

L 10157-63

ENT(1)/BDS--AFFTC/ASD/ESD-3/SSD

ACCESSION NR: AF3000319

8/0048/63/027/005/0651/0655

AUTHOR: Volod'ko, L. V.; Sevchenko, L. V.; Umreyko, D. B.

58
57

TITLE: Temperature dependence and nature of the electronic absorption spectra of uranyl compounds [Report: Eleventh Conference on Luminescence held at Minsk 10-15 Sept. 1962].

SOURCE: Izvestiya AN SSSR, Seriya fizicheskaya, v. 27, no. 5, 1963, 651-655

TOPIC TAGS: absorption, fluorescence, uranyl compounds

ABSTRACT: A distinctive trait of the absorption and luminescence spectra of uranyl compounds is their strong temperature dependence, which reflects changes in the interaction of the uranyl ion with the surrounding medium. Whereas the origin of the fluorescence spectra of uranyl compounds is fairly well known, this is not true of the absorption spectra. Investigation of the temperature dependence of the fluorescence and absorption spectra can help elucidate the nature of the electronic absorption spectra. The authors recorded the fluorescence and absorption of acid and organic solutions of a number of uranyl

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salts in the range from +20 to -183°C. The spectra of uranyl sulfate and potassium uranyl sulfate in sulfuric acid and uranyl phosphate in orthophosphoric acid are presented. Experimental and calculated mirror symmetry of the fluorescence and absorption spectra is compared. It is concluded that absorption involves several different electronic transitions. Orig. art. has: 2 figures.

ASSOCIATION: Belorusskiy gos. universitet im. V. I. Lenina (Belorussian State University)

SUBMITTED: 00

DATE ACQ: 12Jun63

ENCL: 00

SUB CODE: PH

NR REF SOV: 003

OTHER: 000

PK/9/3
Card 2/2

1072-5

ACCESSION NR: AR5014402

1964 (S) (001) (004) (D054) (D054)

SOURCE: Ref. zh. Fizika, Abs. 4D410

AUTHOR: Volod'ko, L. V.; Sevchenko, A. N.; Umreyko, D. S.

TITLE: The effect of medium and temperature on the probability of transitions in the electron spectra of uranyl compounds

CITED SOURCE: Tr. Komis. po spektroskopii AN SSSR, vyp. 1, 1964, 672-678

TOPIC TAGS: uranium compound, electron spectrum, electron transition

TRANSLATION: The authors investigate the cause of temperature quenching in solutions of uranyl salts. A relationship is found between the probability of emission and overlap of electron transitions in the absorption spectra. The value of the overlap is determined by the nature and structure of the immediate environment of the uranyl ion.

SUB CODE: NP

ENCL: 00

Card *dm* 1/1

L 13777-65 ASD(m)-3/SSD/ESD/AS(mp)-2/AFWL/ESD(gs)/ESD(t)
ACCESSION NR: AP4044847 S/0051/64/017/003/0356/0363

AUTHOR: Volod'ko, L. V.; Sevchenko, A. N.; Umreyko, D. S. B

TITLE: Temperature dependence of electron spectra of inorganic solutions of uranyl salts

SOURCE: Optika i spektroskopiya, v. 17, no. 3, 1964, 356-363

TOPIC TAGS: electron spectrum, temperature dependence, fluorescence, uranyl radical, excitation spectrum, luminescence spectrum

ABSTRACT: Investigations of electron spectra at low temperatures are important both from the point of view of determining the nature of the spectra themselves and from the point of view of explaining the mechanism of fluorescence of uranyl compounds and the concomitant redistribution of the excitation energy over the various channels. The uranyl salts were dissolved in inorganic acids having like anions, and the absorption spectra were recorded with an SF-10 glass automatic recording double-beam spectrophotometer in which the original cuvette was replaced by a thermostatic chamber holding cuvettes filled with the investigated solution and solvent. The test apparatus

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ACCESSION NR: AP4044847

and procedure are described. The decrease in temperature was shown to be accompanied by a narrowing of the fluorescence band and by a monotonic shift towards the short-wave region. The form of the spectral bands also changed with variation of the temperature. On the other hand, the energy distribution over the fluorescence spectrum of acid solutions of the investigated uranyl salts is practically independent of the temperature. An analysis and the resolution of the different bands indicate that the absorption spectrum of the uranyl compounds has a complicated nature in the visible region and consists of several spectra, each corresponding to a group of optical transitions into its own electronic excited state. The transition between the first excited state and the ground state forms a luminescence spectrum and a long-wave absorption spectrum which have mirror symmetry properties. The afterglow and the quantum yield of fluorescence of the investigated inorganic solutions increase with increasing temperature. Original data: Figures and tables.

