dmitriyevich; RUCHIN, Serafim Mikhaylovich; MARGULIS, A.Sh., red.

[Organization of accounting at enterprises; practices of the Gorki Automobile Plant] Organizatsiia ucheta na predpriiatii; opyt Gor'kovskogo avtozavoda. Moskva, Gosfinizdat, 1962. 77 p. (MIRA 16:11)
(Industrial management)

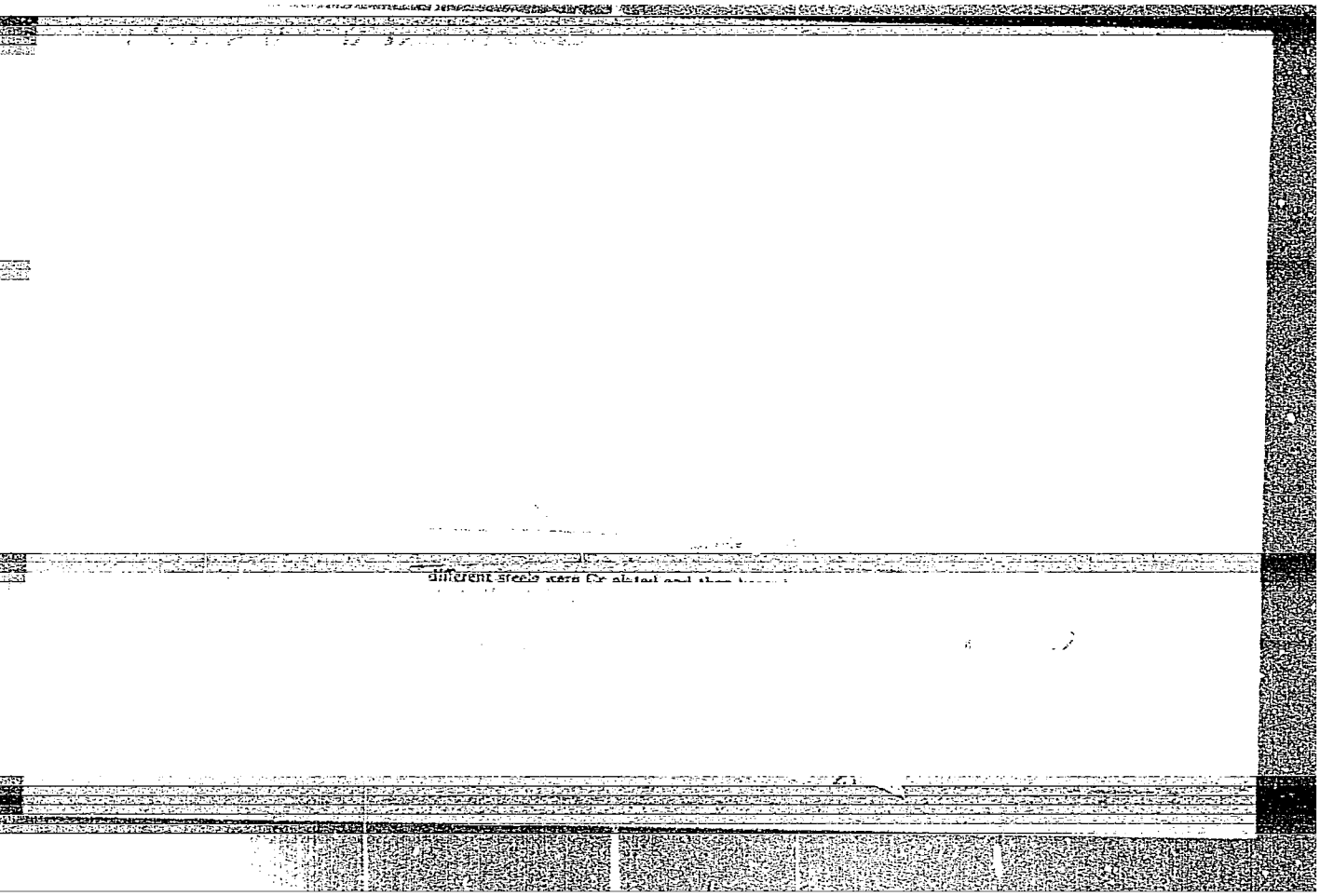
GOLUBTSOV, V.L. (g.Sverdlovsk); KONEV, V.L. (g.Sverdlovsk)

Slit-type ignition of single-anode mercury-arc rectifiers. Elek.i tepl.tiaga 3 no.5:39-41 My '59. (MIRA 12:9)
(Mercury-arc rectifiers)

ARKHAROV, V.I.; KONEV, V.N.

Studying the reactive diffusion in systems binary alloy - gas. Theoretical analysis of the phenomenon. Fiz. met. i metalloved. 18 no.4:594-598 O '64. (MIRA 18:4)

1. Ural'skiy gosudarstvennyy universitet imeni Gor'kogo.



Konev, V. N.

126-1-39/40

AUTHORS: Arkharov, V. I., Konev, V. N., Trakhtenberg, I. Sh. and Shumilina, S. V.

