

USSR / Farm Animals. Silkworm.

Abs Jour: Ref Zhur-Biol., No 9, 1958, 40569.

Author : Smolin, A. N., Zhizhina, Ye. I.

Inst : Not given.

Title : The Distribution of Phosphorus in Various Fractions During the Period of the Development of the Cocoon of Oak-Feeding Silkworm.

Orig Pub: Uch. zap. Mosk. gos. ped. in-t, 1957, 98, 119-128.

Abstract: The changes in the content of the various P fractions in the body of the cocoons of males and females of the oak-eating silkworm was studied. The content of the total P in the dry tissue during the whole period of development is high. The considerable P content of proteins and fats at the beginning of the cocoon phase decreases sharply before long,

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USSR / Farm Animals. Silkworm. Q

Abs Jour: Ref Zhur-Biol., No 9, 1958, 40569.

Abstract: and on the third day drops to zero; from the 7th day on, and up to the moment of the emergence of the moth, it gradually increases. In accordance with a decrease of the P of proteins and fats the amount of inorganic P during the first days increases sharply, and from the 7th day on, drops abruptly. Around the 7th day of the cocoon phase, synthetic processes begin to develop; this is accompanied by a continuous increase in the amount of the organic soluble P which only slightly decreases during the last days. A detailed description of the technique used in the analyses is given.

Card 2/2

USSR / Farm Animals. SILKWORM.

Abs Jour: Ref Zhur-Biol., No 9, 1958, 40570.

Author : ~~Smolin, A. N.~~, Gudalina, N. G.

Inst : Not given.

Title : Glycogen in the Tissues of the Cocoon of the  
Oak-Feeding Silkworm During the Period of  
Metamorphosis.

Orig Pub: Uch. zap. Mosk. gos. ped. in-t, 1957, 98,  
129-135.

Abstract: The regularities of the change of the content  
of glycogen in the tissues of the cocoons of  
males and females of the oak-feeding silkworm  
during metamorphosis were determined. The  
high content of glycogen on the first day of  
life of cocoon (up to 6%) drops in the first  
one third of this phase to 1/4-1/5 of the  
original amount; from the 7th through the 15th

Card 1/2

76

SMOLIN, A.N., PRAVDINA, N.F.

Interrelation of carbohydrate and nitrogen metabolism in tussah  
moth pupae during metamorphosis [with summary in English].  
Biokhimiia 23 no.6:819-823 N-D '58 (MIRA 11:12)

1. Laboratoriya organicheskoy i biologicheskoy khimii Moskovskogo  
gosudarstvennog pedagogicheskogo instituta imeni V.I. Lenina.  
(SILKWORMS)  
(INSECTS--DEVELOPMENT)  
(METABOLISM)

PRAVDINA, N.F.; SMOLIN, A.N.

Synthesis and decomposition of glycogen in the organism of the chrysalis of Chinese tussah moth during metamorphosis. Uch. zap. MGPI 140:255-260 '58. (MIRA 16:8)

1. Iz laboratorii organicheskoy i biologicheskoy khimii Moskovskogo gosudarstvennogo pedagogicheskogo instituta imeni Lenina.

YEGOROVA, T.A.; SMOLIN, A.N.

Trehalose in the body of the tussah moth at various stages of its development. Biokhimiia 27 no.3:476-480 My-Je '62. (MIRA 15:8)

1. Chair of Organic and Biological Chemistry, State Pedagogical Institute, Moscow.

(MOTHS) (TREHALOSE)

YEGOROVA, T.A.; SMOLIN, A.N.

Localization and sources of trehalose biosynthesis in the  
organism of the oak silkworm. Dokl. AN SSSR 147 no.1:224-226  
N '62. (MIRA 15:11)

1. Moskovskiy gosudarstvennyy pedagogicheskiy institut  
im. V.I. Lenina. Predstavleno akademikom N.M. Sisakyanom.  
(Silkworms) (Trehalose)

SMOLIN, A.N.; SMOLIN, Yu.N.

Using zircon paint at Chelyabinsk foundries. Lit. proizv. no.6:  
37-38 Je '64. (MIRA 18:5)



SMOLIN, A.P., inzhener

Experience in operating and repairing the E-505 excavator. Mekh.  
stroi. 12 no.8:13-18 Ag'55. (MLRA 8:10)  
(Excavating machinery)

SMOLIN, Aleksandr Petrovich; SHIMANOVICH, S.V., inzh., retsenzent;  
KRIMERMAN, M.N., inzh., red.; TIKHANOV, A.Ya., tekhn. red.

[E-505 and E-505A (E-651) power shovels; design, operation, and  
repair] Ekskavatory E-505 , E-505A (E-651); konstruktsiia,  
ekspluatatsiia i remont. Moskva, Gos. nauchno-tekhn. izd-vo  
mashinostroit. lit-ry, 1958. 258 p. (MIRA 11:9)  
(Shoveling machines)

AUTHOR: Smolin, A.P., Engineer SOV/118-58-1-14/16

TITLE: The Building of a Railroad Dam Across the Great Salt Lake  
(Stroitel'stvo zheleznodorozhnoy damby cherez Bol'shoye So-  
lenoye ozerc)

PERIODICAL: Mekhanizatsiya trudoyemkikh i tyazhelykh rabot, 1958, Nr 1,  
pp 45-46 (USSR)

ABSTRACT: This is a short description of the building of the new rail-  
road dam across the Great Salt Lake in the USA.  
There are 2 drawings.

1. Dams--Construction 2. Tracks (Railroad)

Card 1/1

SMOLIN, A. P., and MIKHAIL MIKHAILOVICH VOITKEVICH.

Rukovodstvo po tekhnicheskoi eksploatatsii samoletov i motorov  
dlia aeroklubov i shkol Osoaviakhima; Moskva, Osoaviakhim SSSR, 1936.  
180 p., illus., tables, diags.

Title tr.: Manual of aircraft and engine operation.

TL670.V562

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of  
Congress, 1955.

3. ... .., 197-

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... ..  
Collection of the original, as determined from ... ..

Microfilm, Slavic ... AC

SMOLIN, A. P.

SMOLIN, A. P.

Nekotorye voprosy eksploatatsii samoletnykh lyzh. (Vestnik vozdushnogo flota, 1938, no. 11, p.67-77, illus.)

Title tr.: Some problems in the use of airplane skis.

TL504.v45 1938

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

*Smolin, A.P.*

86-1-30/30

AUTHOR: Smolin, A.P., Engr Col in the reserves

TITLE: The Aircraft of the French Air Force (Samolety VVS Frantsii)

PERIODICAL: Vestnik Vozdushnogo Flota, 1958, Nr 1, pp. 91-96 (USSR)

ABSTRACT: This is a review of the types of combat and training planes, helicopters, and guided missiles the French Air Force is equipped with. Six photos.

AVAILABLE: Library of Congress

Card 1/1

SMOLIN, A.P.; IVASHUTIN, L.R., retsenzent; OTDEL'NOV, P.V., inzh.,red.  
Izd-va; MODEL', B.I., tekhn.red.

[E-652 and E-651 excavators; design, operation and repair]  
Ekskavatory E-652 i E-651; konstruktsiia, ekspluatatsiia i  
remont. Izd.2., perer.i dop. Moskva, Mashgiz, 1963. 338 p.  
(MIRA 16:6)

(Excavating machinery)



SMOLIN, A. V.

Smolin, A. V.

"Thermountain schools of the Altay in the 18th and 19th centuries."  
Academy of Pedagogical Sciences RSFSR. Inst of the History and Theory  
of Pedagogy. Kemerovo, 1956. (Dissertation for the Degree of Candidate  
in Pedagogical)

Knizhnaya letopis'

No. 21, 1956. Moscow.

SMOLIN~~Y~~, D. D.

"Recherches dans le domaine de la synthese dans la serie des derives du 7-oxycoumarine".  
Nesmejanov, A. N., Vompe, A. F., Zarevitch, T. S., Smoline, D. D. (p. 2767).

SO: Journal of General Chemistry (Zhurnal Obshchei Khimii). 1937, Volume 7, No. 22.

SMOLIN, D.D.  
CA

**Anthraquinone series. XIV. *q,q'*-Disulfonic acids of anthraquinone.** V. V. Kozlov and D. D. Smolin. *Zhur. Obshchaya Khim.* (J. Gen. Chem.) 19, 740-4 (1949); *cl. C.A.* 42, 359v; 43, 3815a. — 1,5-Anthraquinonedisulfonyl chloride (4 g.) (from the di-K salt and PCl<sub>5</sub>) ground carefully with 8 ml. ice water at 5-10° and slowly treated with 4.8 g. Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub> in 9 ml. H<sub>2</sub>O, with the temp. kept under 40°, gave after 30 min. stirring, filtration, and acidification to Congo red with HCl, the crude 1,5-disulfonic acid, 83.5% pure product, hygroscopic but not deliquescent, which after 2 reprecip. from 10% NH<sub>4</sub>OH with HCl gave forms a tetrahydrate on long standing in the air, sol. in 5 parts H<sub>2</sub>O at 20°, slowly oxidized by 0.1 N KMnO<sub>4</sub>, readily titrated with 0.1 N NaOH to methyl red endpoint; its di-K, di-Na, di-(NH<sub>4</sub>), di-Ag, Mg, and Ca salts are sol. in H<sub>2</sub>O; soln. of the acid in H<sub>2</sub>O, neutralization with NH<sub>4</sub>OH, and boiling off the excess NH<sub>3</sub> gave the following salts by double decomp.: Cu (2H<sub>2</sub>O), yellow plates (from H<sub>2</sub>O), sol. 1:75 in H<sub>2</sub>O at 20°, 1:25 at 100°; Ni (2H<sub>2</sub>O), yellow plates (from H<sub>2</sub>O), sol. 1:125 and 1:50, resp., at 20° and 100°; Pb (H<sub>2</sub>O), yellowish plates (from H<sub>2</sub>O), insol. at 20°, very poorly sol. at 100°; Ba, yellow needles (from EtOH), insol.; Zn (3H<sub>2</sub>O), yellow needles, in 8- (from EtOH), insol.; Zn (3H<sub>2</sub>O), Addn. of 0.84 g. free acid in 50 ml. 0.1 N NaOH to 2.75 g. hot HgCl<sub>2</sub> decomp. 340°, yielding HgCl<sub>2</sub> and anthraquinone. 1.8 ml. H<sub>2</sub>O gave 1.5 g. yellow ppt., C<sub>14</sub>H<sub>8</sub>O<sub>6</sub>S<sub>2</sub>HgCl<sub>2</sub>, treated with Anthraquinonedisulfonyl chloride, m. 221.5°, filtration, and Na<sub>2</sub>S as above gave after 30 min. at 40°, filtration, and addn. of 100 ml. concd. HCl, 77.5% crude 1,8-disulfonic acid, which is very difficult to purify because of its high soly. in most org. solvents except hydrocarbons; the product is a monohydrate which does not lose H<sub>2</sub>O in vacuo over