ASSOCIATION: None

Card 2/3

L 13777-65

ACCESSION NR: AP4044847

SUBMITTED: 17Jul63

SUB CODE: OP

NO REF SOV: 004

ENC: 01

OTHER: 002

Card 3/3

L 51462-65 EWT(1) Pl-4 IJR(c)

UR/0250/65/009/004/0221/0223

ACCESSION NR: AP5011080

AUTHOR: Harayko, D. S.

TITLE: Temperature dependence of the absorptivity and fluorescence quenching of uranyl compounds

SOURCE: AN BSSR. Doklady, v. 9, no. 4, 1965, 221-223

TOPIC TAGS: uranyl compound, fluorescence quenching, absorption spectrum, temperature dependence, electron transition

ABSTRACT: This is a continuation of earlier work by the author (with L. V. Volod'ko et al., Fizicheskiye problemy spektroskopii, Materialy XIII soveshchaniya po spektroskopii, v. 1, 233, 1962; Vestsi AN BSSR, ser. fiz-tekhn., no. 3, 37 and no. 4, 45, 1963, and others). It was established in the earlier investigations that absorption of light by uranyl compounds in the visible region of the spectrum is due to transitions into at least three excited electronic states of the uranyl ion and that the absorption spectra corresponding to the different electronic transitions have different temperature dependences. In the present paper the author compares the temperature dependences of the absorbed spectra and of the quantum yield of fluorescence of organic solutions of uranyl salts which do not limit-

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L 51462-55

ACCESSION NR: AP5011080

ence at room temperature. The tests show that when a solution is cooled only a decrease in the absorption is observed at first, without any structure in the spectrum or any fluorescence. The absorption and fluorescence spectra are rapidly quenched as the temperature is lowered.

ture of liquid nitrogen, enhances only slightly the structure of the absorption spectrum, while the fluorescence yield increases uniformly. All these facts are explained from the point of view of pre-dissociation processes, which in the case of uranyl compounds can be connected with the interaction between two electronic states of the uranyl ion. The temperature quenching of the fluorescence of the uranyl compounds can also be attributed to the interaction between the fluorescent state and higher electronic states of the uranyl ion in the visible region of the spectrum. This report was presented by A. F. Serchenko. Orig. art. has: 2 figures.

ASSOCIATION: Belorusskiy gosudarstvennyy universitet im. V. I. Lenina (Belorussian

Card 2/3

L 51162-65

ACCESSION NR: AP5011080

State University)

SUBMITTED: 31Mar64

ENCL: 00

SUB CODE: SS, OP

NR REV SOV: 005

OTHER: 001

Card 3/3

L 65230-65 EWT(1)/EWT(m)/EWP(s)/T 1JP(c) RM

ACCESSION NR: AP5020797

TR/0048/65/029/008/1349/1352

AUTHOR: Shevchenko, A. N.; Umreyko, D. S.

TITLE: Concerning interpretation of the absorption spectra of some organic uranyl complexes. Report, 13th Conference on Luminescence held in Khar'kov 25 June to 1 July 1964

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 8, 1965, 1349-1352

TOPIC TAGS: light absorption, absorption spectrum, luminescence spectrum, solution property, complex molecule, uranyl nitrate

ABSTRACT: The authors have investigated the absorption and luminescence spectra of a number of uranyl complexes, and in the present paper they report results obtained for dinitrouanyl and trinitrouanyl ions. The complex trinitrouanyl compounds were prepared in anhydrous acetone or cyclohexanone solutions of uranyl nitrate and compared with the spectra of uranyl tetraethylammonium nitrate. uranyl tetraethylammonium nitrate and uranyl nitrate are compared. In the long wavelength region the absorption bands of the complex ion appeared in the same positions as those of the nitrate, but they were much more prominent. The complex

