AVERIN, Ivan Gavrilovich; ZAYTSEVA, Yelena Konstantinovna; MASHKINA,A., red.; SHLYK, M., tekhn. red.

[Thirty thousand baby pigs a year] 30 tysiach porosiat v god. Moskva, Mosk. rabochii, 1963. 39 p. (MIRA 16:8)

1. Direktor sovkhoza im.X-letiya Oktyabrya Moskovskoy oblasti (for Averin).

(Swine)

AVERIN, Ivan Vasil'yevich; KABANOV, Nikolay Nikitich; VILL', V.I., inzh., retsenzent; SHRAYMAN, I.B., inzh., red.; LEYKINA, T.L. red. izd-va; KAPLANSKIY, Ye.F., tekhn. red.

[Friction welding in the manufacture of tools; from practices of the Sestroretsk Tool Manufacturing Plant named after Voskov] Svarka treniem v instrumental'nom proizvodstve; iz opyta Sestroretskogo instrumental'nogo zavoda imeni Voskova. Moskva, Mashgiz, 1962. 72 p. (MIRA 15:12)
(Leningrad--Tool and die industry) (Tools--Welding)

AVERIN, Nikolai Dmitrievich

Stockpiling of cob Moskva Stroiizdat, 1944. 16 p. 51-51802

TP832.C6A9

1. Cob (Building material)

AVERIN, Nikolai Dmitrievich.

The manufacture of foundation blocks Moskva Stroiizdat Narkomstroia, 1944. 17 p.
51-52120

TP832.C6A89

1. Cob (Building material)

AVERIN, N. D. and P. A. ZHUKOV.

Problemy ekskavatoros-troenlia v SSSR. Sverdlovsk, Mashgiz, 1946. 131 p. illus.

(Problems of excavator construction in the USSR.)

DLC: TA730.Z5

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

AVERIN, Nikolai Dmitrievich

Quarries of building material Moskva, Gos. izd-vo stroit. lit-ry, 1946. 230 p.
52-35268

TN277.A8

AVERIN, N.D., inzhener.

Increasing dragline productivity. Mekh.stroi. 4 no.10:3-5 Oct. '47.
(MLRA 9:3)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut po organizatsii i mekhanizatsii stroitel'stva.
(Earthmoving machinery)

AVERIN, N.D., inzhener.

Excavator construction in the U.S.S.R. Mekh. stroi. 4 no.11:7-10 N '47. (MLRA 9:2)

1.Vsesoyuznyy nauchno-issledovatel'skiy institut po organizatsii i mekhanizatsii stroitel'stva.
(Excavating machinery)

AVERIN, Nikolai Dmitrievich

Excavation by machinery Moskva, Gos. izd-vo stroit. lit-ry, 1949. 71p. Nauchno-populiarnaia biblioteka stroitelia 50-35528

TA735.A9

AVERIN, Nikolai Dmitrievich

Earth-work 3.izd., perer. i dop. Moskva, Gos. izd-vo stroit. lit-ry, 1949. 86 p.
50-15030

TA715.A9 1949

1. Earthwork.

AVERIN, N.D.

Planning operations of earthmoving machinery. Stroi.prom. 27 no.1:13-16 Ja '49. (MIRA 13:2)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut po organizatsii i mekhanizatsii stroitel'stva.
(Earthmoving machinery)

N. D.

AVERIN, Nikolay

AVERIN, Nikolay Dmitriyevich; ROGOVSKIY, L.V., redaktor; CHEBYSHEVA, Ye.A., tekhnicheskiy redaktor.

[Raising the productivity of earthmoving machines] Povyshenie proizvoditel'nosti zemleroinykh mashin. Moskva, Mashgiz, 1950. 179 p. (Earthmoving machinery) (MLRA 7:8)

AVERIN, N. P.

"The efficient organization of transportation during earth excavations," Mechanization of Labor Consuming and Heavy Work, 1951.

AVERIN, N. D.

AVERIN, N. D. - Inzh. i, ZELENIN, [illegible] - d-r Tekh Nauk, [illegible]VSKIY, L. V. - Inzhener, MIKHAYLOVSKAYA, N. K. - Inzhener, KURIN, I. A. - Inzhener

Vse soyuznyy nauchno-issledovatel'skiy institut organizatsii i mekhanizatsii stroitel'stva (Vnioms)

ZEMLERoYNOYE O GRUNTOVANIYE I RAZRA OTKA VYYEMOK (SPRAV [illegible] YE POSOBIYE)

Page 142

SO: Collection of Annotations of Scientific Research Work on Construction, completed in 1950. Moscow, 1951

AVERIN, Nikolai Dmitrievich

Organization of transport of larege masses of earth Moskva, Gos. izd-vo lit-ry po stroitel'stvu i arkhitekture, 1952. 71p
Velikim stroikam kommunizma 53-23185

TA715.A87

1. Earthwork. 2. Earthmoving machinery.

AVERIN, N. D.

Changeable shovel for single shovel excavators. N. D. Averin., Mekh. stroi, 9, no. 2, 1952.

SO: MLRA. April 1952.

AVERIN, N. D.

"Tractow scrapers." Reviewed by N.D. Averin. Mekh. stroi. 9 no. 4, 1952

SO: MLRA. July 1952.

AVERIN, M.D., inzhener, laureat Stalinskoy premii; NEMENKO, L., redaktor; VUYEK, M., tekhnicheskiy redaktor

[Earthwork] Zemlianye raboty. [Kiev] Gos. izd-vo tekhn. lit-ry USSR, 1953. 238 p. (MLRA 8:7)
(Earthwork)

AVERIN, Nikolay Dmitriyevich, inzhener, laureat Stalinskoy premii.

[Quarrying] Kar'ernoe khozialstvo. Moskva, Gos.izd-vo lit-ry po stroitel'-stvu i arkhitekture, 1953. 439 p. (MLRA 6:7)
(Quarries and quarrying)

AVERIN, Nikolay Dmitriyevich, inzhener, laureat Stalinskoy premii [author]; VARAKIN, V.I., inzhener; CHLENOV, G.O., inzhener [reviewers].

A book which does not fulfill its purpose. "Quarrying." N.D.Averin. Reviewed by V.I.Varakin, G.O.Chlenov. Mekh.trud.rab. 7 no.10:46-47 O-N '53. (MLRA 6:10)

(Quarries and quarrying) (Averin, Nikolai Dmitrievich)

AVERIN, N.D.

TOLSTOPYATOV, V.M., professor.

"Organizing the transportation of large masses of earth." N.D. Averin. Reviewed by Tolstopyatov. Mekh.stroi. 10 no.5:31 My '53. (MLRA 6:6)
(Earthwork) (Averin, Nikolai Dmitrievich)

AVERIN, N.D., laureat Stalinskoy premii, inzhener; PETERS, Ye.R., kandidat tekhnicheskikh nauk; BARON, F. Ya.

Bucket vibrators for single-bucket excavators. Mekh.stroi. 10 no.6:12-3. Je '53. (MLRA 6:6)

(Excavating machinery)

AVERIN, N.D., laureat Stalinskoy premii, inzhener; PETERS, Ye.R., kandidat tekhnicheskikh nauk; FEYNBERG, G.M., inzhener.

Concerning the type of self-propelled scraper. Mekh.stroi. 10 no.7:6-10 Jl '53. (MLRA 6:7)
(Excavating machinery)

SHISHKO, Ye.F., professor, doktor tekhnicheskikh nauk [reviewer]; AVERIN, N.D., inzhener, laureat Stalinskoy premii [author].

"Quarrying." N.D.Averin. Reviewed by E.F.Shishko. Mekh.stroi. 10 no.12:29-30 D '53. (MLRA 6:11)
(Quarries and quarrying)

AVERIN, N. D.

USSR/Engineering---Excavation

Card 1/1

Author : Averin, N. D., Engineer, Laureate of the Stalin prize

Title : Complex mechanization of excavation work

Periodical : Mekh. Stroi. 11/2, 10-13, February 1954

Abstract : The article is an analysis of factors involved in effective mechanized excavation work. The basic conditions of correct coordination of machine operations and organization of technological procedure, the author states, are: a) the parameters of the machines should correspond to the character and volume of the work, the type and dimensions of the equipment installed and their number should be held at a minimum; b) the production of each machine should insure the greatest amount of work for the power supplied; and c) the whole unit should insure a steady flow of excavated material.

Institution : .....

Submitted : .....

AVERIN, N.D.

AVERIN, N.D., inzhener, laureat Stalinskoy premii; PETERS, Ye.R., kandidat tekhnicheskikh nauk; SHINKEVICH, N.A., inzhener.

New machinery for working frozen ground. Mekh.stroi. 11 no.7: 9-11 Jl '54. (MLRA 7:7)
(Frozen ground) (Earthmoving machinery)

CHERKASHIN, V.A., kandidat tekhnicheskikh nauk; AVERIN, N.D., laureat Stalinskoy premii [deceased]; POZDNYAK, V.P., inzhener, redaktor; UDOD, V.Ya., redaktor; VOLKOV, V.S., tekhnicheskiy redaktor.