P<sub>2</sub>O<sub>5</sub> and is very hygroscopic; its di-K, di-Na, di-(NH<sub>4</sub>), di-Ag, and Mg salts are sol. in H<sub>2</sub>O; the following salts were made from the di-(NH<sub>4</sub>) salt: Cu (3H<sub>2</sub>O), yellow plates (from H<sub>2</sub>O or EtOH), sol. 1:125 at 20° and 1:115 at 100° in H<sub>2</sub>O; Ni (5H<sub>2</sub>O), scales (from H<sub>2</sub>O or EtOH), sol. 1:340 at 20° and 1:165 at 100°; Pb (H<sub>2</sub>O), plates (from H<sub>2</sub>O or EtOH), sol. 1:650 at 20° and 1:275 at 100°; Ca (4H<sub>2</sub>O), crystals (from H<sub>2</sub>O), sol. 1:850 at 20° and 1:68 at 100°; Ba (2H<sub>2</sub>O), plates (from H<sub>2</sub>O or EtOH), crystals (from H<sub>2</sub>O), sol. 1:145 at 100°; Zn (4H<sub>2</sub>O), crystals (from H<sub>2</sub>O), sol. 1:200 at 20° and 1:95 at 100°. Similarly, 1,4-anthraquinonedisulfonyl chloride treated with Na<sub>2</sub>S and kept 0.5 hr. at 40°, filtered, cooled to 2°, and acidified with concd. HCl, followed by satn. with dry HCl for 15-30 min. with cooling gave a granular 1,4-disulfonic acid, obtained on vacuum drying over NaOH in 90% yield, very sol. in H<sub>2</sub>O, EtOH, Me<sub>2</sub>CO, somewhat sol. in xylene, and almost insol. in hydrocarbons; most of its salts are sol. in H<sub>2</sub>O. The acids have the following m.p.: 1,5, 220°, 1,8, 171°, and 1,4, 154°. XV. 1,5-Mercaptoanthraquinone (2.38 g.) containing unsymmetric compounds of anthraquinone. *Ibid.* 745-51. — 1,5-Diaminoanthraquinone (2) ml. concd. ground with 2 ml. glycerol was mixed with 2) ml. concd. HCl, refluxed 30 min., cooled to 40-50°, diazotized with 8.7 ml. 20% NaNO<sub>2</sub>, filtered after 2 hrs., and treated with 8.7 g. yellow Hg oxide in 5) ml. 30% HCl and 3) ml. H<sub>2</sub>O. The pink needles, filtered after 2-3 hrs., washed with ice water and EtOH, and vacuum-dried represented a 47% yield of HgCl<sub>2</sub> salt of the diazonium deriv., C<sub>14</sub>H<sub>8</sub>O<sub>6</sub>N<sub>2</sub>Cl<sub>2</sub>. This Hg<sub>2</sub> decomp. 330°, sol. in H<sub>2</sub>O, EtOH, Me<sub>2</sub>CO. This (8.7 g.) suspended in 50 ml. dry Me<sub>2</sub>CO, treated with stirring at 20-30° with 2.5 g. Cu bronze, let stand overnight, filtered, the ppt. washed with hot EtOH, and the filtrate treated with charcoal and concd. gave 9.8 g. crude

product (m. 136-44°), purified by 40 hrs. extn. with hot-xylene and concn. until it m. 230-40° (it was still impure); extn. for 5 days with cold EtOH gave some 1,5-dichloroanthraquinone, m. 243°, while the residue contained Hg and Cl; treatment of the xylene extn. residue with 30% HNO<sub>3</sub> 12 hrs. and washing with H<sub>2</sub>O and hot EtOH gave 27% 1,5-bis(chloromercuri)anthraquinone (I). This (1.0 g.) suspended in 15 ml. KOH in 60 ml. dry MeOH and refluxed 6 hrs. gave a brown-black ppt. (90.4%) of 1,5-C<sub>10</sub>H<sub>6</sub>O<sub>2</sub>-

(HgOH), in-sol. in the usual solvents. This (0.5 g.) added to 10 ml. stirred concd. H<sub>2</sub>SO<sub>4</sub> at 0°, filtered, and carefully dild. to 3 vols. with H<sub>2</sub>O gave 95.5% 1,5-C<sub>10</sub>H<sub>6</sub>O<sub>2</sub>(HgSO<sub>4</sub>H), sol. only in weak oleum. I is recovered unchanged after 1.5-2 hrs. in 5% oleum at 15°, but 10% oleum gives upon treatment with ice water 86% of a mixed salt, apparently an (HgCl)(HgSO<sub>4</sub>H) deriv., decomp. 350°; 10% oleum 6 hrs. at 30° gave 94.5% of the di-(HgSO<sub>4</sub>H) deriv., which is obtained in 85.9% yield with 15% oleum 6 hrs. below room temp. The product (4 g.) treated with 12 g. 10% oleum 30 min. at 140° and salted out with KCl gave 0.56 g. salt of a disulfonic acid, which yielded 1,5-dichloroanthraquinone, m. 241°, and 2.8 g. Hg deriv. was recovered; 4.8 g. 25% oleum 1.5 hrs. at 140° gave 0.05 g. crude anthraquinone (insol.) and the mother liquor on salting out gave 2 g. di-K anthraquinonedisulfonate, yielding pure 1,5-dichloroanthraquinone (identifying the acid as the 1,5-isomer). XVI. 1,8-Mercury derivatives of anthraquinone (unsymmetric). *Ibid.* 863-8; cf. Danilov and Kor'mina. *C.A.* 43, 6570c.—Di-Na 1,8-

anthraquinonedisulfonate (1.04 g.) in 40 ml. 0.1 N NaOH added to 5 g. HgCl<sub>2</sub> in 20 ml. hot H<sub>2</sub>O, boiled 3 hrs., with aqdn. of 0.1 N NaOH until the soln. is clear initially, gave 2.87 g. 1,8-bis(chloromercuri)anthraquinone, R(HgCl), which (1 g.) suspended in 15 g. KOH in 60 ml. dry MeOH and refluxed 6 hrs. gave 86.16% of the (hydroxymercuri) analog, green-grey powder. The latter (0.5 g.) in 10 ml. concd. H<sub>2</sub>SO<sub>4</sub> mixed at 0° and carefully dild. with 3 vols. H<sub>2</sub>O gave 88% 1,8-C<sub>10</sub>H<sub>6</sub>O<sub>2</sub>(HgSO<sub>4</sub>H), an infusible solid; further dildn. of the filtrate gave some anthraquinone; the same sulfate is obtained in 77% yield upon keeping the HgCl deriv. in 10% oleum 6 hrs. at 30-5° or in 18% oleum 6 hrs. in the cold (73% yield). The sulfate (4 g.) treated with 12 g. 10% oleum at 140° 0.5 hr. gave 0.29 g. 1-anthraquinonesulfonic acid (as the chrysoiline salt), and 0.45 g. 1,8-anthraquinonedisulfonic acid (isolated as the di-K salt by salting out), while extn. of the residue with AcOH gave 2 g. unreacted sulfate and 0.3 g. of apparently 1-sulfoanthraquinonylmercury sulfate (assumed to be the 8-isomer), brown, darkening at 325° (from dil. AcOH). Sulfonation with 25% oleum at 140° 1.5 hrs. gave 0.08 g. 1-anthraquinonesulfonic acid, 0.19 g. di-K 1,5-disulfonate, and 1.71 g. di-K 1,8-disulfonate; the insol. residue was free of Hg and gave pure anthraquinone on distn. Hence, the 1,8-(bism mercury sulfate) gives a wider variety of products on sulfonation than the 1,5-isomer because of greater thermal lability of the Hg intermediate.  
G. M. Kowaloff

SMOLIN, D. D.

183743

USSR/Chemistry - Production of Ketene May 51

"Brief Communication: Large-Scale Laboratory Apparatus for Production of Ketene," D. D. Smolin, F. R. Kravtsov, A. P. Skoldinov, Sci Res Lab Exptl Chemotherapy, Min Public Health USSR

"Zhur Prik Khim" Vol XXIV, No 5, pp 547-551

Describes new large-scale lab ketene generator, made entirely of metal, yielding 200-400 g/hr of ketene, depending on regime. It is based on principle of pyrolysis of acetone on open elec heating elements (spirals) placed in atm of acetone.

183743

SMIRNOVA, N.V., ARENDARUK, A.P., SMOLIN, D.D., SKOLJINOV, A.P.

Esters of N-(arylalkyl)-4-phenylisonipecotic acid. Med.prom.12 no.7  
31-35 J1 '58 (MIRA 11:8)

1. Institut farmakologii i khimioterapii AMN SSSR.  
(NIPPECOTIC ACID)

MIKHALEV, V.A.; DOROKHOVA, M.I.; SMOLINA, N.Ye.; ZHELOKHOVTSEVA, A.M.; IVANOV, A.I.; ARENDARUK, A.P.; GALCHENKO, M.I.; SKORODUMOV, V.A.; SMOLIN, D.D.

Styrene as raw material for the production of synthomycin and levomy-  
cetin. Part 1: Synthesis of p-nitro- $\alpha$ -acylaminoacetophenones. Anti-  
biotiki, 4 no.2:21-24 Mr-Ap '59. (MIRA 12:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy khimiko-farmatsevticheskiy  
institut imeni S. Ordzhonikidze (for Mikhalev, Dorokhova, Smolina,  
Zhelokhovtseva). 2. Institut farmakologii i khimioterapii AMN SSSR  
(for Skoldinov, Ivanov, Arendaruk, Galchenko, Skorodumov, Smolin).

(CHLORAMPHENICOL, prep. of.

synthesis from styrene through p-nitro- $\alpha$ -acylamino-  
acetophenones (Rus))

(VINYL COMPOUNDS

styrene, use in chloramphenicol synthesis through p-nitro-  
 $\alpha$ -acylaminoacetophenones (Rus))

(KETONES

p-nitro- $\alpha$ -acylaminoacetophenones, intermediate in chlor-  
amphenicol synthesis from styrene (Rus))

SMOLIN D. D.

MIKHALEV, V.A.; DOROKHOVA, M.I.; SMOLINA, N.Ye.; ZHELOKHOVTSEVA, A.M.;  
TIKHONOVA, O.Ya.; SKOLDINOV, A.P.; ARENDARUK, A.P.; SMOLIN, D.D.;  
GOLOVKINA, T.V.; SLONOVA, L.A.

Styrene as an initial product for synthomycetin and levomycetin  
production. Part 2: Synthesis of p-nitroacetophenone and  
p-nitro- $\alpha$ -bromacetophenone. Antibiotiki 4 no.4:21-24 J1-Ag  
'59. (MIRA 12:11)

1. Vsesoyuznyy nauchno-issledovatel'skiy khimiko-farmatsevticheskiy  
institut imeni S.Ordzhonikidze (for Mikhalev, Dorokhova, Smolina,  
Zhelokhovtseva, Tikhonova). 2. Institut farmakologii i khimio-  
terapii AMN SSSR (for Skoldinov, Arendaruk, Smolin, Golovkina,  
Slonova).