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L 65230-65

ACCESSION NR: AP5020797

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ion showed absorption bands in the ultraviolet, where the absorption spectrum of the nitrate is continuous. The frequency separations of the absorption bands are analyzed and it is concluded that three partly overlapping electron transitions

and are presented. The temperature dependence of the absorption spectra and the fluorescence spectra are presented. The series of emission bands with different temperature behavior are observed in the trinitrate spectra, and their origin is discussed. The fluorescence spectra are presented. This conclusion is supported by the different temperature dependence of the fluorescence quantum efficiency and the fluorescence lifetime. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: Belorusskiy gosudarstvennyy universitet im. V.I.Lenina (Belorussian State University)

SUBMITTED: 00

44,55

ENCL: 00

SUB CODE: CC, OP

NC REF SOV: 002

OTHER: 001

Card 7/19
2/2

APANASEVICH, P.A.; BORISEVICH, N.A. VOI OD'KO, L.V.; GLADCHENKO, L.F.;
GRIBKOVSKIY, V.P.; GURKINOVICH, G.P.; IVANOV, A.P.; KUZNETSOVA,
V.V.; PIKULIK, L.G.; FILIPOVICH, V.A.; RUBANOV, A.S.; RUBANOV,
V.S.; SAMSON, A.M.; SARZHEVSKIY, A.M.; SOLOV'YEV, K.N.;
UMREYKO, D.S.; KHAPALYUK, A.P.; YEL'YASHEVICH, M.A., akademik,
red.

[Interaction between nonequilibrium radiation and matter]
Vzaimodelstvie neravnovesnogo izlucheniia s veshchestvom.
Minsk, Nauka i tekhnika, 1965. 223 p. (MIRA 18:3)

1. Akademiya nauk SSSR. Institut fiziki. Akademiya nauk Belorusskoy SSR (for Yel'yashevich).

E 3148-66

ACCESSION NR: AP5016051

UR/0368/65/002/005/0465/0467
535.37:535.34

AUTHOR: Umreyko, D. S.

22
B

TITLE: Symmetry of construction and structure of electronic absorption spectra of uranyl compounds

SOURCE: Zhurnal prikladnoy spektroskopii, v. 2, no. 5, 1965, 465-467

TOPIC TAGS: uranium compounds, uranyl nitrate, absorption spectrum, excited electron state, fluorescence

ABSTRACT: The article considers the dependence of the structure of the absorption spectra of uranyl compounds on the symmetry of the nearest surrounding structure of the UO_2^{2+} ion. From a study of the electronic absorption spectra of UO_2^{2+} , $UO_2NO_3^+$, and $UO_2(NO_3)_2$ in water and the electronic absorption spectra of a solution of uranyl dinitrate and trinitrate in acetone, it is found that the symmetry

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ACCESSION NR: AP5016051

dependence of the structure is in good agreement in the different solutions. It is concluded on the basis of concepts previously developed by the author (Izv. AN SSSR ser. fiz. v. 27, 651, 1963 and elsewhere), that three electronic transitions exist in the investigated region of absorption spectra ($\lambda = 500\text{--}350\text{ nm}$), it is concluded that some of the transitions are not affected by the surrounding structure, while others are strongly modified when the surrounding is changed. The interaction between the electronic states of the uranyl ion can cause the excitation energy to become transformed via different channels (fluorescence, heat production, and others). The relation between the fluorescence intensity of the uranyl compounds and the overlap of their absorption spectra, which has been observed experimentally, also explains the different behavior of the uranyl salts in different behavior of the uranyl salts in different solvents. The effect of the transitions on fluorescence quenching is briefly discussed. Orig. art. has: 3 figures.

ASSOCIATION: None

Card

2/3

I 3148-66

ACCESSION NR: AP5016051

SUBMITTED: 01Oct64

ENCL: 00

SUB CODE: GC, OP

NR REF SOV: 006

OTHER: 007

Card ^{mj.} 3/3

SEVCHENKO, A.N.; IMREYAO, D.S.