TITLE: Oxidation of chromium in air and in oxygen. (Okisleniye khroma v vozdukhe i kislorode).

PERIODICAL: Fizika Metallov i Metallovedeniye, 1957, Vol.5, No.1, pp. 190-191 (USSR)

ABSTRACT: On the basis of experiments of various authors it can be concluded that the scale on chromium oxided in oxygen as well as in air consists of rhombohedric Cr_2O_3. On the basis of indirect indications the assumption was expressed of the existence of γ-Cr_2O_3 but this has not been established experimentally. The influence of the air nitrogen on the process of oxidation has not been taken into consideration by previous authors, although in principle such an influence is possible at elevated temperatures. In other work of one of the authors (Ref.5) formation of a nitride was observed on the X-ray diffraction patterns as a result of nitriding of chromium which was similar to that interpreted in earlier work (Ref.4) as a sign of presence of γ-Cr_2O_3. For getting a more accurate picture on the mechanism of the phenomenon, the authors

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investigated the oxidation of chromium in air and in oxygen. At various temperatures the kinetics of the scale formation was studied (from the gain in weight of the specimen) and also the phase composition and the texture in the layers of the forming scale (by X-ray diffraction) and the microstructure of the layers. The specimens of electrolytic chromium were made in the form of hollow cylinders by a method described in earlier work (Ref.4). The oxidation in air was effected in a vertical electric furnace whereby the specimen was suspended on a tray of an analytical balance located above the furnace, so that the weight increase could be determined without removing the specimen from the hot part of the furnace. Oxidation in oxygen at a pressure of 160 mm Hg was effected in a closed vertical quartz tube placed inside a tubular electric furnace; by means of a special gate the specimen was displaced from the top, cold part into the hot part without disturbing the atmosphere of the tube and, after a fixed oxidation time, the displacement was in the opposite direction. Oxidation in oxygen was effected at 700, 880 and 1000°C; only a single phase was observed in the scale. Oxidation in

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KONEV, V.N.

ARKHAROV, V.I.; KONEV, V.N.; TRAKHTENBERG, I.Sh.; SHUMILINA, S.V.

Role of nitrogen in the process of high temperature oxidation of chromium in contact with air. Issl. po zharopr. splav. 3:402-407 '58. (MIRA 11:11)

(Chromium) (Nitrogen) (Oxidation)

ARKHAROV, V.I.; KONEV, V.N.; MEN'SHIKOV, A.Z.

Investigating reaction diffusion in the chromium - nitrogen system.
Issl. po zharopr. splav. 3:408-414 '58. (MIRA 11:11)
(Chromium) (Nitrogen) (Diffusion)

KONEV, V.N.

Structure and properties of carbonitrided chromium. Issl. po zharopr. slav. 3:415-419 '58. (MIRA 11:11)
(Chromium steel) (Case hardening)

SOV/126-6-5-34/43

AUTHOR: Konev, V. N.

TITLE: On the Problem of Simultaneous Diffusion of Carbon and Nitrogen in Chromium (K voprosu o sovmestnoy diffuzii ugleroda i azota v khrom)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 6, Nr 5, pp 942-943 (USSR)

ABSTRACT: Arkharov et al. (Refs 1-3) found that three layers of chromium carbides Cr_3C_2, Cr_7C_3 and $Cr_{23}C_6$ (one on top of the other) are formed in carburization of chromium. Studies of oxidation of chromium in air (Arkharov et al., Ref 4) showed that the atmospheric nitrogen reacts with chromium at 700°C and higher temperatures, forming a layer of chromium nitride under the oxide layer on the surface. Nitrogen was found to affect also carburization of chromium. To investigate the effect of nitrogen on diffusion of carbon in chromium, the author studied carburization of chromium in an atmosphere containing nitrogen (carbonitriding). The kinetics of the carbonitriding process, phase composition and texture as well as the microstructure

On the Problem of Simultaneous Diffusion of Carbon and Nitrogen in Chromium

of various layers formed on chromium were studied. Electrolytic chromium was used in the form of small cylinders, employing the technique described by Arkharov and the author (Ref 3). Chromium samples were carburized in a vertical tubular electrical furnace in a moving atmosphere consisting of a mixture of benzene vapours with nitrogen. The composition of the gaseous mixture was determined by thermostatting the temperature of the saturator with benzene through which a stream of oxygen-free nitrogen was passed at the rate of 10 litres/hr. Study of the carbonitriding kinetics and metallographic investigations followed the technique described by Arkharov et al. (Ref 4). Carbonitriding was carried out at the temperatures of 700, 900, 1000 and 1100°C. The microstructure of carbonitrided chromium showed clear laminar structure due to diffusion of nitrogen and carbon into chromium. X-ray crystallographic analysis indicated that the layers had the following compositions:

On the Problem of Simultaneous Diffusion of Carbon and Nitrogen in Chromium

1. An outer layer of rhombic Cr_3C_2;
2. A middle layer of hexagonal Cr_7C_3;
3. An inner layer of hexagonal Cr_2N.

In weakly carbonitrided samples of "bright" chromium, Cr_2N layers have a clear texture of (110) type parallel to the external surface. With increase of the duration of carbonitriding, the intensity of the maximum in the X-ray diffraction pattern, due to Cr_2N, decreases and the intensities of the Debye rings of Cr_7C_3 and Cr_3C_2 increase. Carbonitrided samples of "grey" chromium show no sign of texture. The absence of texture in the external layers and the absence of loose structure at inter-phase boundaries indicate that nitrogen and carbon diffuse through the surface layers towards metal. There is hardly any diffusion of chromium in the opposite direction. The presence of a nitride layer under two carbide layers shows that the rate of diffusion of nitrogen in chromium is greater than that of carbon

On the Problem of Simultaneous Diffusion of Carbon and Nitrogen in Chromium

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in chromium. A similar effect is observed in oxidation of chromium in air (Ref 4). Under simultaneous diffusion of atmospheric nitrogen and oxygen, the reaction front of nitrogen overtakes the reaction front of oxygen. A layer of chromium nitride is thus formed under an oxide layer. The author found that diffusion of carbon and nitrogen in chromium at 700°C follows a power law $\Delta m = \varkappa t^n$, where $n = 1/3$. With increase of temperature, the value of n increases and at 1100°C it approaches 1/2. At all temperatures the rate of carbonitriding of chromium is faster than the rate of carburization and it is not slower than the rate of nitriding of chromium in ammonia.
There are 4 Soviet references.

ASSOCIATION: Ural'skiy gosudarstvennyy universitet imeni A. M. Gor'kogo (Ural State University imeni A.M.Gor'kiy)
SUBMITTED: May 29, 1957
Card 4/4

SOV/126-7-1-9/28

AUTHORS: Arkharov, V.I., Konev, V.N. and Men'shikov, A.Z.

TITLE: Investigation of Diffusion in the System Chromium-Nitrogen (Issledovaniye diffuzii v sisteme khrom-azot)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1959, Vol 7, Nr 1, pp 64-71 (USSR)

ABSTRACT: Nitrogen participates in the diffusion of oxygen or carbon in chromium at high temperatures. In the present work nitriding of chromium in an atmosphere of ammonia was studied. The kinetics of the process, phase composition, texture and microstructure of the nitride layers was studied during their formation at various temperatures between 600 and 1200°C. Electrolytic chromium served as the basic material in the study. Specimens were made by Arkharov's method (Ref.14) in the shape of hollow cylinders, 17 mm long, 7 mm diameter and 0.8 mm wall thickness. Deposition was carried out by two different methods, giving two different types of coating (Ref.15) - (1) bright chromium deposits, having a well-defined texture, and (2) matt (grey) deposits with a weakly defined texture. Nitriding was carried out

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in a closed vertical quartz tube placed inside a tubular electric furnace. Before and after nitriding the specimens were weighed and the increase in weight determined. Debye crystallograms of the phase analysis were taken in K-Cr rays after asymmetrically blocking up the film. Textural X-ray pictures were taken and interpreted by a method described by Arkharov (Ref.16). For the metallographic study chromium deposits were prepared on steel cylinders on which flat portions had been filed along the generatrix. After nitriding, oblique sections of these flat portions were prepared for micro-examination. In Fig.1 the dependence of weight gains of specimens at various temperatures on duration of nitriding is shown. Fig.2 shows the temperature dependence of the angle of inclination of the kinetic curves for nitriding of chromium. In Fig.3 a micrographic cross-section of a chromium specimen after being nitrided right through is shown. Fig.4 shows the dependence of gain in weight of specimens of Cr_2N on the length of nitriding time. Fig.5 shows the temperature dependence of the angle of inclination of the kinetic curves for nitriding of Cr_2N.

Investigation of Diffusion in the System Chromium-Nitrogen

The results obtained in the above investigation have led to the following conclusions:

(1) The reaction diffusion in the system Cr-N begins with perceptible speed at 700°C and obeys the parabolic time law in the entire temperature range up to 1200°C.

(2) As the temperature is increased, the diffusion rate of the Cr-N increases initially slowly (i.e. below 1030°C), then rapidly (above 1030°C).

(3) Below 1030°C nitriding produces a two-phase layer in chromium - an internal, thicker one of Cr_2N and an outer, thinner one of CrN. Above 1030°C only the Cr_2N layer is formed. The CrN phase is unstable in an ammonia atmosphere above 1030°C. It does not re-form and the phase CrN, forming below 1030°C, is converted into the phase Cr_2N as this temperature is raised. The change in increase in the diffusion rate with temperature at above 1030°C seems to be associated with a change in the nature of the phase in the diffusion layers.

(4) As the Cr_2N layer forms in textured chromium the texture of the type

Investigation of Diffusion in the System Chromium-Nitrogen

$$(110)\ Cr_2N \parallel (111)\ Cr \parallel NP$$

or possibly

$$(120)\ Cr_2N \parallel (111)\ Cr \parallel NP$$

forms at all temperatures. In untextured chromium the Cr_2N possesses no texture.