(CHLORAMPHENICOL chem)  
(KETONES chem)



S/079/60/030/012/008/027  
B001/B064

AUTHORS: Yashunskiy, V. G., Smolin, D. D., Yermolayeva, V. G.,  
and Shchukina, M. N.

TITLE: Substances Capable of Complex Formation. V. 2,2'-Diamino-  
diethyl Ether-N,N,N',N'-tetraacetic Acid

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 12,  
pp. 3916-3918

TEXT: The authors continue their studies (Ref. 2) of the synthesis of com-  
plexons by synthesizing 2,2'-diamino-diethyl ether-tetraacetic acid; this  
synthesis has hitherto not been described. It may, however, be assumed  
that this complex was obtained on the basis of data of an English patent  
(Ref. 3) from 2,2'-diamino-diethyl ether by carboxymethylation. Several ex-  
periments had failed before the complex was obtained by reacting 2,2'-di-  
amino-diethyl ether. The diamino ether was obtained from 2,2'-dichloro di-  
ethyl ether with the diphthalimide derivative by the reaction of Gabriel  
(Ref. 4), however, the 2,2'-di(phthalimido)-diethyl ether was split off by  
boiling with an alcohol solution of hydrazine hydrate and subsequent treat-  
ment with hydrochloric acid which simplified the reaction and led to an  
Card 1/2

✓

Substances Capable of Complex Formation.  
V. 2,2'-Diamino-diethyl Ether-N,N,N',N'-  
tetraacetic Acid

S/079/60/030/012/008/027  
B001/B064

abruptly increasing yield. The diamine was separated as dichloro hydrate and reacted with monochloro acetic acid. The reaction was normal and took place in alkaline medium (Ref. 2). Since it was not possible to precipitate tetra acid by acidifying the reaction mass, which is the case with some other complexons, two methods of precipitation were applied. The cationite KU-2 was used for the first one applied in the study of Ref. 5. By the latter method the reaction mixture was acidified until the acid reaction toward Congo red as indicator had been reached and, after the separation of sodium chloride from the solution, the monosodium salt of the complexon precipitated with methanol and purified by repeated precipitation with methanol from water. There are 6 references: 2 Soviet, 1 US, 1 Swiss, 1 German, and 1 British.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy khimiko-farmatsevticheskiy institut imeni S. Ordzhonikidze (All-Union Chemical and Pharmaceutical Scientific Research Institute imeni S. Ordzhonikidze)

SUBMITTED: January 11, 1960

Card 2/2

L 34132-65

ACCESSION NR: AT5006143

S/0000/64/000/000/0356/0360

AUTHOR: Ivannikov, A. T.; Razbitnaya, L. M.; Smolin, D. D.

TITLE: Effect of N, N, N' - tetra-acetic acid 2, 2' - diaminodiethylsulfide (DDSTA) on the excretion of uranyl nitrate and course of uranium poisoning in rats

SOURCE: Raspredeleniye, biologicheskoye deystviye, uskoreniye vyvedeniya radioaktivnykh izotopov (Distribution, biological effect, acceleration of the excretion of radioactive isotopes); sbornik rabot. Moscow, Izd-vo Meditsina, 1964, 356-360

TOPIC TAGS: uranium compound, poisoning, bone, kidney, blood, complexing agent, therapy

ABSTRACT: DDSTA proved to be an effective complexing agent for uranyl nitrate. It intensified the excretion of uranium from the body whether administered immediately after uranium poisoning or much later when deposition in the tissues and skeleton had already taken place. The complex compound of uranium with DDSTA was excreted with urine. The residual uranium found in the rats was indicative of a marked decrease in uranium deposition in the treated animals, especially in the skeleton (the main depot). The rapid excretion of uranium under the influence

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ACCESSION NR: AT5006143

of DDSTA had a favorable effect on the course of uranium poisoning. The symptoms of kidney involvement were less distinct in the experimental animals than in the controls and there were no tremors or convulsions. In addition, treatment with DDSTA increased the survival rate of the animals. The authors consider this compound a promising agent for the treatment of uranium poisoning. Orig. art. has 3 figures. (2)

ASSOCIATION: none

SUBMITTED: 10Apr64

ENCL: 00

SUB CODE: LS

NO REF SOV: 000

OTHER: 000

Card 2/2

GROKOV, V.A.; ZHUKAYVA, Z.I.; ROMANTSEV, Ye.F.; SMOLIN, D.D.; SOKOLOVA, G.N.

Changes in the composition of liver lipid fractions in animals  
exposed to radiation. Radiobiologiya 4 no.3:37E-380 '64.

(MIRA 17:11)

SMOLIN, D.D.; RAZBITNAYA, L.M.; VIKTOROV, Yu.M.

2,2'-Diaminodiethylsulfide of N,N,N',N'-tetraacetate acid and  
some inner-complex compounds. Zhur. ob. khim. 34 no.118  
3713-3715 N '64 (MIRA 18:1)

ALIKOVICH, G.N.; PARULEV, V.I.; GOLUBEV, V.A.; SMOLIN, G.G. (MOSCOW)

" Investigation of turbulent plasma and real gas jets"

report presented at the 2nd All-Union Congress of Theoretical  
and Applied Mechanics, Moscow, Moscow 29 Jan - 5 Feb 64.

L 58377-65 . EWT(1)/EWP(m)/EWA(d)/FCS(k)/EWA(1) Pd-1

ACCESSION NR: AP5014175

UR/0382/65/000/001/0043/0054  
538.4 : 532.542

30  
B

AUTHOR: Kukin, I. K. ; Smolin, G. G.

TITLE: Some problems of two-dimensional channel flow of incompressible fluid in the presence of electric and magnetic fields

SOURCE: Magnitnaya gidrodinamika, no. 1, 1965, 43-54

TOPIC TAGS: magnetohydrodynamics, laminar flow, conductive fluid, boundary layer

ABSTRACT: A two-dimensional steady laminar flow of an electrically conducting incompressible fluid in a channel of varying (increasing and decreasing) cross section is discussed for a case of applied electric and magnetic fields. The system of approximate equations is similar to that for boundary layer flow, following the work of J. C. Williams (AIAA J., 1963, 1, 1, 186). The solution is sufficiently general to yield several special cases as, for example, the case considered by Williams. The similarity solutions obtained are represented by Jacobian elliptic functions. Orig. art. has: 38 formulas, 5 figures.

Card 1/2



L 58377-65

ACCESSION NR: AP5014175

ASSOCIATION: none

SUBMITTED: 15Sep64

NO REF SOV: 001

ENCL: 00

OTHER: 002

0  
SUB CODE: ME, EM

*LR*  
Card 2/2

L 32842-66 EWP(m)/EWT(1)/EVT(m)/T DJ

ACC NR: AP6008831

SOURCE CODE: UR/0294/66/004/001/0073/0079

AUTHOR: Kukin, I. K. (Moscow); Smolin, G. G. (Moscow)

83  
82  
B

ORG: None

TITLE: Two-dimensional isothermal flow of an electroconducting fluid and gas in a channel in the presence of an electrical and a magnetic fields

SOURCE: Teplofizika vysokikh temperatur, v. 4, no. 1, 1966, 73-79

TOPIC TAGS: fluid flow, conducting fluid, gas flow, isothermal flow, plane flow, electroconductive fluid, electric field, magnetic field

ABSTRACT: The authors investigate two-dimensional, stabilized, isothermal flow of an electroconducting compressible fluid in a plane channel in the presence of crossed electrical and magnetic fields. Use is made of an approximate equation system, analogous in form to boundary-layer equations. Self-similar solutions are derived and presented by means of the Jacobi elliptical functions. The existence conditions for these solutions are examined. As a particular case, the authors obtain relationships for the velocity profile and pressure variations along the axis of the channel applicable to the flow of an incom-

Card 1/2

UDC: 532.542:538.6:537.29

I 32842-66

ACC NR: AP6008831

pressible fluid. Orig. art. has: 24 formulas and 4 figures.

SUB CODE: 20 / SUBM DATE: 13Jan65 / OTH REF: 003

LS  
Card 2/2



86023  
S/020/60/135/003/001/039  
C111/0222

AUTHORS: Azbelev, N.N., Smolin, I.M., and Tsalyuk, Z.B.  
TITLE: An Approximate Method of Constructing Cauchy Function  
PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol.135, No.3, pp.511-514

TEXT: The authors consider the equation  
(1)  $L[y] = y^{(n)} - \sum_{k=0}^{n-1} g_k(x)y^{(k)} = f(x), y^{(k)}(a) = y_0^{(k)}, k=0, \dots, n-1,$

where  $g_k$  and  $f$  are continuous on  $[a, b]$ . Let

$$K(x, s) = \begin{vmatrix} u_0(s) \dots u_{n-1}(s) \\ \dots \dots \dots \\ u_0^{(n-2)}(s) \dots u_{n-1}^{(n-2)}(s) \\ u_0(x) \dots u_{n-1}(x) \end{vmatrix} : \begin{vmatrix} u_0(s) \dots u_{n-1}(s) \\ \dots \dots \dots \\ u_0^{(n-2)}(s) \dots u_{n-1}^{(n-2)}(s) \\ u_0^{(n-1)}(s) \dots u_{n-1}^{(n-1)}(s) \end{vmatrix},$$

where  $u_k(x) (k=0, \dots, n-1)$  is a fundamental system of the solutions of  $L[y] = 0$ .  
Let  $W(x, s)$  be a function  $n$  times continuously differentiable with respect

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86023

S/020/60/135/003/001/039  
C111/C222

An Approximate Method of Constructing Cauchy Function

$$(3) \quad \tilde{u}(x) = z(x) + \int_a^x W_1(x,s) \{f(s) - L[z(s)]\} ds$$

of the equation (1) then there holds the estimation: if  $|f(x) - L[z(x)]| \leq \epsilon (x-s)^\beta R$ , then

$$(4) \quad |\tilde{u}^{(k)}(x) - u^{(k)}(x)| \leq \frac{R \beta! P_k \alpha_k! (Q \beta!)^{2^i - 1} (2^i - 1)(\beta + 1) + \alpha_k + \delta + 1}{[(2^i - 1)(\beta + 1) + \alpha_k + \delta + 1]!} (x-a)$$

As  $W_0(x,s)$  it is recommended e.g.

$$W_0(x,s) = \frac{(x-s)^{n-1}}{(n-1)!} + \frac{(x-s)^n}{n!} \epsilon_{n-1}(s).$$

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86023

S/020/60/135/003/001/039  
C111/C222

An Approximate Method of Constructing Cauchy Function

Some properties of the considered sequence are given. Therefrom there result the conditions given in (Ref.3,5) that  $K^{(k)}(x,s) > 0$  ( $k \leq n$ ).