Interpretation of the absorption spectra of certain organic uranyl
complexes. Izv. AN SSSR. Ser. fiz. 20 no.8:1349-1352 '65.
(MIRA 18:8)

1. Belorusskiy gosudarstvennyy universitet im. V.I.Lenina.

VOLOD'KO, L.V. [Valadz'ko, L.V.]; UMREYKO, D.S. [Umreika, D.S.]

Temperature dependence and nature of electron spectra of organic
solutions of uranyl salts. Vestsi AN BSSR. Ser.fis.-mat.nav.
no.1:83-89 '65. (MIFA 19:1)

UNREYKO, D.S.

Temperature dependence of absorptivity and the quenching of
the fluorescence of uranyl compounds. Dokl. AN BSSR 9 no. 4:
221-223 Ap '65 (MIRA 19:1)

1. Belorusskiy gosudarstvennyy universitet imeni Lenina.
Submitted March 31, 1964.

L 10396-65 EWT(m)/EMP(j)/EWP(t)/ETI IJP(c) RM/WW/JD/JW/JG

ACC NR: AP6019652

SOURCE CODE: UR/0368/66/004/006/0523/0528

AUTHOR: Umreyko, D. S.

ORG: none

TITLE: Absorption properties and stability of certain uranyl compounds at high temperatures

SOURCE: Zhurnal prikladnoy spektroskopii, v. 4, no. 6, 1966, 523-528

TOPIC TAGS: uranium compound, absorption spectrum, high temperature effect

ABSTRACT: The absorption spectra of aqueous, acid, and organic solutions of the nitrate and acetate salts of uranyl and of several complex uranyl compounds were investigated in the temperature range of 20-135C simultaneously with an investigation of the effect of a temperature rise on the pH value of certain of these solutions. An examination of the temperature effect on the absorption spectra of the investigated solutions indicated the presence of two types of changes: a rise of temperature of certain of the solutions was accompanied by a monotonic and weak change of their absorption properties, whereas the heating of others led to substantial deformation of their absorption spectra. The spectra of all the investigated aqueous solutions belonged to the first type. The results obtained indicated a considerable stability of uranyl compounds in the indicated solutions within a certain temperature range. For a number of

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UDC: 535.37:535.34

L 40896-66

ACC NR: AP6019652

substances, e.g., uranyl sulphate in sulphuric acid at 135C and uranyl nitrate in cyclohexanone at 70C, irreversible chemical reactions were observed which led to the formation of new compounds. An analysis of their absorption spectra permitted the conclusion that in the first example a new compound is formed at 135C which apparently contains tetravalent uranyl and in the latter example the temperature rise to 70C leads to the formation of the mixed oxide of uranium U_3O_8 . Most of the absorbing systems (with a uranyl center) formed in the investigated inorganic and organic solvents were rather stable with respect to temperature changes within a certain range. This is possible only if the molecules of the solvent, forming, for example, a solvate shell around the uranyl molecule or ion, are sufficiently strongly bound with them and, consequently, shields them from external effects. Orig. art. has: 4 figures.

SUB CODE: 07,20/SUBM DATE: 28Apr66/ ORIG REF: 005/ OTH REF: 010

Card 2/2/11 LP

ROZNATSEV, Ye.S.; UMRIKHIN, A.N.

Locally relieving coal seams for the prevention of sudden outbursts
of coal and gas. Vop. gor. davi. no.17:42-49 '63. (MIRA 18:9)

1. Vostochnyy nauchno-issledovatel'skiy Institut po bezopasnosti
rabot v gornoy promyshlennosti.

ROZANTSEV, Ye.S.; UMRIKHIN, A.N.; SOTNIKOV, I.V.

Searching for and improving methods to control sudden outbursts
in development workings. Vop.bezop.v ugol'.shakh. 4:75-100 '64.
(MIRA 18:1)

ROZANTSEV, Yevgeniy Serafimovich; UMRIKHIN, Anatoliy Nikolayevich;
TEPLITSKAYA, G., red.