(5) The outer layer, CrN (forming at below 1030°C) never possesses a texture, irrespective of whether the chromium and the Cr_2N layer have a texture or not.

(6) All structural characteristics of the layers point to the fact that during reaction diffusion in the Cr-N system nitrogen diffuses from without through the nitride layer into the metal, and no perceptible diffusion of the metal occurs in the reverse direction.

There are 5 figures, 2 tables and 18 references, of which

Card 4/5 8 are Soviet, 4 German, 1 French, 1 Swedish and 4 English.

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Investigation of Diffusion in the System Chromium-Nitrogen

ASSOCIATION: Ural'skiy gosudarstvennyy universitet imeni A.M. Gor'kogo (Ural State University imeni A.M. Gor'kiy)

SUBMITTED: March 3, 1958

Card 5/5

KONEV, V. N. Cand Phys-Math Sci -- (diss) "Study of the reactive diffusion in certain "metal-gas" systems on the basis of chromium." Sverdlovsk, 1959. 10 pp including cover (Min of Higher Education USSR. Ural State Univ im A. M. Gor'kiy), 120 copies (KL, 46-59, 135)

KONEV, V.N.

PHASE I BOOK EXPLOITATION SOV/4347

Akademiya nauk Ukrainskoy SSR. Institut metallokeramiki i spetsial'nykh splavov. Seminar po zharostoykim materialam

Trudy, vyp. no. 5 (Transactions of the Academy of Sciences, Ukrainian SSR, – Institute of Metal Ceramics and Special Alloys, Seminar on Heat Resistant Materials, No. 5) Kiyev, Izd-vo AN Ukrainskoy SSR, 1960. 65 p. 2,000 copies printed.

Ed. of Publishing House: I.V. Kisina; Tech. Ed.: A.A. Matveychuk; Editorial Board: G.V. Samsonov (Resp. Ed.), I.N. Frantsevich, V.V. Grigor'yeva, A.Z. Men'shikov, and M.I. Korsunskiy.

PURPOSE: The book is intended for engineers, scientific workers and students specializing in refractory metals and their compounds, powder metallurgy, electronics, machine building and physical metallurgy in schools of higher technical education.

COVERAGE: This collection of papers, originally presented at the Seminar on Heat Resistant Materials in Kiyev on June 13–June 17, 1958,

discusses the physical properties and production technology of refractory metals and their metal-like compounds with boron, carbon, nitrogen, and silicon. The results of investigations of the absorption and emission spectra of niobium and chromium compounds, processes of joint diffusion of two elements in metals, and data on phenomenological studies of physical properties of metal-like phases are presented. Methods of processing rare metals and refractory compounds in making powders and various articles used in many fields of modern technology are analyzed in detail. Several articles discuss the particular problems of powder metallurgy of ordinary metals and alloys. The papers reflect work performed at the following institutions: Institut metallokeramiki i spetsial'nykh splavov AN USSR (Institute of Metal Ceramics and Special Alloys, Academy of Sciences UkrSSR), Gosudarstvennyy institut prikladnoy khimii (State Institute of Applied Chemistry) Leningrad, Khar'kovskiy politekhnicheskiy institut (Khar'kov Polytechnic Institute), Institut fiziki metallov AN SSSR (Institute of the Physics of Metals, Academy of Sciences USSR), Sverdlovskiy gosudarstvennyy universitet (Sverdlovsk State University), VIAM, TsNIIChERMET, VNIIASh, Institut metallurgii AN USSR (Institute of Metallurgy, Academy of Sciences UkrSSR) VNIITS, NIIGOZ, MEIS, Gor'kovskiy politekhnicheskiy institut (Gor'kiy Polytechnic Institute), and Moskovskiy elektrolampovyy zavod (Moscow Electric Bulb Plant). References accompany individual articles.

AVAILABLE: Library of Congress

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S/126/60/009/02/010/033
E111/E335

AUTHORS: Arkharov, V.I. and Konev, V.N.

TITLE: Investigation of Reaction Diffusion in "Metal-complex Gas" Systems. I. General Picture of the Phenomenon

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 2, pp 212 - 215 (USSR)

ABSTRACT: The authors point out that to be useful in technology, studies of diffusion with reaction should involve mixtures of gases as well as of solid phases. The general aim is to study such diffusion (especially gas corrosion and processes for making high-temperature coatings) and find practical methods of regulating these processes: for this many particular cases of systems of the type "solid element - mixture of two chemically active gaseous components" can be formulated. The authors discuss the significance of the type of equilibrium diagram of binary and ternary systems of the elements participating in diffusion with reaction. They examine three main types of pseudobinary systems in which reaction of the three components forms a scale with a phase composition corresponding to variations in the character

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Investigation of Reaction Diffusion in "Metal-Complex Gas" Systems. I. General Picture of the Phenomenon

of pseudobinary equilibrium diagrams formed by chemical compounds contained in binary systems of the metal with each of the components separately. The authors also consider briefly the significance of the type of crystal structure of phases formed in the scale and finally indicate the possible importance of other factors, such as phase transformations in the metal during solution in it of the gaseous elements or formation of deposits on the solid surface through gas-phase reactions.