There are 5 Soviet references.

ASSOCIATION: Izhevskiy mekhanicheskiy institut (Izhevsk Mechanical Institute)

PRESENTED: June 17, 1960, by S.L.Sobolev, Academician

SUBMITTED: June 14, 1960

X

Card 4/4

SMOLIN, Kalman

Properties of cooling agents applied in hardening. *Gepgyartastechn* 1  
no.3:87-91 Je '61.

1. *Forgacsolo Szerszamok Gyara.*



SOLOV'YEV, V.N.; SMOLIN, L.N.

Method for determining the latent period of the defense reflex  
in white rats and mice. Biul. eksp. biol. i med. 40 no.10:75-77  
Oct. '55. (MLRA 9:1)

1. Iz laboratorii eksperimental'noy terapii (zav.-kandidat  
meditsinskikh nauk A.M.Chernukh) Instituta patofiziologii i  
eksperimental'noy terapii (dir.--akademik A.D.Speranskiy)  
AMN SSSR, Moskva.

(REFLEX,

defense reflex, determ. of latent period in white  
rats & mice)

SMOLIN, L.N.

SOLOV'YEV, V.N.; SMOLIN, L.N.

Effect of dimedrol on the central nervous system. Farm. i toks. 19  
no.5:29-34 S-0 '56. (MLRA 10:3)

1. Laboratoriya eksperimental'noy terapii (zav. kandidat meditsin-  
skikh nauk A.M.Chernukh) Instituta normal'noy i patologicheskoy  
fiziologii AMN SSSR.

(DIPHENHYDRAMINE, effects,  
on CNS in animals (Rus))

(CENTRAL NERVOUS SYSTEM, effect of drugs on,  
diphenhydramine in animals (Rus))

SMOLIN, L.N. (Moskva)

Role of experimental neuritis of the vagus nerve in the pathogenesis  
of aspiration pneumonia. Pat.fiziol. i eksp.terap. 2 no.3:49  
My-Je '58 (MIRA 11:7)

1. Iz laboratorii eksperimental'noy terapii (sav. - dotktor med.  
nauk A.M. Chernukh) Instituta normal'noy i patologicheskoy fiziologii  
AMN SSSR (direktor - deystvitel'nyy chlen AMN SSSR prof. V.N.  
Chernigovskiy).

(VAGUS NERVE--DISEASES)  
(PNEUMONIA)

SMOLIN, L.N.

Appearance of electroencephalographic asymmetry following unilateral lung injury. Biul. eksp. biol. med. 47 no.5:47-51 My '59. (MIRA 12:7)

1. Iz laboratorii sravnitel'noy patologii nervnoy sistemy (zav. - prof. S. I. Frankshteyn) otdela fiziologii i patologii nervnoy sistemy (zav. - prof. A.A. Volokhov) Instituta normal'noy i patologicheskoy fiziologii (dir. - deystvitel'nyy chlen AMN SSSR V.N. Chernigovskiy), Moskva. Predstavlena deystvitel'nym chlenom AMN SSSR V.N. Chernigovskiy), Moskva. Predstavlena deystvitel'nym chlenom AMN SSSR V.N. Chernigovskim.

(LUNGS, physiol.

exper. unilateral thermal lesion inducing EEG asymmetry  
(Rus))

(ELECTROENCEPHALOGRAPHY,

asymmetry induced by exper. unilateral thermal lesion  
of lung (Rus))

SMOLIN, L.N.

Origin of "spontaneous" electrical activity of the frog brain.  
Biul. eksp. biol. i med. 52 no.12:17-22 D '61. (MIRA 14:12)

1. Iz laboratorii eksperimental'noy patologii nervnoy sistemy (zav. -  
prof. S.I.Frankshteyn) Instituta normal'noy i patologicheskoy fiziologii  
(dir. - deystvitel'nyy chlen AMN SSSR V.V.Parin) AMN SSSR, Moskva.  
Predstavlena deystvitel'nym chlenom AMN SSSR V.V.Parinym.  
(BRAIN) (ELECTROPHYSIOLOGY)

FRANKSHTEYN, S.I.; GAYDINA, G.A.; GORYUNOVA, T.I.; SERGEYEVA, Z.N.;  
SMOLIN, L.N.

Mechanism of dyspnea in lung injury in the light of electro-  
physiological studies. Trudy Inst. norm. i pat. fiziol. AMN  
SSSR 6:102-104 '62 (MIRA 17:1)

1. Laboratoriya eksperimental'noy patologii nervnoy sistemy  
(zav. - prof. S.I. Frankshteyn) Instituta normal'noy i pato-  
logicheskoy fiziologii AMN SSSR.

SMOLIN, L.N.

Facilitation of primary cortical responses under the influence of  
impulses from inflammatory foci. Trudy Inst.norm.i pat.fiziol.  
AMN SSSR 7:86-87 '64. (MIRA 18:6)

1. Laboratoriya eksperimental'noy patol'gii nervnoy sistemy (zav. -  
prof. S.I. Frankhtayn) Instituta normal'noy i patologicheskoy  
fizologii AMN SSSR.

FRANKSHTEYN, S.I., prof.; BIYASHEVA, Z.G.; SMOLIN, L.N.

Significance of inhibitory synapses in the mechanism of  
compensation of functional disorders. Biol. eksp. biol. i  
med. 59 no.5:27-31 '65. (MIRA 18:11)

1. laboratoriya eksperimental'noy patologii nervnoy sistemy  
(zav. - prof. S.I. Frankshteyn) Instituta normal'noy i  
patologicheskoy fiziologii (direktor - deystvitel'nyy chlen  
AMN SSSR prof. V.V. Parin) AMN SSSR, Moskva. Submitted May  
16, 1964.



*SMOLIN, M.D.*

21-58-7-12/27

AUTHORS:

Frantsevich, I.I., Corresponding Member of the AS UkrSSR,  
Kalinovich, D.F., Kovenskiy, I.I., Pen'kovskiy, V.V. and  
Smolin, M.D.

TITLE:

Electrodiffusion of Tungsten in an Iron - Tungsten Alloy  
( Elektrodifuziya vol'frama v splave zhelezo - vol'fram )

PERIODICAL:

Dopovidi Akademii nauk Ukrain's'koi RSR, 1958, nr 7,  
pp 736-739 (USSR)

ABSTRACT:

The role which is played in highly heat-resistant alloys by the increase in the strength of interatomic bonds in metal solid solutions is well known. The strength of interatomic bonds is essentially increased by the donor-acceptor interaction between the atoms of elements which compose the alloy. The availability of information on this interaction makes it possible to theoretically base the selection of a composition with optimum characteristics of heat resistance. The electrotransfer method is the best for studying the donor or acceptor ability of the alloy components. This article describes an investigation of tungsten migration in its solid solution in iron being subjected to a constant electric field, which

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21-58-7-12/27

Electrodifffusion of Tungsten in an Iron - Tungsten Alloy

was carried out by means of the radioactive isotope  $^{185}\text{W}$ . Experiments on electrotransfer were conducted at 900; 950; 1,000; 1,050; 1,100 and 1,150°C, and at exposure times from 40 to 110 hours. It has been established that in the solid metal solution of tungsten in iron, the former migrates, under the action of a constant electric field, towards the cathode. On the basis of experimental data, velocities of the tungsten atom displacements have been computed, as well as the charges of tungsten ions and transfer ratios at all investigated temperatures. It has been shown that the migration speed and transfer ratio values increase with an increase of temperature from 900 to 1,000°C while the charge remains constant. At a further

Card 2/3

21-58-7-12/27

Electrodifussion of Tungsten in an Iron - Tungsten Alloy

rise of temperature all these quantities decrease and reach zero at  $1,150^{\circ}\text{C}$ . There are 2 graphs, 1 table and 3 Soviet references.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR  
(Institute of Metalloceramics and Special Alloys of the AS UkrSSR)

SUBMITTED: February 15, 1958

NOTE: Russian title and Russian names of individuals and institutions appearing in this article have been used in the transliteration

1. Iron-tungsten alloys--Diffusion 2. Iron-tungsten alloys--Temperature factors 3. Tungsten isotopes (Radioactive)--Applications

Card 3/3

FRANTSEVICH, I.N.; KALINOVICH, D.F.; KOVENSKIY, I.I.; SMOLIN, M.D.

Some quantitative relationships of donor-acceptor interactions in  
alloys. Fiz.tver.tela 1 no.1:62-66 Ja '59. (MIRA 12:4)  
(Alloys) (Electrons)

SOV/180 59-1-13/29

**AUTHORS:** Kalinovich D.F., Kovenskiy I.I., Smolin M.D. and Frantsevich I.N. (Kiyev)

**TITLE:** Investigation of the Migration of the Components of an Iron-Tungsten Alloy in a Constant Electric Field (Issledovaniye migratsii komponentov splava zhelezo-vol'fram v postoyannom elektricheskom pole)

**PERIODICAL:** Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 1, pp 71-74 (USSR)

**ABSTRACT:** The authors point out that one of the best methods for studying the donor-acceptor electron interaction in alloys is to study the migration of the components under the action of an electric field. In the published data for solid metal alloys, however, only one component is considered and the possibility of donor-acceptor interaction is not examined. The authors describe their own work on the transfer of the components of a solid solution of 5 wt. % tungsten in iron. For studying the diffusion of tungsten W<sup>185</sup> was introduced by diffusion into the central part of an electrolytic-iron wire 60 mm long and 0.6 mm in diameter. The activity was determined along the test piece before and after its heating by the

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SOV/180-59-1-13/29

## Investigation of the Migration of the Components of an Iron-Tungsten Alloy in a Constant Electric Field

passage of a direct current. For studying the mobility of iron, the normal isotope of tungsten was introduced by diffusion into a similar specimen (diameter 0.65 mm) over its whole length. Fe<sup>59</sup> was then deposited electrolytically on the central zone of the specimens and the distribution of this radioactive isotope over the cross-section was secured by annealing. After heating by the passage of a direct current the wire was cut into sections whose activities were determined. The heating temperatures were 900, 950, 1000, 1050, 1100 and 1150°C ± 5-7°C, the times being 40-110 hours for the tungsten mobility and 10-40 for the iron mobility experiments. Fig 1 shows typical distributions of activity along the length of the specimen for Fe - W<sup>185</sup> (950°C, 40 hours); Fig 2 the distributions for Fe - W - Fe<sup>59</sup>. The distribution obtained when an alternating current was used is shown in Fig 3. The authors determine the transfer numbers of tungsten and iron for the various temperatures on the basis of equations previously deduced (Ref 1) and published data on diffusion coefficients (Ref 2).

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SOV/180-59-1-13/29

Investigation of the Migration of the Components of an Iron-Tungsten Alloy in a Constant Electric Field

They conclude that it has been shown that at 900-1100°C the valency electrons contributed by tungsten atoms go to fill the vacant 3d-levels of iron atoms, producing a

Card 3/3 donor-acceptor interaction.  
There are 3 figures, 1 table and 3 Soviet references.