[Winter mining of sand and clay in open pits] Razrabotka glinianykh i peschanykh kar'erov v zimnee vremia. Moskva, Gos.izd-vo lit-ry po stroit. i arkhitekture, 1955.87p [Microfilm](MLRA 9:6)

1.Nachal'nik laboratorii Vsesoyuznogo nauchno-issledovatel'skogo instituta organizatsii i mekhanizatsii stroitel'stva (for Averin). 2.Vsesoyuznyy nauchno-issledovatel'skiy institut organizatsii i mekhanizatsii stroitel'stva.
(Clay) (Sand)

AGAPOV, D.S.; ARTIBILOV, B.M.; VIKTOROV, A.M.; GINTS, A.N.; GOR'KOV, A.V.; GUSYATINSKIY, M.A.; KARPOV, A.S.; KOLOT, I.I.; KOMAREVSKIY, V.T.; KORYAGIN, A.I.; KRIVSKIY, M.N.; KRAYNOV, A.G.; NESTEROVA, I.N.; OBES, I.S., kandidat tekhnicheskikh nauk; SOSNOVIKOV, K.S.; SUKHOTSKIY, S.F.; CHLENOV, G.O.; YUSOV, S.K.; ZHUK, S.Ya., akademik, glavnyy redaktor; KOSTROV, I.N., redaktor; BARONENKOV, A.V., professor, doktor tekhnicheskikh nauk, redaktor; KIRZHNER, D.M., professor, doktor tekhnicheskikh nauk, redaktor; SHESHKO, Ye.F., professor, doktor tekhnicheskikh nauk, redaktor; AVERIN, N.D., inzhener, redaktor [deceased]; GOR'KOV, A.V., inzhener, redaktor; KOMAREVSKIY, V.T., inzhener, redaktor; ROGOVSKIY, L.V., inzhener, redaktor; SHAPOVALOV, T.I., inzhener, redaktor; RUSSO, G.A., kandidat tekhnicheskikh nauk, redaktor; FILIMONOV, N.A., inzhener, redaktor; VOLKOV, L.N., inzhener, redaktor; GRISHIN, M.M., professor, doktor tekhnicheskikh nauk, redaktor; ZHURIN, V.D., professor, doktor tekhnicheskikh nauk, redaktor; LIKHACHEV, V.P., inzhener, redaktor; MEDVEDEV, V.M., kandidat tekhnicheskikh nauk, redaktor; MIKHAYLOV, A.V., kandidat tekhnicheskikh nauk, redaktor; PETROV, G.D., inzhener, redaktor; RAZIN, N.V., redaktor; SOBOLEV, V.P., inzhener, redaktor; FERINGER, B.P., inzhener, redaktor; TSYPLAKOV, V.D., inzhener, redaktor; ISAYEV, N.V., redaktor; TISTSOVA, O.N., redaktor; SKVORTSOV, I.M., tekhnicheskiy redaktor

[The Volga-Don Canal; technical report on the construction of the Volga-Don Canal, the TSimlyanskaya hydro development and irrigation works (1949-1952); in five volumes] Volgo-Don; tekhnicheskii otchet

(continued on next card)

AGAPOV, D.S. --- (continued) Card 2.
o stroitel'stve Volgo-Donskogo sudokhodnogo kanala imeni V.I.Lenina. TSimlianskogo gidrouzla i orositel'nykh sooruzhenii (1949-1952) v piati tomakh. Glav.red. S.IA. Zhuk. Moskva, Gos.energ. izd-vo. Vol.5. [Quarry management] Kar'ernoe khoziaistvo. Red.toma I.N. Kostrov. 1956. 172 p. (MLRA 10:4)

1. Russia (1923- U.S.S.R.) Ministerstvo elektrostantsii. Byuro tekhnicheskogo otcheta o stroitel'stve Volgo-Dona. 2. Deystvitel'nyy chlen Akademii stroitel'stva, i arkhitektury SSSR (for Razin)
(Quarries and quarrying)

AVERIN, N.D.

Conducting earthwork operations in winter. Stroi.prom. 27 no.9:3-6 S '59. (MIRA 13:2)
(Earthwork--Cold weather conditions)

BABAKOV, A.A.; FEDOROVA, V.I.; SOLOV'YEV, L.L.; IOIA, V.N.; DOBOKA, L.I.; CHERKASHINA, N.P.; SHAMIL', Yu.P.; SMOLYAKOV, V.F.; BABKOV, T.M.; MOSHKEVICH, Ye.I.; PARADA, A.N.; REPESHKO-KRAVCHENKO, S.I.; ALEKSEYENKO, M.F.; KOROBKO, M.I.; KOROBKO, I.M.; AVERIN, N.M.; MATOV, A.A.; MIGUTSKIY, L.R.

Inventions. Met. i gornorud. prom. no.4:83 Jl-Ag '64. (MIRA 18:7)

AVERIN, A. M.

AVERIN, A. M. [Averin, O. M.] (Saratov); BURMISTROV, Ye. F. [Burmistrov, IE. F.] (Saratov)

Bending of a plate with a hole in which is soldered a rigid washer. Prykl. mekh. 8 no.6:675-679 '62. (MIRA 15:10)

1. Saratovskiy gosudarstvennyy universitet i Saratovskiy politekhnicheskiy institut.

(Elastic plates and shells)

AVERIN, O.F.

SEREDA, M.V.; AVERIN, O.F.

Experience of the "Chervonyi Ekskavator" Plant workers in increasing labor productivity and production. Nauk.zap.Kiev.un. 15 no.9:71-76 '56. (MIRA 10:7)

1. Direktor zavodu "Chervoniy ekskavator" (for Sereda).
2. Nachal'nik planovogo viddilu (for Averin).
(Kiev--Excavating machinery) (Labor productivity)

SLOTVINSKIY-SIDAK, N.P.; POTAPOV, V.I.; AVERIN, P.I.

Precipitating pure and chemically pure vanadium pentoxide from alkaline solutions. TSvet. met. 38 no.5:67 My '65.
(MIRA 18:6)

137-58-6-11679

Translation from Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 65 (USSR)

AUTHORS: Semikin, I.D., Averin, S.I.

TITLE: Controlling the Flame Jet in Open-hearth Furnaces (Organizatsiya fakela plameni v martenovskikh pechakh)

PERIODICAL: Tr. Donetsk. otd. Nauchno-tekhn. o-va chernoy metallurgii, 1957, Nr 5, pp 39-46

ABSTRACT: When a free jet moves in an infinite space, the process of mixing consists of the capture of and transportation of the necessary amount of air into the depth of the flame and then of intimate intermixing thereof. The flame length (FL) depends upon the diameter of the burner, the heating value of the gas (calculation has to be in terms of heat value per unit weight), the O_2 content of the air, the velocities of the gas and air flows and the angle at which they meet. In open-hearth furnace practice, FL is not dependent upon the velocity of the gas, unless supplementary sources of energy are used in the form of compressed air. But the FL does depend upon air velocity, declining as air velocity increases. The angle of contact of gas and air must not be $>20^{\circ}$, because although the FL diminishes

Card 1/2

Controlling the Flame Jet in Open Hearth Furnaces

in this case as the result of the impact of the flows, the aerodynamics of the flame are simultaneously impaired. Venturi ports should be modified in the following directions: 1) reduction of the dimensions of the gas port where reserve draft is available, 2) provision of multiple-jet burners if coke gas is available. The speed of outflow of cold coke gas should be $\geq$ 80 m/sec. 3) delivery of compressed air in high-pressure jets with Laval nozzles. It was found at one of the plants in Dnepropetrovsk that delivery of compressed air into the tank by means of two side nozzles reduced heat time by 30-40 min. A design has been developed of a port with an aerodynamic tank in which the major role is played by air and not gas.

M.M.

1. Open hearth furnaces--Control systems

Card 2/2

38389

S/148/62/000/004/004/006
E081/E435

11.7200

AUTHORS: Semikin, I.D., Averin, S.I.

TITLE: Basic mechanism of a turbulent gas flame

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, no.4, 1962, 140-152

TEXT: The paper is a continuation of previous work. The similarity conditions in turbulent flow are analysed and a formula derived for transforming from one type of flow to another. The length of the flame is regarded as the sum of two lengths, the capture length in which the gas emerging from the nozzle captures some of the surrounding air and the transfer length in which the combustion is completed. The forces in the flame due to the difference between the densities of the gases, and the dimensionless Euler forces arising from the differences in static pressure are evaluated and a calculation made of the amount of air transferred in the capture length. A fifth power equation is obtained for the dimensionless length of the turbulent flame and the factors determining this length are briefly discussed.

Card 1/2

Basic mechanism ...

There are 3 figures.

ASSOCIATION: Dnepropetrovskiy metallurgicheskiy institut
(Dnepropetrovsk Metallurgical Institute)

SUBMITTED: June 19, 1961

Card 2/2

S/148/62/000/006/003/005
E081/E435

AUTHORS: Averin, S.I., Semikin, I.D.

TITLE: Combustion of a single component gas mixture in a turbulent flame

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya metallurgiya, no.6, 1962, 146-154

TEXT: In a previous work (Izv.VUZ. Chernaya metallurgiya, no.4, 1962) the present authors found the formula for flame length

$$Z_{0_{\text{фак}}} = \left[N_0(1+G) - \frac{1}{b_0}\right] \sqrt[3]{\frac{\gamma_r}{\gamma_{\text{см}}\left(\Delta + \frac{f(G)\cdot f(\gamma)}{Fr} Z^3_{C_{\text{фак}}}\right)}}, \qquad (1)$$

In order to calculate flame length from this formula, it is necessary to know the mean composition and specific gravity of the gas mixture at the end of the capture path, and equations are quoted for (1) the weight fractions of combustible gas, of residual

S/148/62/000/008/008/009
E194/E435

AUTHORS: Averin, S.I., Semikin, I.D.