[In seams subject to outbursts; manual for workers and
brigade captains] Na plastakh, sklonnykh k vybrosam; pa-
miatka dlia rabochikh i brigadirov. Kemerovo, Kemerov-
skoe knizhnoe izd-vo, 1964. 50 p. (MIRA 18:1)

Umrikhin, D. G.

✓ Prevention of scale formation in closed circulating systems by the acid-phosphate method. D. G. Umrikhin. *Elek. Stanitsi* 21, No. 5, 50-1(1959). — Severe carbonate scale formation occurred rapidly (over 1 mm. thickness per month) in a thermoelec. plant where an artesian well water, used for make up to a circulating cooling water system, had the following compn.: carbonate hardness 9.34°, HCO_3^- 10.40°, CO_3^{--} 0.50°, free CO_2 3.3, CaO 90.21, MgO 2.4, SO_4^{--} 50.5, Cl^- 21.5, SiO_2 21.8, and total solids 327.9 mg./l. Although the chloride/alkalinity ratio in make-up water was about 2, it was 3 in the circulating system; this indicated considerable carbonate deposition. This condition was corrected by addition of a superphosphate soda to the circulating system sufficient to bring its alkalinity to 17° together with addition of enough free concd. H_2SO_4 to hold this value on continued recycle with only a single purge stream. The CO_2 freed thereby displaced the carbonate-bicarbonate ~~equil.~~ toward the latter in the condensers. In use this process not only controlled further deposition but also removed older scale. H. J. K.

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UMRIKHIN, D. G. (Engineer)

Filters and Filtration.

Water softening in mechanical filters. Za ekon. top., 9, no. 5, 1952.

9. Monthly List of Russian Accessions, Library of Congress, August 1953² Unclassified.

UMRIKHIN, D. G., Engineer

Water - Softening.

Water softening in mechanical filters. Za ekon. top. 9 no. 5, 1952.

9. Monthly List of Russian Accessions, Library of Congress, August 1952/2 Unclassified.

AUTHOR: Umrikhin, D.G., Engineer 91-58-6-7/39

TITLE: Chemical Cleaning of a Turbine Condenser Using Sulfuric Acid and Sodium Chloride (Khimicheskaya chistka kondensatora turbiny s primeneniye m sernoy kisloty i povarennoy soli)

PERIODICAL: Energetik, 1958, Nr 6, pp 9-10 (USSR)

ABSTRACT: The author shows that in place of hydro-chloric acid carbonate, scale deposits may be removed from turbine condensers by using sulfuric acid, adding sodium chloride to the extent of 70 - 80% by weight of the (100%) H_2SO_4 .

AVAILABLE: Library of Congress

Card 1/1 1. Turbine condensers-Maintenance

UMRIKHIN, D.G., inzh.

Improvement of a method for wet storage of salt.

Energetik 11 no.4:18-19 Ap '63.

(MIRA 16:3)

(Water--Purification)

UMRIKHIN, D.G., inzh.

Use of highly mineralized boiler water for preparing a regenerated
solution for sodium cation exchange filters. Energetik 12 no.5:
14-17 My '64. (MIRA 17:6)

UMRIKHIN, D.G.

Hydraulic steam pressure governor. Energetik. 13 no.2:14-16 F
165. (MIRA 18:6)

UMATEBIN, D.C., nat.

Removal of oil from the ...
no. A-10 Ap '65. (DURE 1816)

UMRTKHIN, D.O., Inzh.

Simplification of a salt dissolver. Energetik 13 no.5:22-23
My '65. (MIRA 18:8)

UMRIKHIN, I.D.

Investigating the repressuring of gas wells by means of reservoir
models. Gas.prom. no.9:1-5 S '57. (MIRA 10:10)
(Gas wells)

UMRIKHIN, I.D., Cand Tech Sci -- (diss) "Theoretical and
experimental study of non-stationary ^{and wells} ~~well~~-intake in an
elastic filtration system (effect of free volume of wells,
~~of the~~ limits of the stratum and its non-homogeneity)."
Mos, 1958, 9 pp (Min of Higher Education USSR. Mos Order
of Labor Red Banner Petroleum Inst im Academician I.M.
Gubkin. Chair of ~~the~~ General and Underground Hydraulics)
120 copies (KL, 23-58, 108)

UMRIKHIN, I.D.