SUBMITTED: June 4, 1958

SMOLIN, M. D.

SOV/170-99-4-1/30

Frantsovich, I.S., Kalinovich, D.P., Korotkiy, I.I., Smolov, M.D.

On Electrical Transfer of Tungsten in Nickel-Tungsten Alloys (On elektroperevoda vol'frama v nikelvol'franzhevych splavakh)

Inzhenerno-fizicheskii zhurnal, 1959, Nr. 4, pp. 47-51 (USSR)

18(4)

AUTHORS:

TITLE:

PERIODICAL:

ABSTRACT:

The present paper describes the results of investigations into electrical transfer of tungsten in solid solution in nickel. Experiments were performed with specimens marked with tungsten at 400°C and 500°C. Tungsten marked with radioactive <sup>187</sup>W isotope was introduced into the central portion in these specimens by diffusion. The tungsten transfer at temperatures of 850, 950, 1000, 1100°C and 1200°C. It was shown that tungsten atoms migrate toward the cathode, i.e., in the alloy under investigation they are donors of electrons. Changes in tungsten ions and the number of electrons transferred are calculated by formula derived by the authors. It turned out that the effect of alcohol transfer increases with an increase in temperature from 850 to 950°C, and then begins to fall reaching

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zero at 1100°C. Electron transfer curves also conform to this pattern. The charge on ions remains constant in the temperature range from 850 to 950°C, and then decreases reaching zero at 1100°C.

There are 2 graphs, 2 tables and 9 references, 5 of which are Soviet, 2 English, 1 Indian and 1 unidentified.

ASSOCIATION: Institut metalloberazhki i spetsialnykh metallov (Institute of Metal Ceramics and Special Alloys of the AS USSR), Kiev.

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06567

SOV/170-59-9-8/18

18(3)

AUTHORS: Frantsevich, I.N., Kalinovich, D.F., Kovenskiy, I.I., Smolin, M.D.

TITLE: On the Donor-Acceptor Interaction of Components in a Binary Iron-Chromium Alloy

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1959, Nr 9, pp 62-68 (USSR)

ABSTRACT: Electric transfer of components in solid metallic solutions furnishes important information for the development of the electronic theory of alloys. The purpose of the present investigation was to study the behavior of the components of the solid solution of chromium in iron in a constant electric field. Radioactive isotopes  $Cr^{51}$  and  $Fe^{59}$  were employed for marking atoms migrating in the process of electric transfer. It was established by experiments that the chrome-plated zone in all samples was shifted towards the cathode; hence it is concluded that chromium in its solid solution with iron is a donor of electrons. The study of electric transfer was carried out at temperatures of 1,000, 1,050, 1,100 and 1,150°C and at various durations. It turned out that the electric transfer of chromium ions increases with an increase in temperature and duration of experiments. This relationship is shown in Figure 2. The study of the electric transfer of iron ions was carried

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SOV/170-59-9-8/18

On the Donor-Acceptor Interaction of Components in a Binary Iron-Chromium Alloy

out at temperatures from 900 to 1,200°C and various durations. The rate of migration of iron ions grows with an increase of temperature until 1,050°C and then falls down to 1,200°C. At a fixed temperature, the effect of electric transfer increases linearly with the duration of experiments. This is shown in Figure 4. The experimental data obtained made it possible to determine the charges and numbers of transferred ions of chromium and iron at various temperatures. These data are presented in Table 1. Thus the existence of a donor-acceptor interaction in the iron-chromium alloy has been established; it diminishes with an increase of temperature above 1,050°C. This finding agrees with a conclusion by P.L. Gruzin [Ref 17] that chromium strengthens interatomic interaction in the iron lattice at temperatures below 1,100°C.

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06567

SOV/170-59-9-8/18

On the Donor-Acceptor Interaction of Components in a Binary Iron-Chromium Alloy

There are: 4 graphs, 1 table and 17 references, 8 of which are Soviet, 6 German, 1 French, 1 Indian and 1 unidentified.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR (Institute of Ceramics and Special Alloys of the AS UkrSSR), Kiyev.

Card 3/3

*Smolin, M.D.*

S/170/60/003/008/009/014  
B019/B054

AUTHORS: Glinchuk, M. D., Kalinovich, D. F., Kovenskiy, I. I.,  
Smolin, M. D.,

TITLE: A Method of Determining Diffusion Coefficients in Solids

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1960, Vol. 3, No. 8,  
pp. 78 - 81

TEXT: The authors investigate diffusion along an infinitely long cylinder with the radius  $R$ . It is assumed that at the beginning the diffusing substance is distributed at one end of the cylinder in a thickness  $\Delta R$  and a width of  $2l$ . The authors proceed from the diffusion equation (1) and obtain the approximate equation (4) for the distribution of concentration along the cylinder. Equation (5) indicates the concentration distribution of the diffusing substance after diffusion at the temperatures  $T_1$  and  $T_2$  for the durations  $t_1$  and  $t_2$ , and the diffusion coefficients  $D_1$  and  $D_2$  are calculated from (4) and (5). Formula (7) gives the quantity of the substance diffused. By the method suggested here, the

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A Method of Determining Diffusion Coefficients in Solids S/170/60/003/008/009/014  
B019/B054

authors determined the diffusion coefficient of chromium in nickel. Table 1 gives the mean values of the diffusion coefficients for various temperatures. The diffusion coefficients were calculated by formula (9). Fig. 2 graphically shows the diffusion coefficient of chromium in nickel as a temperature function. The method suggested allows the determination of diffusion coefficients for various temperatures on a sample. The accuracy is designated to be satisfactory. There are 2 figures, 1 table, and 2 Soviet references. ✓

ASSOCIATION: Institut metallokeramiki i spetsplavov AN USSR, g. Kiyev  
(Institute of Powder Metallurgy and Special Alloys of the  
AS UkrSSR, Kiev)

SUBMITTED: March 8, 1959

Card 2/2

81902

18.1250  
Smolin, M.D.

S/126/60/010/01/004/019  
E111/E335

AUTHORS:

Kalinovich, D.F.; Kovenskiy, I.I., Smolin, M.D. and  
Frantsevich, I.N.

TITLE:

Mobility of Chromium Atoms in a Nickel-chromium Alloy  
Under the Action of a Direct Electric Field

PERIODICAL:

Fizika metallov i metallovedeniye. 1960, Vol.10,  
No. 1, pp 42 - 46

TEXT: The authors point out that the study of migration of ions in alloys can give indications of the high-temperature stabilizing role of alloying elements. They describe their work on the migration of chromium in a 0.63 diameter, 60 mm long wire containing 4.36% Cr by weight. The central part of the specimens was electrolytically coated with a 5-micron thick layer of Cr<sub>51</sub>. After annealing at 1200 °C for 60 hours, the specimens were electrolytically etched to remove the surface layer. Longitudinal radioactivity distribution was measured with an MST-17 counter. Specimens were then placed in an argon atmosphere and a direct current was passed through them. Activity-versus-position plots before and after passage of current at 950, 1000, 1050 and 1100 °C for 120 hours (Fig1) and for 950, 1000, 1050 and 1100 °C ✓

81902

S/126/60/010/01/004/019  
E/117/63/53

Mobility of Chromium Atoms in a Nickel-chromium Alloy Under the Action of a Direct Electric Field

showed appreciable migration of chromium towards the cathode. Allowing for diffusion the authors calculate the speed of migration of chromium (average values rise from  $2.70 \times 10^{-8}$

at 950 to  $29.71 \times 10^{-8}$  cm/sec at 1100 °C). By removing the outer layer of treated specimens and repeating the activity measurements (Figure 2), migration within the specimen was found to be less than near the surface ( $7.20 \times 10^{-9}$

$1.55 \times 10^{-8}$  cm/sec). For both there was a linear relation between the average displacement of the chromized-zone boundary and duration of experiment. Using Einstein's equation (Ref.4) the authors calculate effective chromium-ion charge values in solid solution in nickel to be 57.6, 42.5, 34.7 and 27.6 at 950, 1000, 1050 and 1100 °C, respectively, which is in line with Wever's values for higher temperatures (Ref.6).

There are 2 figures, 2 tables and 6 references: 2 Soviet, 2 English and 2 German.

Card 2/3

SMOLIN, M.D.; FRANTSEVICH, I.N.

Application of the electric transfer method in the study of the  
electronic structure of metals and alloys. Fiz.tver.tela 3  
no.7:2115-2122 JI '61. (MIRA 14:8)

1. Institut metallokeramiki i spetsial'nykh splavov AN USSR,  
Kiyev.  
(Ions--Migration and velocity) (Metals--Electric properties)



S/181/61/003/011/019/056  
B125/B104

AUTHORS: Kalinovich, D. F., Kovenskiy, I. I., and Smolin, M. D.

TITLE: A contribution to the problem of determining partial velocities of electrical transfer with tagged atoms

PERIODICAL: Fizika tverdogo tela, v. 3, no. 11, 1961, 3367-3370

TEXT: To determine the velocity of motion of a tagged ion during electrical transfer it is necessary to have a coordinate system firmly connected with a fixed point. The origin of coordinates can be put at one end of the sample or at a mark which is located in a nonheated area (the mark can be obtained by the impression of a microhardness test). When investigating the electrical transfer of each alloy component, it is possible to tag the components to be studied either along the whole sample or only along a narrow part in the center of the heated zone with a radioisotope. In the first case, a new distribution of the concentration of the component in question is observed, while in the other case the motion of atoms of this component during electrical transfer is observed directly. Under such

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S/181/61/003/011/019/056  
B125/B104

A contribution to the problem of ...

conditions, the temperature distribution curve will pass through two symmetrical points in regions with a strong decrease along the sample. In these points, the mobility of atoms is practically zero. The following two cases were investigated: (1) If migration of atoms of all components in one direction is observed, ions of all components will arrive at the boundary surface of the mass flux which is located in the direction of transfer. New lattice planes are formed. Simultaneously, atomic planes are removed at the boundary of the heated zone located on the opposite side. Therefore, all atomic planes located in the heated region are shifted opposite to the direction of transfer by the width of the built-up or removed zone. The equation of displacement is given by  $U = \sum_i \gamma_i u_i$  (1),



where  $\Delta x/t = \sum_i v_i \gamma_i$  (2).  $U$  denotes the total transfer number;  $u_i$ ,  $v_i$ , and  $\gamma_i$  denote partial transfer numbers, velocity, and molar share of the  $i$ -th component;  $\Delta x$  denotes the width of the built-up (removed) zone;  $t$  denotes the duration of test.  $\Delta x/t$  may be regarded as the total transfer velocity. The shift measured during electrical transfer for a tagged  
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4/21/03/003/011/019/056  
3125/3104

A contribution to the problem of ...

atom in the heated zone is equal to the sum of shifts due to partial and total transfer:  $v_i = v_i^* + W$  (3), where  $v_i^*$  denotes the velocity determined experimentally from the shift of the tagged atom. In the case studied, a transfer of matter will always take place. (2) Atoms of the components will migrate in both directions. In both regions limiting the flux, atoms of one type are supplied and atoms of the other type are removed. Under these conditions, Eqs. (1) and (2) will also describe the total mass transfer in general. When determining partial velocities of electrical transfer with tagged atoms, the motion of these atoms has to be considered. The method of tagged atoms shows various advantages over the method of fixed marks. Especially, a chemical analysis of plate and cathode space of the sample is not required. All conclusions in this paper are only valid if the geometrical shape of samples does not change during the tests. There are 3 non-Soviet references. The reference to the English-language publication reads as follows: R. P. Johnson. Phys. Rev., 54, 459, 1938. ✓

Card 3/4

A contribution to the problem of ...