TITLE: The combustion of multicomponent gas mixtures in a turbulent flame

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, no.8, 1962, 158-169

TEXT: General equations are first formulated for the combustion of a mixture of two combustible gases with oxygen. The combustion of mixtures of oxides of carbon and hydrogen is then considered and, on the basis of previous articles by the same authors (Izv.VUZ. Chernaya metallurgiya, nos. 4 and 6, 1962), a formula is derived for the ratio of the flame length to the gas nozzle diameter. An auxiliary graph is given to facilitate practical calculations with the formula. The combustion of hydrocarbons and of mixtures of several gases is then considered. Calculations are made of flame length as function of Froude Number for oxides of carbon, hydrogen, generator gas, natural gas, coke oven gas, blast furnace gas and Moscow city gas in an atmosphere of air for subsonic rates of gas flow. The results are compared with

Card 1/2

S/148/62/000/012/008/008
E081/E184

AUTHORS: Averin, S.I., and Semikin, I.D.

TITLE: Length of a turbulent gas flame issuing under high pressure from cylindrical and conical jets

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya metallurgiya, no.12, 1962, 162-173

TEXT: A formula for turbulent flame length derived previously by the present authors (Izv. vuz. Chern. met. no.8, 1962) is analysed and developed with special reference to conditions of high gas velocity, in which changes of gas density must be taken into account. The relationship between the specific gravity and the velocity of the gas is established, and two criteria, characterising respectively the relative gas flow and the initial gas compression, are obtained. Calculations are carried out for Shebelinka natural gas (92.3% CH_4, 4.21% C_2H_6, 0.9% C_3H_8, 0.33% C_4H_{10}, 0.46% C_5H_{12}, 1.39% N_2, 0.41% CO), and curves are given to show the dependence of flame length on relative gas flow. The flame length increases continuously with increasing gas flow, but at a decreasing rate up to a critical flow, after which the rate

Card 1/2

increases again. Smaller diameter jets give shorter flames with a greater ratio of flame length to jet diameter. If the air is pre-heated, the flame length increases more rapidly with gas flow than if it is not; the flame length to jet diameter ratio depends less on jet diameter and the flame is longer. Measurements made with Shebelinka gas show good agreement with theory.
There are 6 figures.

ASSOCIATION: Dnepropetrovskiy metallurgicheskiy institut
(Dnepropetrovsk Metallurgical Institute)

SUBMITTED: September 12, 1961

Card 2/2

AVERIN, S.I.; SEMIKIN, I.D.

Calculating the length of a turbulent gas flame. Izv.vys.uchob.zav.; chern. met. 8 no.4:202-211 '65. (MIRA 18:4)

1. Dnepropetrovskiy metallurgicheskiy institut.

LEVENETS, N.P.; SAMARIN, A.M.; SEMIKIN, I.D.; KAZAKOV, V.E.; BEMBINEK, Ye.I.; PANYUKHNO, L.G.; SVINOLOBOV, N.P.; AVERIN, S.I.; SMIRNOV, V.M.; ZELENSKIY, V.D.; LAYKO, B.G.; TISHCHENKO, O.I.; OKHRIMOVICH, B.P.; DANILOV, A.M.; TISHKOV, Yu.Ya.; PANOV, M.A.; MARKELOV, A.I.; PETROV, A.K.; VASILEVSKIY, P.A.; PASYUK, K.I.; NESTEROV, V.I.; KHRUSTAL'KOV, L.A.; GLAZKOV, V.S.; MAKAGON, V.G.; FOMIN, G.G.; TRISHCHENKO, V.D.; KORZH, V.P.; SUYAROV, D.I.; ARSEYEV, A.V.; PAVLYUCHENKO, A.A.; ZHADAYEV, V.G.; KONDORSKIY, R.I.; MOROZOVA, I.A.; KOCHETOV, V.V.; PRUZHINER, V.L.; MALEVICH, I.A.; MALIOVANOV, D.I.; ZAKOVRYASHIN, I.I.; NOVSKIY, I.S.; NOVIKOVA, V.P.; GRISHIN, K.N.; MOSKOVSKAYA, M.L.; KORNEYEV, B.M.

Inventions. Met. i gornorud. prom. no.3:75-76 My-Je '64.
(MIRA 17:10)

AVERIN, S.Z., SEMIKIN, I.D.

Effect of various factors on the length of a turbulent gas flame. Izv. vys. ucheb. zav., chern. met. 8 no.10:146-152 '65. (MIRA 18:9)

1. Dnepropetrovskiy metallurgicheskiy institut.

SEMKIN, Iosif Danilovich; AVERIN, Sergey Ivanovich; KADCHENKO, Irina Ivanovna; KOVALEV, A.P., prof., doktor tekhn. nauk retsenzent; TELEGIN, A.S., dots., kand. tekhn. nauk, retsenzent

[Fuel and fuel management in metallurgical plants] Toplivo i toplivnoe khoziaistvo metallurgicheskikh zavodov. Moskva, Metallurgiia, 1965. 391 p. (MIRA 18:11)

ACC NR: AP6029071 SOURCE CODE: UR/0413/66/000/014/0128/0129

INVENTOR: Gerlovin, L. I.; Chernovin, N. A.; Averin, V. A.; Nagibin, A. Ya.; Torgashov, A. L; Aleksandrovskiy, A. A.; Sigachev, V. P.; Mikhaylovskiy, M. M.; Mironov, M. I.

ORG: none

TITLE: Valve with a hydraulic or pneumatic piston drive. Class 47, No. 184084 [announced by the Special Design Office of the Baltic Boiler Building Factory im. Sergo Ordzhonikidze (Spetsial'noye konstruktorskoye byuro kotlostroyeniya Baltiyskogo zavoda)]

SOURCE: Izobret prom obraz tov zn, no. 14, 1966, 128-129

TOPIC TAGS: valve, hydraulic piston drive, pneumatic piston drive, hydraulic device, pneumatic device, piston engine

ABSTRACT: The proposed valve with a hydraulic or pneumatic piston drive is designed for opening and closing the through flow-section of main and auxiliary pipings. In order to synchronize the opening and closing of both pipings, its control piston is provided with an annular groove, which, in the open valve position, connects the

Card 1/2 UDC: 621.646.23-82-85

57

PURPOSE I BOOK EXPLOITATION SOV/5460

Leningradskiy metallicheskiy zavod. Otdel tekhnicheskoy informatsii.

Nekotoryye voprosy tekhnologii proizvodstva turbin (Current Problems in the Manufacture of Turbines) [Collection] Leningrad, 1960. 398 p. (Series: Its: Trudy, vyp. 7) Errata slip inserted. 2,100 copies printed.

Sponsoring Agency: [illegible]. Sovet narodnogo khozyaystva Leningradskogo [illegible] administrativnogo rayona, Upravleniye [illegible] Kharkhelego mashinostroyeniya, and Leningradskiy dvazhdy ordena Lenina metallicheskiy zavod. Otdel tekhnicheskoy informatsii.

Ed. (Title page): G. A. Drobenko; Editorial Board: [illegible]; G. A. Drobenko, [illegible] A. Glebov, A. [illegible] and N. K[illegible]; Tech. Ed. [illegible] I. [illegible]storovich; [illegible]. For Literature on Machinology: Yu. P. Narkov, Engineer, Leningrad Department [illegible].

[illegible] is intended for technical [illegible], personnel, organizations, [illegible]

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Certain Problems (Cont.) SOV/5460

COVERAGE: The experience of the LMZ (Leningradskiy metallicheskiy zavod - Leningrad Metalworking Plant) in the manufacture of modern large-capacity turbines is presented. Methods for the rationalization of basic manufacturing processes and for the mechanization and automation of manual operations are given. Descriptions of attachments and tools designed by LMZ for improving labor productivity and product quality are provided, and advanced inspection methods discussed. References accompany some articles. No personalities are mentioned. There are 26 references: 25 Soviet and 1 English.

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B102/B212

26.2311

AUTHORS: Averin, V. G., Mazing, M. A., Pisanko, A. I.

TITLE: Spectroscopic investigation of a toroidal discharge

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. (7), 1961, 42 - 48

TEXT: The authors report on spectroscopic investigations of light emitted from plasma in a "Beta" toroidal chamber under various test conditions. Contrary to the "Alpha" and "Zeta" chambers, this chamber has a considerably higher current density. Here are some parameters of the "Beta" chamber: Main torus diameter: 750 mm; diameter of the discharge chamber: 210 mm; duration of discharge: 670 μsec; field: 200 - 1100 oe; maximum discharge current: 120 ka (at 1.5 kv); maximum current density: 400 a/cm^2. The light emitted by the plasma was observed through a quartz window. Two mirrors were used to reflect it to two monochromators of type ЗМР-2(ZMR-2). At the outputs of these monochromators there were photomultipliers of type ФЭУ-18(FEU-18). The pulses from the multipliers were led to the oscilloscope ОК-24МКВ(OK-24MKV) via two amplifiers. The discharge current was

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Spectroscopic investigation of...

measured with the help of a "Rogovskiybelt" probe. After integration its signals were fed to an OK-17M(OK-17M) oscilloscope. The voltage pulses were fed to the second input of this oscilloscope. The intensity of the spectral lines has been studied as a function of time for oxygen, fluorine, nitrogen, carbon, and helium and also the influence of initial conditions on the discharge and the influence of impurities. The following has been found: Ions with various charges start to emit light at various instants after the discharge has started. Ions with higher charges (OV, FV) will start later to emit light than ions with lower charges (OIII, FIII). All lines show an intensity minimum where the discharge current has its maximum. On both sides of this minimum OIII and OIV have distinct maxima; OV, however, has only a weak one at the end of discharge. The intensity characteristics with respect to time of NV, NIV, and CIII are similar to those of OII, OIV, FIII and FIV. It has been found that the occurrence of an intensity dip of the lines was very sensitive with respect to changes in pressure, discharge current and magnetic field. The plasma resistance is also a function of these parameters. If the field deviates from its optimum value (150 - 200 oe) on either side the dip will disappear and strong intensity fluctuations will show up. Analogous conditions are found if the optimum pressure is not kept

Spectroscopic investigation of...