Using model layers for studying pressure restoration in wells.
Izv. vys. ucheb. zav.; neft' i gaz no. 3:73-78 '58. (MIRA 11:7)

1. Moskovskiy neftyanoy institut im. akad. I.M. Gubkina.
(Oil wells)

UMRIKHIN, I.D.

Effect of free volume of wells on pressure restoration graphs.

Trudy MNI no.22:231-244 '58.

(MIRA 12:4)

(Second recovery of oil)

UMRIKHIN, I. P.

11(2,4) PHASE I ROCK EXPLORATION 507/2336
 Moscow, Institut neftskhikh i gazovoy promyshlennosti.
 Problemy nefli i gaza (Oil and Gas Problems) Moscow, Gosizdatkhim, 1959.
 365 p. (Series: *UML Trudy*, 979 2D) Errata slip inserted. 2,000 copies
 printed.
 Sponsoring Agency: Ministerstvo yuzhnyego obrasovaniya SSSR.
 Rao, M. I. G. P. Morgunova; Tech. Ed.: I. G. Fedotova; Editorial Board:
 N. P. Zhigach, Professor (Resp. Ed.); I. M. Murav'ev, Professor, A. A.
 Gerasimov, Candidate of Economic Sciences; V. K. Vinogradov, Candidate
 of Technical Sciences, M. M. Chazygin, Professor, P. F. Dusev, Professor,
 I. A. Char'y, Professor, V. M. Zubov, Professor, G. M. Puchanbayev,
 Professor.

PURPOSE: This collection of articles is intended for specialists in the petroleum and gas industry. It will also be of interest to scientific research institutes, teachers and students of vuzses.
COVERAGE: This collection of articles reviews problems connected with the study of regional oil and gas-bearing zones, the crystalline beds underlying the Volg-Brel's petroleum basins, geologic, tectonic of the Caspian depression, seismic prospecting, oil well logging, development of oil and gas fields, petroleum-bearing formations, and their physico-chemical characteristics, and their possible use in the oil and gas industry, the production of carbonyl-methyloluronic compounds, the synthesis of a cationic exchange resin to the organic catalyst, continuous cooling of heavy petroleum residues, (fluid-acid), the improvement of lube oil production, and the influence of a number of properties of lubricating oil, and the influence of a number of photographs, tables, flow sheets, and diagrams. The book contains those relating to coal gasification and conversion, among which those over a catalyzed bed catalyst deserve special attention. References accompany individual articles.

Moyevskiy, V. B. (Deceased), T. A. Zepinshaya, and V. S. Kuznetsov. Some Results of the Petrographic Study of Crystalline Beds Underlying the Volg-Brel's Petroleum Provinces 65

Musakov, M. P. Tectonic Patterns of the Caspian Depression and Adjacent Regions 85

Nyabinkin, L. A. Application of Reproductive Photoregistrations in Seismic Prospecting 95

Lerionov, E. V. Study of Porosity and Saturation of Oil Reservoir Rocks by Applying Radiometric Methods in Oil Well Logging 107

Shobitbaev, V. K., E. M. Paragovskaya, G. L. Geyrova, and N. A. Chazygin. The Field Investigations Made by the Department of Theoretical Mechanics in the Field of Seismic Hydrodynamics and the Development of Petroleum-bearing Strata 122

Char'y, I. A. and I. P. Morgunova. Generalization of Parameters of the Formation Heat on the Basis of Observations of the Oil Well Unstabilized Inflow 140

Kerzhbaum, Ia. M. Manufacturing Cast-iron Rock Bits 146

Efupak, Ya. M., A. I. Kurdin, and I. P. Morgunova. Increasing the Wear Resistance of Rock Bits by Alloying Them With a Hard Metal Alloy 156

Tomilov, A. D. Stability of Biaxial Plastic Tension 170

Marthasin, E. I. (Deceased), and A. A. Pol'shchik. Cutting Temperature in Round Milling Performed by Inverse Cutters 174

Belokon', N. I. Thermodynamic Processes of Gas Turbine Units 180

Porghabov, B. P. Comparable Characteristics of Gas Turbine Unit Systems 233

CHARNY, I.A.; UMRKHIN, I.D.