ASSOCIATION: Ural'skiy gosudarstvennyy universitet im. A.M. Gor'kogo (Ural State University imeni A.M. Gor'kiy)

SUBMITTED: November 2, 1959

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19.8300

AUTHORS: Konev, V.N., Bogacheva, N.G. and Arkharov, V.I.

TITLE: Investigation of Diffusion with Reaction in the System "Metal-Complex Gas". II. The System Chromium - Sulphur-Dioxide

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 3, pp 358-361 (USSR)

ABSTRACT: This is a continuation of work by Arkharov and Konev (Ref 1) to investigate the physical mechanism of diffusion with reaction in systems of the type solid-metal-mixture of chemically active gases. This information is necessary for developing non-scaling materials and understanding their failures in service. The present work deals with Cr-O-S. Parallelepiped specimens (1.0 to 1.5 cm side) of technical chromium were suspended in a heated sealed quartz tube at 600 to 1200°C; the apparatus and procedure were described previously (Ref 2 to 6). Fig 1 shows gains in weight of specimens at the various temperatures (except 600 and 1200°C) per unit of surface as functions of time (hours). Fig 2 shows a plot of the logarithm of the rate constant

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Investigation of Diffusion with Reaction in the System "Metal-Complex Gas". II. The System Chromium - Sulphur-Dioxide

against reciprocal of absolute temperature, the points relating to those in Fig 1, where the curves become horizontal. Specimens exposed under various conditions were subjected to qualitative X-ray analysis: a feature was the appearance of a new phase. Fig 3 shows lines from the outside (a) and inner (б) layers of a specimen oxidized in sulphur dioxide at 1200°C, some doubling of lines being evident in the latter. No texture in the outer layer of scale could be detected on any specimen. The scale contained 9.23 weight % of combined sulphur, according to analyses carried out in the Mineral Salts Laboratory of UNIKhIM. Heating of mixtures of Cr_2O_3 and CrS, or Cr_2O_3 and Cr_2S_3 at 800°C for 8 to 10 hours in vacuo (table gives compositions of mixtures and products) did not give the new phase present in the scale. The non-scaling properties of specimens previously treated under conditions producing the new phase were suspended in air at 1000 and 1100°C: in 12 hours no weight increase took place and the new phase remained. The investigation

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showed that oxidation of chromium with sulphur dioxide becomes appreciable at 700°C, the rate being a whole order less than with air (Ref 2, 5,7). The process goes in two stages: formation of Cr_2O_3 on the chromium surface; formation of a new phase with practical cessation of reaction. Reaction diffusion in the system studied occurs by way of diffusion of both oxygen and sulphur through the scale to the metal; beyond a definite sulphur content in the scale a new phase, preventing further diffusion is formed. There are 3 figures, 1 table and 9 references, 8 of which are Soviet and 1 English.

ASSOCIATION: Ural'skiy gosudarstvennyy universitet im. A.M.Gor'kogo (Ural State University imeni A.M.Gor'kiy)

SUBMITTED: November 2, 1959

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E193/E483

5.2600

AUTHORS: Konev, V.N., Bogacheva, N.G. and Pavlova, V.P.

TITLE: On the Problem of the Structure of Chromium Sulphides

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 3, pp 475-478 (USSR)

ABSTRACT: It was observed by the present authors, in the course of an earlier investigation (Ref 1,3), that qualitative phase analysis of the products of reaction between chromium and sulphur, taking place under identical conditions, sometimes gave different results which indicated the possibility of the structure of these products being affected by the cooling rate. The object of the investigation, described in the present paper, was to check this hypothesis by studying the effect of the cooling rate on the structure of chromium sulphides formed at elevated temperatures. The experimental materials were prepared from chromium and sulphur powders. The carefully weighed and mixed charges, placed in sealed evacuated quartz ampoules, were inserted in an electrical furnace, heated slowly to the test temperature and maintained at this temperature for 5 h. Some

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On the Problem of the Structure of Chromium Sulphides

specimens were quenched in water directly from a vertical furnace, others were cooled to the room temperature in the furnace; one portion of the quenched specimen was subjected to a vacuum annealing (10 h at 300°C). The structure of specimens obtained in this manner was studied by X-ray diffraction using K-Cr radiation. The results are given in a table on p 476 under the following headings: stoichiometric composition of the compounds; conditions during preparation (heating the powders to 1000°C in 6 h and holding at the temperature for 5 h; heating to 800°C in 6 h and holding at the temperature for 5 h; dittos; heating to 1000°C in 6 h and holding at the temperature for 5 h); subsequent heat treatment (water-quenched from 1000°C; water-quenched from 800°C; furnace-cooled from 800°C; water-quenched from 800°C and vacuum annealed at 300°C; ditto; furnace-cooled from 800°C; water-quenched from 800°C; water-quenched from 1000°C); results of X-ray phase analysis (super-structure CrS, according to Haraldsen, Ref 3; ditto; Cr_5S_6 according to Jellinek

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On the Problem of the Structure of Chromium Sulphides

Ref 4, plus Cr; ditto; Cr_2S_3 according to Jellinek; dittos). Several conclusions were reached namely:
(1) The phase corresponding to the stoichiometric formula CrS is unstable at room temperature.
(2) A phase of the composition near to CrS, existing at high temperature, decomposes on cooling, yielding a chromium-rich phase Cr_5S_6 and metallic chromium.
(3) Phase of the composition Cr_2S_3 is stable at room temperature. There are 1 table and 4 references, 2 of which are Soviet, 1 German and 1 English.