($3.5 - 4.5 \cdot 10^{-3}$ mm Hg). A decrease of the discharge current will also bring about a flattening and, finally, a disappearing of the minimum. When 50 % He was added to H, no changes occurred, just as in a discharge in pure He. Addition of argon, however, had a significant influence. The occurrence of a minimum may be explained by at least two hypotheses. The degree of ionization (OII→OIV→OV→OVI) which increases with the electron temperature, can be considered as the cause, or due to instabilities during discharge the plasma may touch the wall. The electron temperature will drop, and an intensity dip will occur. The first assumption seems more probable. An analogous dip was also found in the chamber "Scilla" (Phys. Rev. 119, 843), and is attributed to the transition $O^{5+} \rightarrow O^{6+}$ due to an increase of the electron temperature. At a discharge current of 120 ka, the electron temperature will reach about 30 ev and keep this value for about 100 μsec. The rate of temperature increase and the maximum temperature depend on the discharge current. At 50 ka the electron temperature is not higher than 14 ev at the moment of maximum current. In order to determine the maximum electron temperature exactly, it would be necessary to investigate the intensities of the lines OVI, FVI and, if possible, OVII as a function of time. The authors thank Academician I. K. Kikoin and Professor S. L.

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Spectroscopic investigation of...

Mandel'shtam for advice and interest, and V. V. Sokol'skiy for help and discussion. There are 5 figures, 1 table, and 6 references: 2 Soviet-bloc and 4 non-Soviet-bloc. The two most important references to English-language publications read as follows: F. C. Jahoda et al. Phys. Rev. 119, 843, 1960; C. Brenton, L. Herman. IV. Internat. Conf. on Ionization Phenom. in Gases, Uppsala, 1959, p. 17.

SUBMITTED: January 21, 1961

Legend to the Table: (1) Line; (2) transition; (3) energy of the upper level, ev.

Линия (1)	λ, Å	Переход (2)	Энергия верхнего уровня (3), эв
OV	2781	$3s^3S_1-3p^3P_2$	81
OIV	3003	$3^1S_{1/2}-3^1P^0_{3/2}$	48
OIII	3047	$3s^3P^0_2-3p^3P_1$	37
FV	2707	$3s^4P^0_{7/2}-3p^1D_{1/2}$	81
FIV	2826	$3s^3P^0_2-3p^3D_3$	56
FIII	2904	$3s'^4S^0_{5/2}-3p'^4P_{7/2}$	53
NV	4945	$6^1G-7^2H^0$	91
NIV	3485	$3^1S_1-3^1P^0_1$	50
CIII	4650	$3^1S_1-3^1P^0_1$	32
He II	4685	3^1D-4^1F	51

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S/0057/64/034/002/0269/0271

ACCESSION NR: AP4013413

AUTHOR: Averin, V.G.; Mazing, M.A.; Pisanko, A.I.

TITLE: Investigation of fluctuations in intensity of spectrum lines in a toroidal discharge in a weak magnetic field

SOURCE: Zhurnal tekhn.fiz.,v.34, no.2, 1964, 269-271

TOPIC TAGS: discharge, toroidal discharge, turbulent discharge, line intensity fluctuations, electron density fluctuations, aluminum(III), fluorine(III), fluorine(V), oxygen(IV), oxygen(V), Beta installation

ABSTRACT: The intensity fluctuations of spectrum lines in the weak magnetic field toroidal discharge of the "Beta" installation were observed over the frequency range from 10 to 100 kilocycles by an experimental technique described earlier (V. G.Averin,M.A.Mazing,A.I.Pisanko,ZhETF,41-42,1961). The following lines were observed: Al III 3621Å; F III 2994Å; F V 2707Å; O IV 3063Å; O V 2781Å. Strong fluctuations occurred, but only after thorough cleaning of the discharge chamber over a period of days. The gas pressure could be varied from 0.001 to 0.01 mm Hg. The intensity fluctuations were strongest (up to 50% of the mean) between 0.001 and 0.003

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ACCESSION NR: AP4013413

mm Hg. Above 0.005 mm Hg the fluctuations sharply decreased, and between 0.003 and 0.005 mm Hg they gave way to the characteristic "collapse" in the temporal course of the light intensity described in the reference cited above. The experimental technique was such that two spectrum lines originating in the same portion of the discharge could be observed simultaneously. Correlations were sought between the intensity fluctuations of different lines. Between the fluctuations of lines of widely different excitation energies (in particular, F V and F III, and O V and O IV) only low frequency (<20 kilocycle) correlations were present. The intensity fluctuations of lines with similar excitation energies (in particular, O V and F V) were correlated at all frequencies observed, up to 100 Kc. (Higher frequency fluctuations could not be followed because of noise in the recording equipment.) Correlations were also sought between spectrum line intensity fluctuations and the signal received by a 0.5 m antenna located near the discharge chamber. Low frequency correlations were observed, but high frequency correlations were not. It is assumed that the intensity fluctuations are due to electron density fluctuations and that spectral lines with nearly the same excitation energies originate in the same region of the discharge. It is concluded from the observed correlations, therefore, that the high frequency electron density fluctuations are of

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ACCESSION NR: AP4013413

limited spatial extent, whereas the lower frequency fluctuations extend throughout a larger region of space. "The authors express their deep gratitude to academician I.K.Kikoin and professor S.L.Mandel'shtam for discussing the results and for their constant interest in the work." Orig.art.has: 2 figures.

ASSOCIATION: none

SUBMITTED: 30Jan63 DATE ACQ: 26Feb64 ENCL: 00

SUB CODE: PH NR REF SOV: 002 OTHER: 006

Card 3/3

ACCESSION NR: AP4040312 S/0057/64/034/006/1131/1132

AUTHOR: Averin, V.G.; Lobikov, Ye.A.; Nastyukha, A.I.

TITLE: Measurement of the electron density distribution in the toroidal discharge of the "beta" installation (Letter to the editor)

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.6, 1964, 1131-1132

TOPIC TAGS: plasma, electron density, particle distribution, discharge plasma, Beta installation

ABSTRACT: The electron density distribution in the toroidal discharge of the "beta" installation was determined from the current and electron energy distributions. The current and velocity distributions were measured with a special probe consisting of an 11 mm diameter stainless steel cylinder containing a 6 x 9 mm^2 collecting electrode. An 0.02 mm thick tantalum foil with an 0.05 mm diameter opening for entrance of electrons was welded to one wall of the cylinder, and the instrument could be located at various positions within the discharge with the opening either up stream or down. A pressure of about 10^{-4} mm Hg was maintained within the probe by separate pumping. The characteristic curves obtained with this probe are not discussed. The

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ACCESSION NR: AP4040312

electron density decreased monotonically with distance from the axis of the discharge and fell to zero at the wall of the tube at a distance of 10.5 cm from the axis. The decrease of electron density with increasing radius was at first very slow, the density decreasing by only 10% in the first 6.5 cm. The maximum electron density was 3×10^{13} cm^{-3} with a discharge current of 50 kA and 7×10^{13} cm^{-3} with a discharge current of 90 kA. The plasma did not break from the wall and form a filament at this current. Orig.art.has: 2 figures.

ASSOCIATION: none

SUBMITTED: 02Jul63 DATE ACQ: 18Jun64 ENCL: 00

SUB CODE: NP, ME NR REF SOV: 003 OTHER: 002

Card 2/2

ACCESSION NR: AP4028970 S/0057/64/034/004/0767/0768

AUTHOR: Averin, V.G.; Mazing, M.A.; Pisanko, A.I.

TITLE: Spectroscopic investigation of a toroidal discharge

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.4, 1964,767-768

TOPIC TAGS: plasma, Beta plasma machine, electron temperature, plasma electron temperature, plasma spectrum, oxygen ion, fluorine ion

ABSTRACT: The time variation of the intensity of the O V 2781 Å and O VI 1032 Å lines in the spectrum of the "Beta" installation discharge was measured. This work was a continuation of earlier work of the same type (V.G.Averin, M.A.Mazing and A. I.Pisanko,ShETF 41,42,1961). The discharge time of the "Beta" machine was 1100 microsec and the maximum current was 120 ka. The lines were isolated with a 70° constant deflection diffraction grating monochromator (dispersion 16 Å/mm) and were recorded by means of a sodium salicylate screen, a photomultiplier, and an oscilloscope. As was previously observed (loc.cit.supra), the O III, O IV, O V, F III, V IV, and F V lines decreased in intensity during the portion of the discharge in which the current reached its peak. This is interpreted (as before) as a result of

Card 1/2

AVERIN, V.V.