S/15/61/003/011/019/056  
B125/B104

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR  
Kiyev (Institute of Powder Metallurgy and Special Alloys  
AS UkrSSR, Kiyev)

SUBMITTED: June 5, 1961



Card 4/4

SMOLIN, M. D.

18.7500

1145 1555

22826  
S/170/61/004/005/012/C15  
B111/B214

AUTHORS: Kalinovich, D. F., Kovarskiy, I. I., Smolin, M. D.,  
Frantsevich, I. H.

TITLE: The diffusion of nickel in a nickel molybdenum alloy in an  
electric field

PERIODICAL: Inzhenerno-fizicheskii zhurnal, v. 4, no. 5, 1961, 108-110

TEXT: The electric field produces a directed displacement of the atomic  
shell in the crystal lattice of a pure metal and solid solutions. Two  
forces act on the ions: the electric field and a force depending on the  
momentum transition between ions and the conduction electrons or holes. The  
electrotransportation of Ni ions in a solid solution of molybdenum in nickel  
is investigated in this paper (molybdenum content 9.24% by weight). The  
tracer was Ni<sup>63</sup> which was measured by a counter of the type T25-BFA (T25-BFT).  
The temperature of the sample was measured by a pyrometer of the type  
ХГМИИП (KHGMIP). The direction and rate of electrotransportation could be  
determined from the displacement of the boundary of the radioactive zone.  
The diffusion was eliminated by relating the rate of electrotransportation

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22826

S/170/61/GG4/G05/012/015  
B111/B214

The diffusion ...

to the arithmetic mean of the displacement of the boundary of the active zone. The force acting on an ion may be written as

$$F = Ee(z - n_1\sigma_1l_1 + n_2\sigma_2l_2),$$

where E is the potential; e the electronic charge; z the charge of the ion in multiples of e;  $n_1$  concentration of the conduction electrons;  $\sigma_1$  the scattering cross section of the conduction electrons on the migrating ion; and  $l_1$  the mean free path of the electrons on the Fermi surface. The index 2 denotes hole conductivity. The quantity  $z - n_1\sigma_1l_1 + n_2\sigma_2l_2 = z^*$

is the effective charge which is equal to the true charge in the absence of the effect of electrons and holes. Applying Einstein's formula one may write for the effective charge  $z^*$ :  $z^* = 300 v\lambda qkTf/IDe$  (2), where v is the rate of electrotransportation;  $\lambda$ , q the electrical conductivity and area of the cross section of the sample; f = 0.78 (for a face centered lattice); I the current strength; and D the diffusion coefficient. The derivation of the diffusion coefficient has been given in IPZh, No. 8, 78, 1960. The value found is  $D = 2.68 \exp(-65600/RT)$ . The experimental conditions, the rates of electrotransportation, and the effective charges

Card 2/3

22826

3/170/61/004/005/012/015  
B111/B214

The diffusion ...

calculated according to (2) are collected in Table 1. All the experiments showed that nickel migrates to the anode. There are 1 table and 10 references: 6 Soviet-bloc and 4 non-Soviet-bloc. The three most recent references to English-language publications read as follows: 1) Compaan, K., Haven G.: Trans. Faraday Soc., 52, 786, 1956; 2) Wever H.: Proc. of Symp. No. 9 of Phys. Chem., 21, 2, 1958.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR g. Kiyev (Institute of Powder Metallurgy and Special Alloys AS UkrSSR, Kiyev)

SUBMITTED: September 30, 1960

Legend to Table 1:

1 - Temperature in °C; 2 - experimental time in hours; 3 - rate of electrotransportation in cm/sec; 4 - effective charge.  
Card 3/3

Температура, °C (1)	Время опыта, час (2)	Скорость переноса см/сек (3)	Эффективный заряд (4)
1150	200	$1,36 \cdot 10^{-8}$	25,7
1200	150	$2,22 \cdot 10^{-8}$	20,9
1250	100	$4,16 \cdot 10^{-8}$	18,0
1300	100	$7,36 \cdot 10^{-8}$	16,0

25349

S/021/61/000/007/006/011  
D205/D306

24,7700

AUTHORS: Frantsevych, I.M., Member of ASUkrRSR, and Smolin, M.D.

TITLE: Dependence of electrotransportation of the components of Ni-Cr alloy on concentration

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR, Dopovidi, no. 7, 1961, 908 - 910

TEXT: An ion which is migrating in the process of electrotransport is influenced, apart from the force of a constant electric field, also by the resultant force of interaction between the ion and the conductivity electrons and holes. The charge of the ion calculated according to Einstein's formula (Ref. 1: Ann. d. Phys., 17, 549, 1905) on the basis of experimental data is therefore not its true charge but some effective one. The theory gives for the latter

$$z^* = z - n_{-}\sigma_{-}l_{-} + n_{+}\sigma_{+}l_{+}; \tag{1}$$

z being the true charge of the ion,  $n_{-}\sigma_{-}l_{-}$  and  $n_{+}\sigma_{+}l_{+}$  the concen-  
Card 1/5



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S/021/61/000/007/006/011  
D205/D306

Dependence of ...

tration, scattering cross section, mean free path of the electrons and the holes respectively. To transform (1) one can use

$$\lambda = \left(\frac{8\pi}{3}\right)^{1/3} \frac{e^2}{h} l n^{1/2}, \quad (2)$$

which is deduced in approximate two-band theory of metals. In (2)  $\lambda$  is electrical conductivity,  $l$  and  $n$  - mean free path and concentration of current carriers,  $e$  the elementary charge,  $h$  - Planck's constant. From (1) and (2) substituting the values of the constants and taking into account  $\lambda = \lambda_+ + \lambda_-$  one gets

$$z^* = z - 1,3 \cdot 10^4 n_-^{1/3} \sigma_- \lambda_- + 1,3 \cdot 10^4 n_+^{1/3} \sigma_+ (\lambda - \lambda_-) \quad (3)$$

( $\lambda_+$  is hole conductivity and  $\lambda_-$  electron conductivity). Experimental determination of  $z$ ,  $\sigma_+$  and  $\sigma_-$  is particularly complicated. In the present paper the authors try to determine  $z$ ,  $n_-$ ,  $n_+$  etc. from  
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S/021/61/000/007/006/011  
D205/D306

Dependence of ...

the data of temperature dependence ( $c = \text{const}$ ) and temperature dependence ( $T = \text{const}$ ) of electrotransportation in the approximation given by the theory of electro-transportation and the two-band theory of metals. The authors investigated the concentration dependence of electrotransportation in the alloys Ni-Cr with the following concentrations of Cr: 4.76, 7.56, 10.28, 15.49, 19.66, 22.12, 25.07, 31.01 (atomic %) at 1250°C. The experimental methods are described in D.F. Kalinovich, I.I. Kovenskiy, M.D. Smolin, and I.N. Frantsevich (Ref. 5: Izv. AN SSR, OTN, metallurgiya i toplivo, 1, 71, 1959). To increase accuracy all necessary quantities were determined experimentally for each specimen. Two specimens were investigated for each concentration. Radioactive isotopes Cr<sup>51</sup> and Ni<sup>63</sup> were used as indicators. In the concentration interval 4.76 - 19.66 at percent Cr where the dependence of  $\varphi'$  on  $c(1 - c)$  is linear the following equations are valid

$$z_{Cr} = 0,18 \left[ \frac{1}{c(1-c) + 0,011} \right]^2 - 1,7 \left[ \frac{1}{c(1-c) + 0,011} \right] + 13,0; \quad (6)$$

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S/021/61/000/007/006/011  
D205/D306

Dependence of ...

$$z_{Ni}^{\circ} = -0,13 \left[ \frac{1}{c(1-c) + 0,011} \right]^2 - 1,0 \left[ \frac{1}{c(1-c) + 0,011} \right] - 11,4. \quad (7)$$

These have been obtained by adjusting and the parameters determined with the aid of the method of averages. Since temperature dependence was not investigated the calculation of  $z$ ,  $\sigma_{-}$ ,  $\sigma_{+}$  was approximate, with the assumption that these do not depend on the concentration in the interval 4.76 - 19.66 at percent Cr. Values of  $n_{-}$ ,  $n_{+}$  and the mobilities  $\mu_{-}$ ,  $\mu_{+}$  were taken from H. Schmidt (Ref. 6: Z.F. Metallkunde, 49, 3, 113, 1958). All results are given in the Table. There are 1 table and 6 references: 4 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: Instytut metalokeramiky i spetsial'nykh splaviv AN  
URSR (Institute of Metalloceramics and Special Alloys  
AS UkrRSR)

SUBMITTED: March 23, 1961

Card 4/5

S/126/61/011/002/020/025  
E021/E435

AUTHORS: Kalinovich, D.F., Kovenskiy, I.I. and Smolin, M.D.  
TITLE: Diffusion and Electrotransfer of Chromium into  
Molybdenum  
PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.2,  
pp.307-309

TEXT: The electrotransfer of chromium into molybdenum in the solid state was investigated. Pure molybdenum wire samples, 0.5 mm diameter and 60 mm length, were saturated with the stable isotope of chromium by diffusion to a chromium content of 9.92 wt.%. The central 3 mm of wire were covered with a thin film of radioactive  $Cr^{51}$ . The wire was then annealed in a protective atmosphere at 1400°C to give uniform distribution across the section. The distribution of  $Cr^{51}$  along the length of the wire was then found by measuring the activity of portions 0.1 mm in width. A direct current was then passed through the wire which was surrounded by argon. This heated the wire to a chosen temperature, measured by an optical pyrometer. Then the distribution of  $Cr^{51}$  was again measured. The graph shows the  
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S/126/61/011/002/020/025  
E021/E435

Diffusion and ...

distribution before and after heating. Experiments were carried out at 1200, 1250, 1300 and 1350°C and in all cases migration of the chromium occurred towards the cathode. The amount of electrotransfer depended linearly on the length of the experiment and increased with increase in temperature. The rates were as follows:

Temperature, °C	1200	1250	1300	1350
Rate of electro-transfer (cm/sec)	$1.5 \times 10^{-8}$	$2.6 \times 10^{-8}$	$4.2 \times 10^{-8}$	$7.1 \times 10^{-8}$

The coefficient of diffusion was found and it obeyed the following relationship:

$$D = 4.3 \exp(-72700/RT) \text{ cm}^2/\text{sec.}$$

The rate of transfer was measured with an accuracy of  $\pm 5$  to 8% and the coefficient of diffusion with  $\pm 8\%$ . There are 1 figure and 2 Soviet references.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov  
AN UkrSSR (Institute of Powder Metallurgy and Special Alloys AS UkrSSR)

Card 2/3

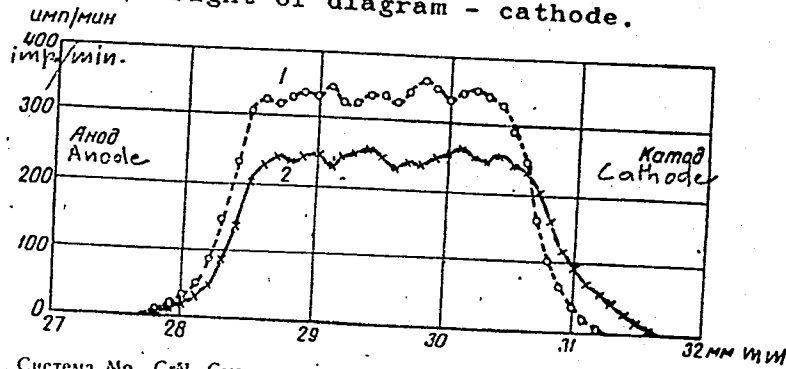
Diffusion and ...

S/126/61/011/002/020/025  
E021/E435

SUBMITTED: June 3, 1960

Figure. Displacement of the Radioactive zone during heating by a direct current to 1300°C for 150 h in the Mo-Cr<sup>51</sup> system, imp/min vs mm

left of diagram - anode; right of diagram - cathode.



Система Mo-Cr<sup>51</sup>. Смещение границ радиоактивной зоны при нагреве образца постоянным током при 1300° С в течение 150 часов:  
1 — до нагрева; 2 — после нагрева.

Card 3/3

S/020/61/136/001/015/037  
B019/B056

AUTHORS: Smolin, M. D. and Frantsevich, I. N.

TITLE: Investigation of the Temperature Dependence of the Electro-  
phoresis in Alloys on the Basis of High-melting Metals

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 1, pp. 81 - 83

TEXT: In the introduction, the authors give some formulas which were set up within the framework of the development of the electrophoresis theory in recent years. Denotations for the resulting force and the effective charge of a migrating ion are given. Next, a report is given on experiments made with Mo, alloyed with 25 % W, and with W, alloyed with 25 % Mo. The experiments were carried out on specimens of 0.5 mm diameter and 60 mm length. The powder-metallurgical production of the specimens is described, the radioactive isotopes Mo<sup>99</sup> and W<sup>185</sup> being used as traces elements. The experiments were carried out within the temperature range of from 1500 to 2500°C according to the alloy. In all experiments a migration of Mo-ions under the effect of a direct (constant) field to the anode and a migration of the W-ions to the cathode was observed. On the basis of the data ob-  
Card 1/4

Investigation of the Temperature Dependence of S/020/61/136/001/015/037  
the Electrophoresis in Alloys on the Basis of E019/B056  
High-melting Metals

tained, the effective charge of a migration ion may be described as

$z^* = z + k \left( \frac{1}{T + \beta_0/\alpha} \right) (4)$ . T is the absolute temperature,  $\beta_0$  the resistivity,

and  $\alpha$  the temperature coefficient of the electrical resistance, k is a proportional factor. Knowing the charge and the atomic concentrations of both alloy components the electron concentration in both alloys can be calculated. The results are given in Table 1. There are 1 figure, 1 table, and 4 Soviet references. ✓

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov Akademii nauk USSR (Institute of Powder Metallurgy and Special Alloys of the Academy of Sciences, UkrSSR)

PRESENTED: July 15, 1960, by G. V. Kurdyumov, Academician

SUBMITTED: July 11, 1960

Card 2/4



S/849/62/000/000/008/016  
A006/A101

AUTHORS: Frantsevich, I. N., Kalinovich, D. F., Kovenskiy, I. I., Smolin,  
M. D.

TITLE: On the behavior of components of metallic solid solutions in an  
electric force field

SOURCE: Vysokotemperaturnyye metallokeramicheskiye materialy. Inst. metallo-  
ker. i spets. spl. AN Ukr.SSR, Kiev, Izd-vo AN Ukr.SSR, 1962, 75 -  
83

TEXT: The method of electric migration makes it possible to estimate di-  
rectly the donor-acceptor interaction in metallic solid solutions. Previous  
studies were directed on the electric migration of the alloying component, with-  
out investigating the behavior of the base metal atoms; in a constant electric  
field the possibility of a donor-acceptor interaction between the atoms of the  
components was not taken into account. In the present article the authors stu-  
died the mutual electric migration of both components of some binary alloys,  
such as Fe-C, Fe-Cr, Fe-W, Ni-W and Fe-Mo, using the method of radio-active iso-

Card 1/4

S/849/62/000/000/008/016  
A006/A101

On the behavior of components of...

topes. The component under investigation was marked with the corresponding radioactive isotope and introduced into the central section of wire specimens, 0.6 mm in diameter and 60 mm long. The distribution of radioactivity over the specimen length was measured prior to and after electric heating. Activity graphs were plotted to determine the orientation and dislocation of the radioactive zone boundaries during the process of electric migration. It was found that carbon, chromium and tungsten migrated under the effect of the electric field towards the cathode. Molybdenum migrates toward the anode and is, contrary to C, Cr and W, an electron acceptor. The electric migration of Fe in binary solutions of C, Cr and W in iron was found to be directed toward the anode, but only a portion of Fe atoms, proportional to the amount of donor-atoms of the admixture component, participated in the migration. On the basis of experimental data obtained, migration rates of the investigated components were calculated and tabulated (Table). The experiments show that a donor-acceptor interaction exists between the components of the Fe-C, Fe-Cr and Fe-W systems. The donor or acceptor nature of admixture atoms is predetermined by the mutual position of energy levels of incomplete shell electrons of the admixture atom, and the Fermi level of the base electron spectrum. The appearance in the lattice of admixture

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S/849/62/000/000/008/016  
A006/A101

On the behavior of components of...

atoms with excess charge is connected with the deformation of energy bands of conductivity near these atoms, and the formation of a charge of the opposite sign, screening the excess charge of the admixture. This screening charge is partially distributed in the conductivity band, and partially in the band corresponding to the internal incomplete shell of the base atom. The temperature dependence of the electric migration effect is explained by the dispersing effect upon the electrons of the conductivity zone of atoms, which are in a state of thermal oscillation at the crystal lattice points, and also by changes in the degree of the donor-acceptor interaction. It can be assumed that the magnitude of the electric migration effect depends upon the correlation between the external electric field forces and the forces resulting from the transfer by conductivity electrons of oriented pulses to the ions. There are 4 figures and 1 table. ✓

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S/849/62/000/000/008/016  
A006/A101

On the behavior of components of...

Table. Migration rates of metal alloy components under the effect of an electric field, in v-cm/sec

Alloy investigated	Migrated element	Experimental temperature in °C							
		850	900	950	1000	1050	1100	1150	1200
Fe—C	C	—	—	$8,06 \cdot 10^{-6}$	$11,67 \cdot 10^{-6}$	$14,44 \cdot 10^{-5}$	$31,39 \cdot 10^{-6}$	$39,14 \cdot 10^{-6}$	—
Fe—C	Fe	—	$3,41 \cdot 10^{-6}$	$2,51 \cdot 10^{-6}$	$1,39 \cdot 10^{-6}$	$0,57 \cdot 10^{-6}$	0	—	—
Fe—Cr	Cr	—	—	—	$6,8 \cdot 10^{-7}$	$9,4 \cdot 10^{-7}$	$12,5 \cdot 10^{-7}$	$18,8 \cdot 10^{-7}$	—
Fe—Cr	Fe	—	$3,00 \cdot 10^{-7}$	$4,01 \cdot 10^{-7}$	$4,87 \cdot 10^{-7}$	$6,26 \cdot 10^{-7}$	$5,35 \cdot 10^{-7}$	$44,4 \cdot 10^{-7}$	$2,18 \cdot 10^{-7}$
Fe—W	W	—	$4,72 \cdot 10^{-7}$	$6,37 \cdot 10^{-7}$	$8,80 \cdot 10^{-7}$	$5,68 \cdot 10^{-7}$	$1,35 \cdot 10^{-7}$	0	—
Fe—W	Fe	—	$1,25 \cdot 10^{-6}$	$1,67 \cdot 10^{-6}$	$2,44 \cdot 10^{-6}$	$1,50 \cdot 10^{-6}$	$0,32 \cdot 10^{-6}$	0	—
Ni—W	W	$1,25 \cdot 10^{-6}$	$2,78 \cdot 10^{-7}$	$3,89 \cdot 10^{-7}$	$1,86 \cdot 10^{-7}$	$0,72 \cdot 10^{-7}$	0	—	—
Fe—Mo	Mo	—	—	$4,40 \cdot 10^{-7}$	$5,83 \cdot 10^{-7}$	$7,23 \cdot 10^{-7}$	$7,78 \cdot 10^{-7}$	—	—

Card 4/4

24,7500

39765  
S/126/62/013/006/014/018  
E193/E383

AUTHORS: Kalinovich, D.F., Kovenskiy, I.I. and Smolin, M.D.  
TITLE: Electrotransport of tungsten in cobalt  
PERIODICAL: Fizika metallov i metallovedeniye, v.13, no. 6,  
1962, 930 - 931

TEXT: The mobility of metal ions in a metal in a constant electrical field depends both on the diffusion mobility and on the characteristics of interaction between the ions, on the one hand, and the electrons and holes, on the other. Useful information on the mechanism of the diffusion and electrical conduction can therefore be obtained from studies of mobility of ions and the object of the present investigation was to study the electrotransport of tungsten in a cobalt alloy containing 99.48% Co, 0.24% Ni, 0.03% C, 0.04% O, 0.01% C, 0.02% Si and 0.14% Fe. Tungsten was introduced into the experimental specimens (60 mm long, 0.62 mm in diameter) by diffusion-annealing (150 hours at 1 200 °C) in tungsten powder, dry argon being used as the protective atmosphere. This treatment was followed by homogenizing annealing (80 hours at 1 350 °C),

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S/126/62/013/006/014/018  
E193/E383

Electrotransport ....

after which the tungsten content of the alloy was 0.82 wt.%. After electrodepositing a thin layer of the radioactive isotope  $W^{185}$  around the circumference in the middle of a specimen, it was sealed in an argon-filled tube and connected to a DC source, the electric current serving both to heat the specimen to the required temperature (in the 1 100 - 1 350 °C range) and to set up an electrical field, each test lasting 150 hours. The sign and extent of electrotransport was determined from the distribution of radioactivity along the specimen before and after each test. Typical results are reproduced in Fig. 1, where the radioactivity (pulses per minute) is plotted against the distance (mm) from the anode end of the specimen, the circles and crosses relating, respectively, to results obtained before and after the test which consisted of 120 hours at 1 200 °C. The absolute values of the rate of electrotransport of tungsten in cobalt, calculated from the experimental results, increased from  $2.84 \times 10^{-9}$  at 1 100 °C to  $1.56 \times 10^{-7}$  cm/sec at 135 °C .