ASSOCIATION: Ural'skiy gosudarstvennyy universitet im A.M.Gor'kogo (Ural State University imeni A.M.Gorkiy)

SUBMITTED: November 12, 1959

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E111/E352

AUTHORS: Asanova, M.P., Gerasimov, A.F. and Konev, V.N.

TITLE: Investigation of Diffusion with Reaction in "Metal-Complex Gas" Systems. III. The System Nb-(B + N)

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 5, pp 689 - 694 (USSR)

ABSTRACT: This is a continuation of a series of investigations on diffusion with reaction in systems of the type "metal - mixture of two chemically active gases" (Refs 1-5). It deals with niobium, boron, and nitrogen, and begins with a study of the binary niobium-boron system for which insufficient data are available (Refs 6,7). Work on reaction diffusion in this binary system (Refs 6,7,16) has so far mainly dealt with the thermodynamics of the process. In the present investigation the authors used 5 x 5 x 20 mm parallelipiped specimens of niobium suspended by molybdenum wire in a porcelain tube to which BCl_3 could be supplied with or without hydrogen, molecular nitrogen and/or ammonia. The apparatus is shown in Figure 1. Figure 2 shows the squares of increase in weight

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Investigation of Diffusion with Reaction in "Metal-Complex Gas" Systems. III. The System Nb-(B + N)

of specimens as functions of time for $BCl_3 + H_2$ at 700 to 1 200 °C. The logarithms of the parabolic constants of these curves are plotted against reciprocal of the absolute temperature in Figure 3 and their values are given in Table 2. Table 1 gives the number of phases detected metallographically, the results of X-ray phase analysis and the growth law of the diffusion layer: there was no texture in the scale layers. It was found that reaction diffusion in a ($BCl_3 + H_2$) atmosphere attained appreciable speed at 700 °C and follows the parabolic time law for the whole range up to 1 200 °C. Rate-constant changes had no simple linear relation with temperature: apparent activation energy rises continuously with temperature. Introduction of ammonia into the atmosphere had no effect on the course of the process and nitrogen took no part in the diffusion. The work showed that in the niobium-boron system reaction diffusion is mainly by boron atoms through the chemical-reaction products

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Investigation of Diffusion with Reaction in "Metal - Complex Gas" Systems. III. The System Nb - (B + N)

to the metal. Without hydrogen $BCl_3 + N_2$ gives rise to volatile compounds of niobium with chlorine. Boride coatings protect niobium from the action of hydrochloric, sulphuric and nitric acids at room temperature but not from oxidation at 1 000 °C and over. Professor V.I. Arkharov advised in the discussion of results. There are 4 figures, 2 tables and 19 references, 13 of which are Soviet, 3 English, 1 German and 2 Scandinavian.

ASSOCIATION: Ural'skiy gosudarstvennyy universitet im. A.M. Gor'kogo (Ural State University imeni A.M. Gor'kiy)

SUBMITTED: November 12, 1959

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AUTHORS: Arkharov, V.I., Konev, V.N. and Gerasimov, A.F.

TITLE: Investigation of Diffusion with Reaction in "Metal - Complex Gas" Systems. IV. The System Molybdenum-nitrogen-carbon

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 5, pp 695 - 700 (USSR)

ABSTRACT: This reports a further investigation by this school on diffusion with reaction in systems of the "metal - mixture of two chemically-active gases" type (Refs 1-7). V. Negodyayev and G. Tatymov participated in the experiments, which were carried out on the binary molybdenum-nitrogen (method described in Refs 15, 16) and molybdenum-carbon systems (method described in Refs 11,12) and then on the ternary molybdenum-nitrogen-carbon system (method described in Refs 3,4). Figure 1 shows increases in weight of molybdenum specimens in ammonia vapour as functions of time for 700 - 1 120 °C, Figure 3 the corresponding curves for a benzene-hydrogen atmosphere at 1 000 - 1 200 °C, and Figure 4 for a benzene-ammonia atmosphere at 1 000 - 1 200 °C. The dependence of the