FD-2992

USSR/Engineering - Metallurgy

Card 1/1 Pub. 41-5/12

Author : Averin, V. V., Polyakov, A. Yu., and Samarin, A. M., Moscow

Title : The activity of oxygen in liquid iron

Periodical : Izv. AN. SSSR. Otd. Tekh. Nauk, 3, 90-107, March 1955

Abstract : Describes the experimental method used and the results obtained in the study of the activity of oxygen in liquid iron and its effect on the iron. The gas-metal equilibrium at different temperatures was determined. The effects of hydrogen gas were studied. Concludes that the activity of oxygen in liquid iron depends on the temperature as well as the oxidizing potential of the gas; proper equilibrium of oxygen is essential for oxidation of metals; oxygen escapes from the molten metal during its crystallization and cooling. Graphs, diagrams, photographs, tables, formulae. Fifteen references, 4 USSR.

Institution :

Submitted : February 1, 1955

AVERIN, V.V.

Acquire of oxygen in liquid iron

that the [illegible] in the gas is largely dependent upon the gas d as well as the gas vel. The degree of satn. of the gases with H2O vapor increases with increasing gas d. and the velocity of the gas stream. A method has been developed for detn. of the equil. liquid metal-gas phase. 18 references.

H. Sierts

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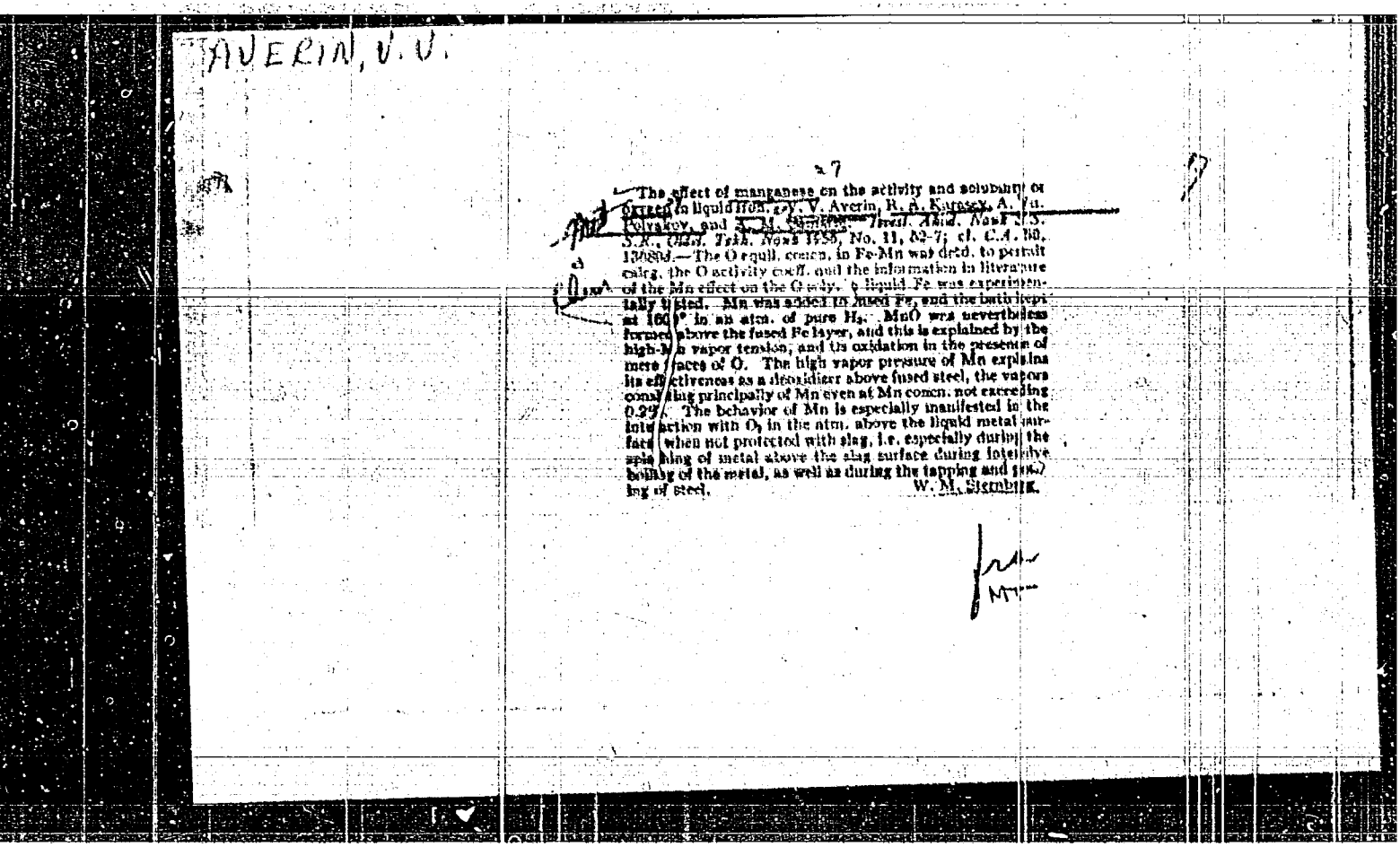

AVERIN, V. V.

27

The effect of manganese on the activity and solubility of oxygen in liquid iron. V. V. Averin, R. A. Kuntsev, A. Yu. Polyakov, and [illegible]. Trudy Akad. Nauk S.S.S.R., Otdel. Tekh. Nauk 1955, No. 11, 82-7; cf. C.A. 50, 13088d.—The O equil. concn. in Fe-Mn was detd. to permit calcg. the O activity coeff. and the information in literature of the Mn effect on the O solv. in liquid Fe was experimentally applied. Mn was added in fused Fe, and the batch kept at 1600° in an atm. of pure H_2. MnO was nevertheless formed above the fused Fe layer, and this is explained by the high-Mn vapor tension, and its oxidation in the presence of mere traces of O. The high vapor pressure of Mn explains its effectiveness as a deoxidizer above fused steel, the vapors consisting principally of Mn even at Mn concn. not exceeding 0.2%. The behavior of Mn is especially manifested in the interaction with O_2 in the atm. above the liquid metal surface when not protected with slag, i.e. especially during the splashing of metal above the slag surface during intensive boiling of the metal, as well as during the tapping and pouring of steel.

W. M. Sternbilk.

USSR/ Laboratory Equipment. Apparatuses, Their Theory, Construction and Application. I

Abs Jour: Referat. Zhur.-Khimiya, No. 8, 1957, 27354.

Author : V.V. Averin, A. Yu. Polyakov.

Title : Preparation of Steam-Hydrogen Mixtures of Preset Composition.

Orig Pub: Zavod. laboratoriya, 1956, 22, No. 10, 1256 - 1257.

Abstract: A new construction of the saturation instrument was proposed. This instrument serves for the preparation of mixtures of steam and hydrogen of a present composition for the thermodynamic study of the interaction between oxygen and impurities dissolved in liquid and solid metals. The instrument is used together with flow meters and permits the increase of the accuracy of the measurement of the

Card 1/2

AVERIN, V.V., POLYAKOV, A. Yu., SAMARIN, A.M.

"Solubility and Activity of Oxygen in Liquid Alloys of Fe-Ni-Co," lecture given at the Fourth Conference on Steelmaking, A.A. Baikov Institute of Metallurgy, Moscow, July 1 - 6, 1957

Activity of Oxygen in Liquid Iron

ditions of equilibrium (the temperature and the composition of the gaseous phase) were altered and new samples of M were again taken. From a charge of 70-80 g three to four samples weighing 10-15 g each would be taken. Owing to vigorous separation of the hydrogen, the crystallization of the little ingots was accompanied by effervescence. In order to reduce the partial pressure of H_2, Ar was added to the gaseous mixture. When the O_2 content exceeded 0.1 percent, the surface of the ingot in contact with the crucible became covered with a shiny oxide film. During the solidification of M a portion of the oxygen left with the escaping hydrogen while another portion was deposited on the walls of the crucible together with the waste materials. When smelting was conducted with Ar, the consumption of H_2 and Ar constituted 255 ml/min and 700 ml/min, respectively. Results of experiments in which Fe was saturated with oxygen at temperatures of 1551°, 1574°, 1597°, 1621°, and 1645° closely coincide with known data on the solubility of oxygen in Fe under a layer of liquid, ferruginous slag. Equilibrium constant of the reaction between liquid Fe and the steam-hydrogen mixture is established as a function of temperature:

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AVERIN, V.V.

24-8-16/34

AUTHORS: Averin, V.V., Polyakov, A. Yu. and Samarin, A.M.(Moscow).

TITLE: Solubility and activity of oxygen in liquid iron, nickel, cobalt and their alloys. (Rastvorimost' i aktivnost' kisloroda v zhidkikh zheleze, nikele, kobal'te i ikh splavakh).

PERIODICAL: "Izvestiya Akademii Nauk,Otdeleniye Tekhnicheskikh Nauk" (Bulletin of the Ac.Sc., Technical Sciences Section), 1957, No.8, pp. 120-122 (U.S.S.R.)