Studying the unstable flow toward wells to determine the parameters
of a layer. Trudy MINKHIGP no.24:140-145 '59.

(Oil reservoir engineering)

(MIRA 13:3)

BUZINOV, S.N.; UMRIKHIN, I.D. (Moskva)

Studying layers and wells utilizing the harmonic law of excitation.
Izv.AN SSSR.Otd.tekh.nauk.Mekh.i mashinostr. no.4:48-52 J1-A_g
'60. (MIRA 13:8)

(Rocks--Permeability)

RUZINOV, S.N.; UMRIKHIN, I.D.

Basing the method for calculating the geological and physical parameters of a layer on data from a study of wells with the harmonic law of stimulation. Trudy VNIIGAZ no.11:219-240 '61.

(MIRA 15:2)

(Gas wells)

В.И.В. С.В.; ИРИКОВ, Л.В.

Determining the reservoir parameters from the pressure change
curve in a reacting well. Nauch.-tekh. sbor. po dob. nefti, no.
14:87-91 '61. (MIRA 17:6)

BAYKOV, N.M.; BUZINOV, S.N.; UMRIKHIN, I.D.

Investigating reservoirs on the basis of curves of the pressure change in reactive wells in the presence of a harmonic oscillation in the flow or pressure in a stimulation well. Nauch.-tekh.sbor. po dob.nefti no. 13:65-72 '62.
(MIRA 17:6)

BUZINOV, S.N.; UMRIKHIN, I.D.; EYKHMAN, V.N.

Effect of layer boundaries on pressure changes in pressure wells.
Trudy VNII no.37:180-193 '62. (MIRA 16:6)
(Oil reservoir engineering)

BUZINOV, S.N.; BYKOV, I.N.; UMRIKHIN, I.D.

Determining the location of the flow between reservoirs from
the data of investigations. Gaz. prom. 7 no.9:9-13 '62.
(MIRA 17:8)

BUZINOV, S.N.; UMRIZHIN I.P.

Influence of edge gas pools in a productive reservoir on pressure variations in observation. Nauch.-tekh. sbor. po dob. nefli no.19:29-33 '63. (MIRA 17:8)

1. Vsesoyuznyy neftegazovyy nauchno-issledovatel'skiy institut.

UMRIKHIN, I. D., BUSINOV, S. N. (Moscow)

"Capacity Estimates of Reservoirs and Wells on the Basis of Time Dependent Harmonic Changes of Pressure and Mass Flow."

report presented at the First All-Union Congress on Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb 1960.

BUZINOV, Stanislav Nikolayevich; UMRIKHIN, Ivan Dmitriyevich;
KAYESHKOVA, S.M., ved. red.

[Investigating beds and wells under an elastic flow
regime] Issledovanie plastov i skvazhin pri uprugom
rezhime fil'tratsii. Moskva, Nedra, 1964. 271 p.
(MIRA 17:9)

TREBIN, F.A.; RAABEN, V.N.; BUZINOV, S.N.; UMRIKHIN, I.D.

Studying wells by injecting gas into them. Neft. khoz. 42
no.1:31-37 Ja'64. (MIRA 17:5)

UMRIKHIN, K.G.

AUTHORS: Popov, Yu.A., Umrikhin, K.G., Shaposhnikov, A.K., Engineers. ^{133-1-3/24}

TITLE: A Rational Charging Equipment for a Blast Furnace (Ratsional'noye zasypnoye ustroystvo domennoy pechi)

PERIODICAL: Stal', 1958, No.1, pp. 7 - 14 (USSR)

ABSTRACT: A description of the design and operation of a new charging equipment is given. The distribution of burden materials, in the blast furnace throat and the possibilities of controlling this distribution with the charging equipment in use at present is outlined. The distribution of materials in a model and an operating blast furnace is shown in Figs. 2 and 3, respectively. It is pointed out that at present the success in controlling this distribution depends to a large extent on the qualifications of the operating personnel and the available equipment, the influence of the individual controlling parameters (size of coke and ore charge, system of charging, stock level and the sequence of rotation of the distributor) on the distribution of materials in the throat is not certain. This uncertainty is caused by the following factors: non-uniformity of raw materials in the chemical and size composition, the influence of the gas stream on the distribution of materials during their fall from the large bell. The design of charging equipment proposed by the authors (Fig.4) can secure the