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Investigation of Diffusion with Reaction in "Metal - Complex Gas" Systems. IV. The System Molybdenum-nitrogen-carbon

logarithm of the parabolic constant on reciprocal of absolute temperature is shown for all the systems in Figure 2 and the values of the constant are given in Table 2. The lines consist of three straight sections and the authors give a physical interpretation of this. Table 1 gives for all the systems the number of layers detected metallographically, the results of phase X-ray analyses and the presence or absence of texture at the various temperature ranges. Texture was found only in Mo-C at 1 200 °C. The work showed that molybdenum-nitrogen reaction in an ammonia atmosphere proceeds appreciably at 700 °C following the parabolic law up to 1 150 °C, above which molybdenum nitrides were not formed. At 700 - 940 °C a scale of an outer layer of MoN with a simple hexagonal lattice and an inner layer of Mo_2N with a face-centred cubic lattice was produced. There was no reaction between molybdenum and molecular nitrogen at atmospheric pressure and 600 - 1 200 °C. The reaction with carbon (from benzene + hydrogen) proceeded appreciably at

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Investigation of Diffusion with Reaction in "Metal - Complex Gas" Systems. IV. The System Molybdenum-nitrogen-carbon

1 000 °C following the parabolic law up to 1 200 °C and producing a single diffusion layer consisting of Mo_2C with a hexagonal lattice. Diffusion in the ternary system also follows the parabolic law at 1 000 - 1 200 °C, giving a single diffusion layer consisting of $Mo_2(C_{1-x}N_y)$ with a Mo_2C lattice. The work showed that in all the systems there is a preferential diffusion of nitrogen and carbon atoms to the metal through the reaction products, Nitriding is quicker than carburization and the rate of the combined process is intermediate with nitrogen accelerating carbon diffusion into molybdenum. There are 4 figures, 2 tables and 16 references, 15 of which are Soviet and 1 German.

ASSOCIATION: Ural'skiy gosudarstvennyy universitet imeni A.M. Gor'kogo (Ural State University imeni A.M. Gor'kiy)

SUBMITTED: December 23, 1959

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AUTHORS: Arkharov, V.I., Konev, V.N. and Pavlova, V.P.

TITLE: Investigation of Diffusion with Reaction in "Metal - Complex Gas" Systems. V. The System Chromium-Sulphur-Nitrogen

PERIODICAL: Fizika metallov i metallovedeni-e, 1960, Vol 9, Nr 5, pp 701 - 708 (USSR)

ABSTRACT: This is a further contribution to the series of researches by this school on diffusion with reaction in systems of the "metal - mixture of two chemically-active gases" type (Refs 1-7). In the work the authors extended their previous experiments on the chromium-sulphur system (Ref 10) before proceeding to the ternary system with nitrogen. Hollow cylindrical (sometimes parallelipiped) specimens of electrolytic chromium were suspended by quartz in a furnace (Figure 1). For the binary system the heated vertical quartz tube was evacuated and its lower end was kept at 250 °C to give a sulphur vapour pressure of 12 mm Hg. For the ternary system the tube after evacuation was connected to a source of pure nitrogen. The products were examined as described

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Investigation of Diffusion with Reaction in "Metal - Complex Gas" Systems. V. The System Chromium-sulphur-nitrogen

previously (Refs 1,8,9,12). The experiments were carried out at 700, 800, 900 and 1 000 °C at a constant sulphur partial pressure; nitrogen pressure was constant at 25 to 30 mm Hg (gauge). Table 1 gives the number of layers detected metallographically, the results of X-ray phase analysis, presence or absence of texture and the microscopic characteristics of the diffusion mechanism. Figure 2 shows typical appearance of a specimen initially and after treatment at 1 000 and 700 °C. Figure 3 shows a section through a specimen sulphided at 1 000 °C for 1 hour and Figures 4a and 4b one through a specimen treated with sulphur + nitrogen for 4 hours at 1 000 and 2 hours at 700 °C, respectively. The weight-gains of specimens under the various conditions are shown as functions of time in Figure 5 and the logarithm of the parabolic constant of the rate curves as functions of reciprocal of absolute temperature in Figure 6 (linear for the binary, complex for the ternary). Reaction diffusion in both systems follows the parabolic law for 700 - 1 000 °C (constant

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E111/E352

Investigation of Diffusion with Reaction in "Metal - Complex Gas" Systems. V. The System Chromium-sulphur-nitrogen

values are given in Table 2). The rate of scaling of the binary is greater than that of the ternary system. In the binary system the outer light layer approximates to Cr_2S_3 at 1 000 °C and Cr_3S_4 at 700 °C, while the dark inner layer approximates to Cr_5S_6. The work showed that in this system the reaction diffusion involves movement of the components in both directions through the scale layer, the relative importance of chromium growing with increasing temperature. In the ternary system the process depends on diffusion of sulphur and nitrogen through crystal lattices to the metal and of chromium to the scale outer surface. There are 6 figures, 2 tables and 16 references, 13 of which are Soviet, 2 German and 1 international.

ASSOCIATION: Ural'skiy gosudarstvennyy universitet im. A.M. Gor'kogo (Ural State University imeni A.M. Gor'kiy)

SUBMITTED: December 23, 1959

Card3/3

187530

24577 S/137/61/000/005/030/060
A006/A106

AUTHORS: Arkharov, V. I., and Konev, V. N.