ABSTRACT: Wriedt, H.A. and Chipman, J. (1,3) and one of the authors of this paper (2) studied the solubility of oxygen in liquid melts of iron and nickel in the entire range of concentrations of the two components but they did not study the problems relating to the activity of the oxygen in liquid iron-nickel solutions. In this paper the solubility and the activity of oxygen are studied in the system Fe-Ni-Co by means of investigating the equilibrium between the metallic melt and the gaseous phase for a given value of oxygen activity. In liquid Fe-Co and Fe-Ni melts the oxygen saturation will have a minimum value for high contents of nickel and cobalt. In nickel and cobalt alloys there is no minimum oxygen solubility, however, even in these alloys no proportionality is observed between the saturated oxygen concentrations and

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AVERIN, V.V., Cand Tech Sci--(diss) "Solubility and activity of oxygen in liquid iron, nickel, cobalt, and their alloys." Mos,1958. 14 pp (Acad Sci USSR. Inst of Metallurgy im A.A. Baykov), 110 copies. Bibliography at end of text (10 titles) (KL,22-58,107)

[illegible], V. V.

AUTHOR: None Given

SOV/128-58-11-24/24

TITLE: Dissertations Presented for Obtaining Scientific Degrees (Dissertatsii predstavlennyye na soiskaniye uchenykh stepeney)

PERIODICAL: Liteynoye proizvodstvo, 1958, Nr 11, inside back cover (USSR)

ABSTRACT: The following dissertations were submitted. For the degree of Doctor of Technical Sciences: V.M. Zamoruyev (Institut metallurgii im. A.A. Baykova, AN SSSR - Institute of Metallurgy imeni A.A. Baykov, AS USSR) - Tungsten in Steel (Vol'fram v stali); A.M. Korol'kov (Institute of Metallurgy imeni A.A. Baykov AS USSR) - The Dependence of Casting Properties of Non-Ferrous Metal Alloys on Their Composition and the Form of Structural Diagram (Zavisimost' liteynykh svoystv splavov tsvetnykh metallov ot ikh sostava i vida diagramm sostoyaniya). For the degree of Candidate of Technical Sciences: V.V. Averin (Institute of Metallurgy imeni A.A. Baykov, AS USSR) - Solubility and Activity of Oxygen in Liquid Iron, Nickel, Cobalt and Their Alloys (Rastvorimost' i aktivnost' kisloroda v zhidkikh zheleze, nikele, kobal'te i ikh splavakh); B.V. Bauman (Moskovskiy institut stali im. I.V. Stalina - Moscow Institute of Steel imeni I.V.

Card 1/4

Dissertations Presented for Obtaining Scientific Degrees

Stalin) - The Effect of Nitrogen on the Structure and Mechanical Properties of Cast Iron (Vliyaniye azota na strukturu i mekhanicheskiye svoystva chuguna); G.M. Glinkov (Moscow Institute of Steel imeni I.V. Stalin) - Heat Absorbtion by the Bath of Open Hearth Furnaces as a Basis of Controlling the Thermal Process (Teplopogloshcheniye vanny martenovskoy pechi kak osnova regulirovaniya teplovoy raboty); N.I. Gran' (Moskovskiy institut tsvetnykh metallov i zolota im. M.I. Kalinina - Moscow Institute of Non-Ferrous Metals and Gold imeni M.I. Kalinin) - Some Problems of Fluxless Oxidizing Blowing-Through of Cobalt Alloys (Nekotoryye voprosy besflyusovoy okislitel'noy produvki kobal'tovogo splava); Du Tyn (Moscow Institute of Steel imeni I.V. Stalin) The Effect of Manganese on the Deoxidizing Capacity of Silicon in Liquid Iron (Vliyaniye margantsa na raskislitel'nuyu sposobnost' kremniya v zhidkom zheleze); Ye.I. Malinovskiy (Ural'skiy politekhnicheskiy institut im. S.M. Kirova - Ural Polytechnical Institute imeni S.M. Kirov) - Determination of Sources of Steel Contamination by Oxide Impurities During the Discharge and Casting of Steel (Ustanovleniye

Dissertations Presented for Obtaining Scientific Degrees

istochnikov zagryazneniya stali oksidnymi vklyucheniyami po khodu vypuska i razlivki stali); R.P. Todorov (Kiyevskiy politekhnicheskiy institut - Kiyev Polytechnical Institute) Shrinkage Phenomena in Graphite Formation Processes in Magnesium Treated Cast Iron (Usadochnyye yavleniya v protsesse grafitoobrazovaniya v chugune, obrabotannom magniyem); M.G. Trofimov (Dnepropetrovskiy metallurgicheskiy institut imeni I.V. Stalina - Dnepropetrovsk Metallurgical Institute imeni I.V. Stalin) - Investigation of Basic High-Refractory Materials Resistant in Rammed Lining of Induction Electric Steel Melting Furnaces (Izyskaniye osnovnykh vysokoogneuporn[illegible] materialov, stoykikh v nabivnoy futerovke induktsionnykh elektrostaleplavil'nykh pechey); K.T. Chernousova (Moscow Institute of Non-Ferrous Metals and Gold imeni M.I. Kalinin) Investigation of Crack Formation in Crystallization of Aluminum Alloys (Issledovaniye treshchinoobrazovaniya pri kristallizatsii alyuminiyevykh splavov); G.A. Chilingarov (Moscow Institute of Steel imeni I.V. Stalin) - On the Effect of

Dissertations Presented for Obtaining Scientific Degrees

the Physical Structure of Sinter on Its Metallurgical Properties (O vliyanii fizicheskoy struktury aglomerata na yego metallurgicheskiye svoystva).

1. Scientific reports

Card 4/4

SHARF, G., inzh.; AVERIN, V.V., kand.tekhn.nauk; POLYAKOV, A.Yu., prof., doktor tekhn.nauk; SAMARIN, A.M., prof.

Effect of silicon on the solubility and activity of oxygen in liquid nickel. Izv.vys.ucheb.zav.; chern.met. no.11:29-36 N '58. (MIRA 12:1)

1. Institut metallurgii imeni Baykova. 2. Chlen-korrespondent AN SSSR (for Samarin).

(Nickel alloys--Metallurgy)
(Silicon)

AUTHORS: Averin, V. V., Samarin, A. M., 20-120-6-24/59
Corresponding Member, Academy of Sciences, USSR

TITLE: The Effect of Silicon on the Solubility of Oxygen in Iron and Chromium Melts (Vliyaniye kremniya na rastvorimost' kisloroda v rasplavakh zheleza i khroma)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 120, Nr 6, pp 1253 - 1254 (USSR)

ABSTRACT: In these experiments the silicon content did not exceed 1,5%, the temperature was 1600°. The method of investigation was described earlier (Refs 1,2). The results are shown on table 1. The following conclusions can be drawn from it: 1) The oxygen solubility in iron and chromium melts determined experimentally agrees well with the data published earlier (Refs 3,4). 2) An addition of 10% nickel does not noticeably influence the solubility. Thus, the maximum solubility of oxygen in stainless steels can be estimated on the basis of the study of the solubility in binary iron and chromium melts. This addition of nickel leads to a slight change of concentration of oxygen at a change of the proportion between iron and chromium. 3) The presence of chromium reduces considerably the deoxydizing power of silicon

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in the mentioned melts. 5) In the case of a constant chromium content (more than 10% Cr) the deoxydizing power of silicon decreases with its increase of concentration. 6) In the range of the silicon concentrations investigated (0,2 - 1,3%) the equilibrium oxide-phase which forms due to the interaction of the gas mixture with the liquid metal mainly consisted of silica. There are 1 figure and 4 references, 3 of which are Soviet.

SUBMITTED: March 26, 1958

1. Oxygen---Solubility 2. Silicon---Chemical effects 3. Chromium -iron alloys---Deoxidation 4. Nickel---Chemical effects

AVERIN, V.V.

OLIFERENKO, Ya.I; AVERIN, V.V.; SAMARIN, A.M.
(Leningrad)

The influence of oxidizable elements on the solubility of O_2 in 18-8 type stainless steels.

Report submitted for the 5th Physical Chemical Conference on Steel Production.

Moscow 30 JUN 1958

AVERIN, V.V.

GERMANY, F.A.; AVERIN, V.V.; SAMARIN, A.M.

The influence of Mn. on the solubility of O_2 in steels of the type Fermalloy.

Report submitted for the 5th Physical Chemical Conference on Steel Production.

MOSCOW 30 Jun 1958

AVERIN, V.V.; SAMARIN, A.M.

Regarding complex oxidation of steels and its alloys.

report submitted for the 5th Physical Chemical Conference on Steel Production.

Moscow 30 JUN 1959

SOV/180-59-1-4/29

AUTHORS: Averin, V.V., Polyakov, A.Yu. and Samarin, A.M. (Moscow)

TITLE: Solubility and Activity of Oxygen in Metallic Melts (Rastvorimost' i aktivnost' kisloroda v metallicheskikh rasplavakh)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 1, pp 13-21 (USSR)

ABSTRACT: The authors consider that the published attempts (Refs 1 and 2) to generalize the available experimental material on the activity of oxygen in iron and its alloys fail to elucidate changes in oxygen-activity and solubility. They give their own critical survey of the literature, as well as some unpublished data (V.A.Sarankin), from which they draw the following main conclusions. The solubility and activity of oxygen in metallic systems do not change additively over the whole concentration range of the components but depend on the composition of the oxide phase in equilibrium with the alloy of given composition. The composition of this phase depends mainly on the ratio of dissociation pressures of the components and to a lesser extent deviations from ideal-solutions laws. From experimental data on the activity of oxygen

Card 1/3

Solubility and Activity of Oxygen in Metallic Melts

in alloys the probable oxygen partial pressure for a saturated solution of oxygen in the pure component for the same temperature can be found approximately. This possibility is limited to solutions with similar component properties and for which the oxygen solubility and activity are proportional to concentration in the part of the solubility curve to the right of the minimum, eg Ni-Fe and Co-Fe from the minimum on the curve to pure iron and Fe-Cr from 12 to 100% Cr. The results examined point to a change in the activity of oxygen from the partial pressure corresponding to the saturated solution in one component to that for the other component at the same temperature. The main factor influencing the solubility of oxygen in alloys is the ratio between the dissociation pressures of the oxides of the components but the solubility of oxygen in the pure components and the interaction of components in the metallic and oxide phases also have significant effects. When a considerable difference exists between the dissociation pressures of the component oxides as, for example, in solutions of deoxidizers in iron, the addition of the deoxidizer

Card 2/3

Solubility and Activity of Oxygen in Metallic Melts

quickly reduces oxygen solubility because of the reduction in the oxygen partial pressure over the oxide phase formed. If the deoxidizer when its concentration is increased can form compounds with iron stable above their melting points, the further course of the oxygen-solubility curve will depend on the solubility of oxygen in the compound and the individual properties of the deoxidizer will appear in the composition range from the chemical compound to the pure deoxidizer. The change in the activity of oxygen in these composition ranges must similarly depend on the nature of the interaction between the component atoms.