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Electrotransport ....

S/126/62/013/006/014/018  
E193/E383

The effective charge of the tungsten ions, calculated from the known Einstein relationship, was found to be of the order of tens of electron units, which indicated the predominant part played by the hole "wind" in determining the sign of the electrotransport in the case under consideration. There is 1 figure. J

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov  
AN UkrSSR (Institute of Powder Metallurgy and  
Special Alloys of the AS UkrSSR)

SUBMITTED: February 12, 1962

Card 3/4 3

L 11259-63 EWT(m)/BDS--AFFTC/ASD  
ACCESSION NR: AP3000596

S/0181/63/005/005/1238/1242

54  
52

AUTHOR: Frantsevich, I. N.; Kalinovich, D. F.; Kovenskiy, I. I.; Smolin, M. D.

TITLE: Relative and total transfer of substance in metals under the influence of direct current

SOURCE: Fizika tverdogo tela, v. 5, no. 5, 1963, 1238-1242

TOPIC TAGS: electrotransference, transference numbers, alloys, Ag, Zn

ABSTRACT: The total and fractional velocities of transference and the transference numbers were determined for Ag-Zn alloys. Measurements were made on alloys with 25, 35, and 50 atomic % zinc. Rods 1 mm in diameter and 70 mm long were used, the two with lowest zinc content being coated electrolytically with the radioisotope Ag sup 110 and the third being marked in the same manner with Zn sup 65. All samples were annealed to produce uniform distribution of the radioisotopes. The distribution of radioactivity was then measured along the length of the rods and was found to be uniform over the entire length. Direct current was then sent through the rods, which were placed in a neutral atmosphere (argon); the rods were simultaneously heated to 550C, and the experiment continued for 280 hours. The results show that in the first two alloys, belonging to the Alpha region, the velocity of electrotransference is greater for silver than for zinc. In the third sample (the

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L 11259-63  
ACCESSION NR: AP3000596

Beta region of solid solution) the relations are reversed. The author concludes that in using radioactive tracers to measure the electrotransference of the two components of a binary alloy, it is sufficient to use tracer atoms of but one of the components. Orig. art. has: 9 formilas, 1 figure, and 1 table. 2

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov, AN USSR, Kiev  
(Institute of Metal Ceramics and Special Alloys, Academy of Sciences UkrSSR)

SUBMITTED: 11Oct62

DATE ACQ: 11Jun63

ENCL: 00

SUB CODE: PH, ML

NO REF SOV: 001

OTHER: 002

Card

lb/wm  
2/2

SMOLIN, M.D.

Temperature dependence of electric transfer in Metals.  
Fiz. tver. tela 5 no.6:1586-1588 Je '63. (MIRA 16:7)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR,  
Kiyev.

L 18008-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD/JG S/0181/63/005/006/1728/1730

ACCESSION NR: AP3001298

AUTHORS: Frantsevich, I. N.; Kalinovich, D. F.; Kovenskiy, I. I.; Smolin, M. D.

TITLE: Determining the degree of ionization of components in Mo-W alloy 59

SOURCE: Fizika tverdogo tela, v. 5, no. 6, 1963, 1728-1730 58

TOPIC TAGS: ionization, alloy, Mo, W, donor, acceptor, interaction, effective charge, radioactive isotope

ABSTRACT: The metal studied was Mo alloyed with 15 atomic % W. Thin wire samples, 0.5 mm in diameter and about 70 mm long, were prepared from this alloy, and in the middle part of each sample a thin layer of radioactive isotope (Mo<sup>99</sup> or W<sup>185</sup>) was deposited. The length of this coated segment was about 3 mm. The method of determining rate of movement of the radioactive zone has been described previously by D. F. Kalinovich, I. I. Kovenskiy, and M. D. Smolin (FTT, 3, 3367, 1961). Investigations were made in the temperature ranges 1773-2473K for W and 1973-2573K for Mo at 100° intervals. At all temperatures the Mo ions migrated toward the anode, the W ions toward the cathode. The values for effective charges indicate that the predominant effect in transfer of W ions

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L 18008-63

ACCESSION NR: AP3001298

is hole movement, that of Mo ions, electron movement. The data show that a definite proportion of the electrons supplied to the collective fund by Mo atoms migrate to W atoms. These electrons apparently contribute to the partial build-up of an imperfect 5d band in the W atoms. Thus, a donor-acceptor interaction takes place in the alloy. Orig. art. has: 3 tables and 3 formulas.

ASSOCIATION: Institut metallokeramiki i spetsial'ny\*kh splavov AN USSR, Kiev  
(Institute of Powder Metallurgy and Special Alloys, Academy of Sciences,  
Ukrainian SSR)

SUBMITTED: 02Jan63

DATE ACQ: 01Jul63

ENCL: 00

SUB CODE: PH,ML

NO REF SOV: 004

OTHER: 000

Card 2/2

FRANTSEVICH, I.N. [Frantsevych, I.M.]; KALINOVICH, D.F. [Kalynovych, D.F.];  
KOVENSKIY, I.I. [Kovens'kyi, I.I.]; SMOLIN, M.D.

Studying the diffusion of the components of a molybdenum-  
tungsten alloy over a wide temperature range. Ukr. fiz. zhur.  
8 no.9:1020-1025 S '63. (MIRA 17:8)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR,  
Kiyev.

S/126/63/015/003/021/025  
E073/E335

AUTHOR: Smolin, M.D.

TITLE: Diffusion of components into molybdenum-tungsten alloys

PERIODICAL: Fizika metallov i metallovedeniye, v. 15, no. 3, 1963, 472 - 473

TEXT: The diffusion of both components into alloys of Mo with 25 at.% W and of W with 25 at.% Mo was investigated by means of Mo<sup>99</sup> and W<sup>185</sup> isotopes in the temperature ranges 1500 - 2200, 1700 - 2300, 1900 - 2500 and 2100 - 2600 °C. Wire specimens of 0.5 mm diameter and 60 mm length were electroplated on a length of about 3 mm with a thin layer of the isotope of the element, the diffusion of which was studied. Since the layer was very thin, the radioactivity of the bath was very high, 125 to 150 mc/litre, i.e. about 50 times the current value used in similar experiments. The experimental method was the same as that used in earlier work of the author. The diffusion coefficients, determined with an error of the order of 8 - 12%, are tabulated. In all cases, the relation observed between lgD and 1/T was  
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Diffusion of ....

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linear. Therefore, the obtained values enabled calculating the temperature parameters of the diffusion - the pre-exponential factor  $D_0$  and the activation energy of diffusion  $E$  (Table 2). Comparison with data published by Bokshteyn et al (Metallovedeniye i termicheskaya obrabotka metallov, no. 9, 1962, 6) indicates that the obtained diffusion parameters are distorted, due to the influence of intercrystalline diffusion. There are 2 tables.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR (Institute of Powder Metallurgy and Special Alloys of the AS UkrSSR)

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SMOLIN, M.D.

Investigating self-diffusion in metals without the use of radioactive isotopes. Fiz. met. i metalloved. 16 no.1:138-140 JI '63.  
(MIRA 16:9)

1. Institut metallokeramiki i spetsial'nykh splavev AN UkrSSR.  
(Diffusion) (Ions--Migration and velocity)



KALINOVICH, D.F.; KOVENSKIY, I.I.; SMOLIN, M.D.

Investigating electron transfer in binary metal alloys. Fiz.  
met. i metalloved. 16 no.2:232-235 Ag '63. (MIRA 16:8)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.  
(Iron-aluminum alloys) (Electrons)

KALINOVICH, D.F.; KOVENSKIY, I.I.; SMOLIN, M.D.

Diffusion of the components of an iron-chromium alloy in a broad  
range of composition. Fiz. met. i metalloved. 16 no.4:619-620  
O '63. (MIRA 16:12)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.

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AUTHOR: Frantsevich, I. N.; D. F., Kalinovich; I. I. Kovensky; M. D. Smolin

TITLE: Study of the passage of electricity through metallic solid solutions

SOURCE: Soveshchaniye po probleme Izpol'zoyaniye atomnoy energii, Kiev, 1961. Radiatsionnaya avtomatika, izotopy\* i yaderny\*ye izlucheniya v nauke i tekhnike (Radiation automation control systems, isotopes, and nuclear radiation in science and technology); doklady\* soveshchaniya. Kiev, Izd-vo AN UkrSSR, 1964, 171-176

TOPIC TAGS: electroconductivity, solid solution, solid solution conductivity, metal solid solution, ion migration, electron density, electron vacancy, hole

ABSTRACT: The Institut metallokeramiki i spetsial'ny\*kh splavov AN UkrSSR (Institute of Powder Metallurgy and Special Alloys, AN Ukr. SSR) has worked out a method for studying the passage of electricity through solids by means of radioactive isotopes. This method makes it possible to study such passage not only in extrinsic elements but also in basic alloys. Some of the binary systems studied were: iron-carbon, nickel-chromium, cobalt-tungsten, nickel-tungsten, molybdenum-chromium, silver-palladium, etc. The radioactive isotopes used included carbon-14, iron-55, nickel-63, silver-110, etc. The experimental method has been discussed in an earlier paper by the same authors. According to

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a recently-developed theory, ions during migration through solids carry the following effective charge:

$$Z^* = Z - n_- \sigma_- l_- + n_+ \sigma_+ l_+ \quad (1)$$

where  $z^*$  is the effective charge,  $Z$  is the true ion charge,  $n$  is the concentration of the conducting electrons (holes),  $\sigma$  is the electron (hole) scattering cross-section, and  $l$  is the length of the electron (hole) free path in the alloy. Values with a minus sign refer to electrons, those with a plus sign, to holes. For greater accuracy in determining the value of the effective charge, all the quantities needed in the calculations by the well-known Einstein formula were experimentally determined for each specimen. The first set of experiments served to obtain the relationship between  $Z^*$  and temperature; the next set was aimed at obtaining the electron density as a function of the charges of the basic alloy and the admixture and of the concentration of the latter; and the third set yielded the electron and hole cross-sections. The results of these experiments are tabulated, showing a linear inverse relationship between temperature and effective charge, and a direct linear relationship between electron density and both charge and concentration. Orig. art. has: 8 formulas and 3 tables.

ASSOCIATION: None