TITLE: On the joint diffusion of two elements into solid metal

PERIODICAL: Referativnyy zhurnal. Metallurgiya, no. 5, 1961, 2-3, abstract 5Zh15 ("Tr. Seminara po zharostoykim materialam" [In-t metallo-keramiki i spets. splavov AN USSR, no. 5] Kiyev, 1960, 37-42)

TEXT: A theoretical analysis is made of the joint diffusion of 2 elements into a third one in systems of a solid metal and a mixture of two chemically active gases: Me - (X' + X"). Phase diagrams of the systems formed by compounds which exist in the binary systems of the Me-X type, are classified. Cases are analyzed where the solubility of X' and X" is unlimited, limited and absent in the binary compounds of the pseudo-binary system $Me_nX'_m$ - $Me_pX"_q$. In the first case the diffusion layer consists of a single phase with a concentration gradient decreasing along the depth of the layer for both components. In the second case the surface layer consists of a phase with a higher content of the element with least diffusional mobility. At a certain depth a layer of another phase may exist with a higher concentration of elements with a greater diffusional mobility.

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On the joint diffusion ... 24577 S/137/61/000/005/030/060
A006/A106

In the 3rd case on the metal surface first a layer is formed (or layers) consisting of phases which exist in the binary system: metal-element with a high chemical affinity with the metal. If X' and X" interact, then the process will be determined and regulated by the reaction of the metal with the excessive element and with the phase of gaseous components formed again. The mechanism of diffusion in binary systems affects the diffusion mechanism in the system Me-(X' + X"). Some factors are studied which affect the kinetics of the processes. The second case is experimentally confirmed by V. N. Konev and V. I. Arkharov and others (RZhMet, 1959, no. 11, 24702; "Fiz. metallov i metallovedeniye" 1952, v. 5, 192). The first and third case were not specially studied.

I. L.

[Abstracter's note: Complete translation]

Card 2/2

34537

S/659/61/007/000/024/044
D217/D303

18.1735

AUTHORS: Arkharov, V.I., and Konev, V.N.

TITLE: Investigating the diffusion kinetics for reaction within systems consisting of metals with complex vapors

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam, v. 7, 1961, 221 - 226

TEXT: An analysis of various structures found in the diffusion layers of diffusion-reaction products, within systems consisting of metals in the presence of two chemically active gases, was carried out. Structural pictures of diffusion-reactions were obtained for the systems Cr-O, Cr-C, Cr-N, Cr-S, Cr-S-N, Cr-S-O, Cr-N-O and Cr-N-C. The structural pictures obtained were tied up with general theories on the reaction mechanism of complex systems of the above type. It was established that it is possible in principle to use diffusion-reaction layers in the systems Cr-C, Cr-C-N, Cr-O-S as protective coats. There are 1 figure, 1 table and 4 Soviet-bloc references.

Card 1/1

X

187530

S/126/61/011/004/014/023
E111/E435

AUTHORS: Gerasimov, A.F., Konev, V.N. and Timofeyeva, N.F.

TITLE: Investigation of Reaction Diffusion in "Metal-Complex Gas" Systems. VI. The System Tungsten-Carbon-Nitrogen

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.4, pp.596-600

TEXT: This work deals with reaction diffusion in the systems W-C, W-N and W-C-N at temperatures up to 1200°C including kinetic studies of carbiding, nitriding and carbonitriding and X-ray determination of the phase composition of the products. It is a continuation of the work of these and other workers of the Arkharov school in this field (Ref.1-9). No such investigation on the W-C-N system has been reported. For W-C reaction diffusion was effected by previously described methods (Ref.8,16). The reaction with a paraffin-hydrogen atmosphere starts to become appreciable at 1000°C and, as do the other reactions studied, it follows the parabolic time law up to the maximum temperature (1200°C). The outer layer was found metallographically and by X-ray diffraction to consist of WC and the inner of W_2C. No texture in the first

was found. The diffusion was uni-directional, from gas through scale to the metal. Reaction of tungsten with ammonia in a previously-described apparatus became appreciable at 1000°C, giving an outer layer of WN and an inner of W_2N. Additional experiments confirmed that the upper temperature limit for the existence of these phases in an ammonia atmosphere is 1100 to 1200°C. For the ternary system, the method was similar to that previously used (Ref.3,8). X-ray diffraction showed that the diffusion layer on tungsten annealed in a mixture of paraffin vapour and ammonia is again WC and W_2C; but the presence of nitrogen in the atmosphere (although carbon partial pressure is unchanged) retards carbon diffusion in tungsten. This is contrary to observations on Cr-C-N (Ref.3,4), Mo-C-N (Ref.8) and Fe-C-N (Ref.20) and is not explicable in terms of activation energies of diffusion for carbon and nitrogen. The authors conclude from their diffusion studies on W-C-N systems that there is preferential diffusion of nitrogen and carbon through reaction products in all these systems. Professor V.I.Arkharov showed an interest in this work. There are 2 figures, 1 table and 20 references: 18 Soviet and 2 non-Soviet.