Card 3/3 There are 3 figures, 3 tables and 13 references, 9 of which are Soviet, 3 English and 1 German.

SUBMITTED: June 23, 1958

S/137/62/000/004/006/201
A006/A101

AUTHORS: Averin, V. V., Samarin, A. M.

TITLE: On the complex deoxidation of steel and alloys

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 4, 1962, 15, abstract 4A76 (V sb. "Fiz.-khim. osnovy proiz-va stali", Moscow, AN SSSR, 1961, 18 - 26)

TEXT: The authors analyze thermodynamical conditions of O dissolving in alloys in the presence of some deoxidizing elements, having a greater chemical affinity to O than the base metal. On the basis of experimental and literature data, a graph is plotted and analyzed; it shows the relationship between the strength of the oxide of the given deoxidizing element, evaluated from the difference in the partial pressure of the given oxide and liquid FeO, and concentration ratio N_{Fe}/N_{Me} in the alloy corresponding to the appearance of a pure deoxidizing oxide in an equilibrium with the alloy. The solubility of O in the Fe-Cr-Si system is analyzed. In low-chromium alloys Si promotes a fuller elimination of O as compared with Fe-Si alloys. At a content of Si > 1% the introduc-

Card 1/2

36421

S/137/62/000/003/005/191
A006/A101

18.1151

AUTHORS: Glinenyy, Ya., Averin, V. V., Samarin, A. M.

TITLE: The effect of aluminum and titanium on oxygen solubility in an iron-chrome alloy (18% Cr)

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 3, 1962, 10, abstract 3A60 (V sb. "Fiz-khim. osnovy proiz-va stali", Moscow, AN SSSR, 1961, 27-32)

TEXT: Tests were run with electrolytic Fe, Cr, Al and sponge Ti. Heats with Al were carried out in chemically pure corundum crucibles, and with Ti in zircon-crucibles. Samples were drawn-off into quartz tubes. The O content was determined by the method of vacuum melting, the Al content by the calorimetric or weight method, and the Ti content by the calorimetric method. The effect of Al and Ti on the O solubility in a Fe-Cr alloy (18% Cr) at 1,600°C was studied by establishing the equilibrium in the following system: metal-oxide phase - H_2-H_2O gas mixture with a given oxidizing potential. The authors evaluated the deoxidizing capacity of the deoxidizing elements in the alloy investigated, which corresponds to the difference in the partial energy values of O dissolving in

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S/137/62/000/003/005/191
A006/A101

the initial alloy and the deoxidizing element. Al and Ti are effective deoxidizers for the alloy investigated; Si and Mn reduce the solubility of O to a considerably lower degree. Mn, in spite of its low deoxidizing capacity, reduces the content of O dissolved in the alloy investigated; this should be taken into account when replacing Ni by Mn in the given steel grades. The joint effect of Si and Ti at low concentration of the latter, causes additional decrease of the O content as compared with an alloy that was deoxidized with Ti only.

T. Kolesnikova

[Abstracter's note: Complete translation]

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S/137/62/000/004/005/201
A006/A101

AUTHORS: Cherkasov, P. A., Averin, V. V., Samarin, A. M.

TITLE: The effect of manganese on solubility of oxygen in nickel and ferro-nickel melts

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 4, 1962, 10, abstract 4A50 (V sb. "Fiz.-khim. osnovy proiz-va stali", Moscow, AN SSSR 1961, 33 - 40)

TEXT: The method of establishing an equilibrium between liquid metal and the gaseous phase with a known oxidizing potential, was used to investigate the effect of Mn on solubility of O in Ni and Fe-Ni alloys "79-Permalloy" and "45-Permalloy" at 1,600°C. The oxidizing capacities of Si and Mn in Ni and 79-Permalloy were compared. The similar values of O solubility in Ni and 79-Permalloy under the effect of Mn and Si are explained by the effect of the strong bond of Si in Ni. It is concluded that it is expedient to use Mn for deoxidation of magnetic Fe-Ni-alloys; Mn has in the given alloys a strong deoxidizing capacity. Si, affecting a reduction of O in the given alloys entails, almost as Mn, im-

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paired magnetic properties of the alloys. The authors revealed a decrease of O solubility in Ni and Ni-base alloys under the effect of Mn, which is in a satisfactory agreement with the different values of partial energy of O dissolving in Mn and in the investigated melt. A reduction of O concentration for Ni and Ni-alloys passes through a minimum at a definite Mn concentration. The position of the minimum of O solubility is explained on the basis of the values of O bond with the alloy components. For Ni and Fe-Ni-alloys 79- and 45-Permalloy, increased O solubility was noted at Mn concentration raised over 0.6 - 0.8; 0.9 - 1.1%, respectively. A distinct relationship was revealed between the relative decrease of O concentration and the difference in the values of partial energy of O dissolving in Mn and the melts investigated. The value of the relative potential of the gaseous phase, corresponding to the appearance of the oxide phase, which is in an equilibrium with liquid Fe, Ni and their alloys at 1,600°C, decreases with a higher Mn concentration in the alloy. The value of the oxidizing potential of the gaseous phase is different for the metals and alloys investigated; it increases with a lesser affinity of the metal (alloy) to O. In the range of O solubility reduced under the effect of Mn the non-metallic inclusions, formed during crystallization of the metal, become more dispersed. At a higher O solubility they become coarser. Authors' summary

[Abstracter's note: Complete translation]

S/180/61/000/005/001/018
E111/E535

AUTHORS: Averin, V.V. and Samarin, A.M. (Moscow)

TITLE: On the thermodynamics of oxygen in liquid metals and alloys

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Metallurgiya i toplivo, no.5, 1961, 3-10

TEXT: The authors point out that oxygen, which is present in the vast majority of metallurgical processes, has a deleterious effect on metal properties. The authors have made previous contributions to the thermodynamics of oxygen in melts (Ref.3: Sb.Fiziko-khimicheskiye osnovy proizvodstva stali. Izd-vo AN SSSR, 1960; Ref.5: Ibid, 1961), and in the present work they analyse conditions leading to delay in the decrease of oxygen concentration in melts and the appearance of an oxygen-solubility minimum at a definite deoxidizer-concentration. Analysis of deoxidation under gas of known composition showed that the decrease in oxygen content of the melt under the action of the deoxidizer is due to two simultaneous opposed processes: a) decrease in the oxidizing potential over the melt,

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$P_{O_2}^{1/2}$ compared with the value corresponding to the liquid metal saturated with oxygen, which leads to a decrease in oxygen concentration in the melt; b) increase in bond strength of the oxygen in the melt, leading to an increase in oxygen concentration in the melt compared with the liquid metal (at constant P_{O_2} and T values). In liquid Me-R-O melts the Raoult activity coefficient for oxygen at infinite dilution,

$$\gamma_o = \gamma_o^o \cdot f_o \cdot f_o^R , \qquad (4)$$

where γ_o^o is the Raoult activity coefficient for oxygen at infinite dilution in the Me-O system, f_o the Henry activity coefficient for oxygen at concentrations tending to zero and f_o^R the change in the activity coefficient of oxygen effected by the deoxidizer element. f_o^R represents the ratio of oxygen concentrations in the original metal and in the melt with a definite concentration of the deoxidizer element (P_{O_2} being constant). The interaction parameter ε_o^R is given by:

$$\frac{d \ln P_{O_2}^{1/2}}{dN_R} - \frac{d \ln N_O}{dN_R} = \epsilon_O^R \qquad (11)$$

where N_O and N_R are the mol fractions of oxygen and deoxidizer, respectively. The authors consider next the reaction of melts with a steam-hydrogen mixture, which is informative both on the solubility and the activity of oxygen. In the general form the reaction is:

$$y.H_{2(g)} + R_xO_{y(s,\ell)} = y.H_2O_{(g)} + x.R_{(Me-R)} \qquad (12)$$

The equilibrium coefficient:

$$K = \left(\frac{P_{H_2O}}{P_{H_2}}\right)^y \cdot a_R^x = \left(\frac{P_{H_2O}}{P_{H_2}}\right)^y \cdot N_R^x \cdot \gamma_R^x \qquad (12a)$$

where γ_R is the Rauolt activity coefficient for the deoxidizer

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in the system Me-R-O. Taking logarithms and differentiating

$$\frac{d \ln P_{H_2O}/P_{H_2}}{dN_R} = -\frac{x}{y} \cdot \frac{d \ln N_R}{dN_R} = -\frac{x}{y} \cdot \frac{1}{N_R} \qquad (14)$$

is obtained, which holds since $K \neq f(N_R)$ and $\gamma_R \simeq$ const (for low deoxidizer concentrations). Taking logarithms and differentiating for the equilibrium constant of the gaseous hydrogen + oxygen = water reaction and combining with (14) gives:

$$-\frac{x}{y} \cdot \frac{1}{N_R} - \frac{d \ln N_O}{dN_R} = \varepsilon_O^R \qquad (18)$$

Taking x/y values from experimental data on the change in the oxidizing potential of the gas phase in relation to deoxidizer concentration (or approximately from the value in the formula of the oxide of the deoxidizer) and knowing the value of ε_O^R, the

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value of N_R at the minimum oxygen concentration can be found. The reverse calculation to find ε_o^R and $e_o^R = \frac{d \ln f_o^R}{d[R]}$ can also be carried out. The table shows calculated and experimental values.

Me-R melt	Deoxidizer concentration for $[O]_{min}$: Calculated $N_R \cdot 10^4$	Calculated R, %	Experimental R, %	$-\varepsilon_o^R$	$-e_o^R$
Fe-Cr	85.00 [2]	8.00	12.0 [9]	8.80	0.041 [2]
	50.00 [10]	4.50	6.0 [11]		0.064 [10]
	—	—	9.0 [12]	13 '0	
Fe-V	11.80 [2]	1.10	1.5—2.0	57.00	0.270 [2]
Fe-Si	200.00 [2]	10.00	—	2.30	0.020 [2]
	33.00 [13]	1.60	—	15.00	0.130 [13]
	34.00 [14]	1.70	5.0—7.0 [14]	14.40	0.125 [14]
	0.75 [15]	0.04	0.1—0.2 [15]	890.00	8.000 [15]
Fe-Al	153.00	15.00	25.0 [16]	6.55	0.030
Ni-Fe	15.00	1.30	1.5—2.0	51.00	0.250
Ni-Cr	8.40	0.73	0.6—0.7 [6]	80.00	0.400
Ni-V	10.30	0.90	0.5—0.8 [5]	97.00	0.450
Ni-Mn	33.00 [4]	1.60	5.0 [4]	15 00	0.137 [4]
Ni-Si	43.00	3.80	3.0—4.0	17.50	0.8080
Co-Cr					

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(The references given in the above table are as follows: Ref.2: Chipman, J. Atomic interaction in molten alloy steels, J.Iron and Steel Inst., 1955, June, 97; Ref.4: Sharf G., Averin, V.V., Polyakov, A.Yu., Samarin, A.M. Izv.vuzov, Chernaya metallurgiya, 1958, No.11, 29; Ref.5: Quoted earlier; Ref.6: Averin, V.V., Cherkasov, P.A., Samarin, A.M. Nauchn. dokl. po teorii zharoprochnosti. Izd-vo VPA, 1961, p.230; Ref.9:Linchevskiy, B.V., Samarin, A.M., Izv. AN SSSR, OTN, 1953, No.5; Ref.10: Turkdogan E.T., J.Iron and Steel Inst., 1954, v.178, p.278; Ref.11: Hilty D.C., Forgang W.D., Folkman R.L. Oxygen solubility and oxide phases in the Fe-Cr-O system. J.Metals, 1955, No.2; Ref.12: Averin, V.V., Samarin A.M. DAN SSSR, 1960, v.120, No.6, 1253; Ref.13: Matoba J. J.Iron and Steel Inst. Japan, 1959, 45, No.3, 229; Ref.14: Hsü Tseng-Chi, Polyakov, A.Yu., Samarin, A.M., Izv.AN SSSR, OTN, Metallurgiya i toplivo, 1961, No.2, 115; Ref.15: Kuznetsov B.M., Samarin A.M. Sb.Fiziko-khimicheskiy oxnovy proizvodstva stali. Izd-vo AN SSSR, 1961.)

Next the authors consider the reaction of the water-hydrogen mixture with the deoxidizer, so as to elucidate how the oxidizing potential of the gas phase changes with changes in deoxidizing

activity. Taking the equilibrium constant for Eq.(12) in the logarithmic form and differentiating, and taking into consideration that $K \neq f(a_R)$, we obtain:

$$\frac{d \lg P_{H_2O}/P_{H_2}}{d \lg a_R} = -\frac{x}{y} \quad . \qquad (21)$$

Finally, the following equation is obtained:

$$\frac{y}{x} \cdot \frac{d \lg \frac{P_{H_2O}}{P_{H_2}}}{d \lg N_R} + \frac{d \lg \gamma_R}{d \lg N_R} + 1 = 0 \qquad (24)$$

This shows that in $\lg \frac{P_{H_2O}}{P_{H_2}} - \lg N_R$ coordinates, the tangent of

the curve is determined not only by the ratio of the stoichiometric coefficients x and y but also on the nature of the change of the activity of the deoxidizer as a function of the concentration. Two particular cases are possible for which the results obtained according to Eqs. (21) and (24) are identical: 1) for small deoxidizer concentrations γ_R is practically constant and, consequently, the term $d \lg \gamma_R / d \lg N_R$ of Eq. (24) becomes zero so that the activity becomes proportional to the concentration

$$a_R = \gamma_R \cdot N_R = \frac{1}{100} \cdot \frac{M}{M_R} \cdot \gamma_R [R] \qquad (25)$$

where M and M_R are respectively the atomic weights of the metal and the deoxidizer and

$$\frac{d \lg \frac{P_{H_2O}}{P_{H_2}}}{d \lg a_R} = \frac{d \lg \frac{P_{H_2O}}{P_{H_2}}}{d \lg N_R} = \frac{d \lg \frac{P_{H_2O}}{P_{H_2}}}{d \lg [R]} \qquad (26)$$

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In this case all equations expressing the concentration of the deoxidizer lead to equal results. 2) In the range of high deoxidizer concentrations $N_R = a_R$ and, accordingly, the derivative $d \lg \gamma_R / d \lg N_R = 0$. Except for the first two terms, Eq.(26) holds for only a limited range of concentrations, even in ideal solutions, due to the fact that the atomic weights differ. There are 4 figures, 1 table and 16 references: 11 Soviet and 5 non-Soviet. The four latest English-language references read as follows: Refs.2, 11, 13 (quoted in text) and Ref.16: Wriedt, H.A. Chipman, J. Oxygen in liquid iron-nickel alloys. Trans. AIME, 1956, v.206, 1195.

SUBMITTED: March 10, 1961

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AVERIN, V.V.

Conference on problems of metal reduction. Izv.AN SSSR. Otd.-tekh.nauk. Met.i topl. no.4:191-192 Jl-Ag '62. (MIRA 15:8)
(Metallurgy--Congresses)

S/509/62/000/011/001/019
E071/E351

AUTHORS: Averin, V.V., Cherkasov, P.A. and Samarin, A.M.

TITLE: Deoxidation of nickel alloys

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Trudy. no. 11. Moscow, 1962. Metallurgiya, metallovedeniye, fiziko-khimicheskiye metody issledovaniya. 36 - 55

TEXT: The influence of deoxidizing elements (cobalt, iron, chromium, manganese, vanadium, silicon, carbon, titanium and aluminum) on the solubility and activity of oxygen in liquid nickel was investigated. Equilibrium was established between the liquid metal, the oxide phase and an argon-hydrogen-steam mixture of known composition. The experimental melts (100 - 130 g) were effected in a high-frequency furnace, using zirconia or alumina crucibles; the temperature was measured to ± 10 °C; sampling was by a silica tube without disturbing the composition of the gaseous phase. The activities of the deoxidizing elements in nickel melts were calculated. Generally, the activity of deoxidizing elements in nickel decreases more than in iron; this is confirmed by data on heats of formation of compounds of the type Ni_xR_y and Fe_xR_y

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(where R - deoxidizing element). The influence of deoxidants on the activity of oxygen in liquid metal was studied, the data obtained for nickel being compared with those for iron. The greater deoxidizing power of the deoxidants in liquid nickel (compared with iron) is in accordance with their greater effect on the activity of the oxygen in the melt. A relationship was shown to exist between the decrease in the activity of the oxygen and its minimum solubility in the melt. A decrease in the activity of the oxygen in a melt, due to stronger bonds between the oxygen and the deoxidizing agent, leads to an increase in the concentration of oxygen in the Me-R melt compared with the pure metal in equilibrium with an atmosphere of the same oxygen potential. However, the value of the oxidizing potential decreases to a greater extent, causing a sharp decrease in the oxygen content at low concentrations of a deoxidizing element. Above a certain deoxidant concentration a position is reached where the effect of the powerful oxygen bonding is so strong that increasing amounts of deoxidant cause an increase in the oxygen content of the melt, in spite of the decrease in oxygen potential of the gas phase. There are 8 figures.

AVERIN, V.V.; CHERKASOV, P.A.; SAMARIN, A.M.

Deoxidation of nickel melts. Issl. po zharopr. splav. 9:204-218 '62. (MIRA 16:6)

(Nickel--Metallurgy)

CHERKASOV, P.A.; AVERIN, V.V.; SAMARIN, A.M.

Deoxidation by manganese of magnetically soft alloys on an iron and nickel base. Trudy Inst. met. no.11:54-64 '62. (MIRA 16:5)
(Iron-nickel alloys--Metallurgy) (Manganese)