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A Rational Charging Equipment for a Blast Furnace

133-1-3/24

uniformity of distribution in size and in chemical composition of the materials in the furnace throat (across the concentric rings) and the constancy of an optimal vertical distribution of materials in the furnace. The proposed charging equipment consists of two parts: 1) charge distributor (Fig.5), and 2) charger (Fig.6). The charge distributor consists of a rotating funnel (a) and rotating cone (g); both rotate during the fall of burden from the skip on to a large bell. An intermediate small bell (d) serves only to isolate top gas during the operation of the large bell. This set secures a uniform distributing cylinder (b) which can secure the constancy of the required distribution of materials along the radius of the furnace and maintain a constant stock level and a directing funnel (d) which permits varying the position of the ridge in the distributing cylinder. The distribution of materials at various settings of the directing funnel is shown in Fig.6. The operation of the above charging equipment was tested on a model in which the stock descent and upwards flow of a gas stream were incorporated. Some results of the distribution obtained are shown in Figs.7-9. It is concluded that the proposed charging equipment gives the following advantages: 1) sufficiently uniform distribution of materials in the concentric rings

Card2/3

A Rational Charging Equipment for a Blast Furnace

133-1-3/24

of the furnace cross-section in respect of size and chemical composition; 2) the possibility of maintaining a constant optimal distribution of materials along the furnace radius; 3) absence of the necessity of air-tight fitting of rotating parts; 4) absence of the necessity of a programme controller for the distributor; 5) simplified control of furnace operation (no need to change the size of charge, charging sequence, stock level, programme of the rotation of the distributor). The proposed equipment will be particularly suitable for large furnaces. There are 9 figures.

ASSOCIATION: Chelyabinsk Metallurgical Works (Chelyabinskiy metallurgicheskiy zavod)

AVAILABLE: Library of Congress
Card 3/3

UMRIKHIN, N.G.; KOROVKEVICH, N.V., inzh., retsenzent; MANYUKOV,
G.S., inzh., red.

[Experience in high-speed freight train traffic; from the practices of the Southern Ural Railroad] Opyt skorostnogo prodvizheniia gruzovykh poezdov; iz praktiki IUzhno-Ural'skoi dorogi. Moskva, Transport, 1964. 61 p. (MIRA 17:3)

1ST AND 2ND ORDER PROCESSES AND PROPERTIES INDEX

BC 6-1-5

DEFECTS IN CHROMIUM AUTOMOTIVE STEELS AND THEIR ELIMINATION.
P. Ushikhin (Stal, 1934, 4, No. 6, 1-10) No. 7, 19-25) Hair
lines and cracks which appear after rolling and forging in the
Krasni Putilovets plant are due to insufficient deoxidation,
addition of Fe-Cr before deoxidation, high (MgO) in the slag,
addition of insufficient CaCO₃ during the oxidation period, and
lack of temp. control.

Ch. Abs. (e)

ASB-ELA METALLURGICAL LITERATURE CLASSIFICATION

| GROUP | CLASSIFICATION | INDEX | DATE |
|-------|----------------|-------|------|
| 1 | 2 | 3 | 4 |

DEFECTS AND PROPERTIES INDEX

9

Defects in chromium automotive steels and means for their elimination. *P. J. Jurek. Steel 4, No. 6, 1-10; No. 7, 10 (25/1934).*—Hair lines and cracks which frequently appeared after rolling and forging in the Krasnii Putilovets plant were due to insufficient deoxidation, addn. of P-Cr before deoxidation, high MgO content in slag, addn. of insufficient CaCO₃ to bath during oxidation period, and lack of temp. control. H. W. Rathmann

ASME-ISA METALLURGICAL LITERATURE CLASSIFICATION

GENERAL INDEX

GROUPS

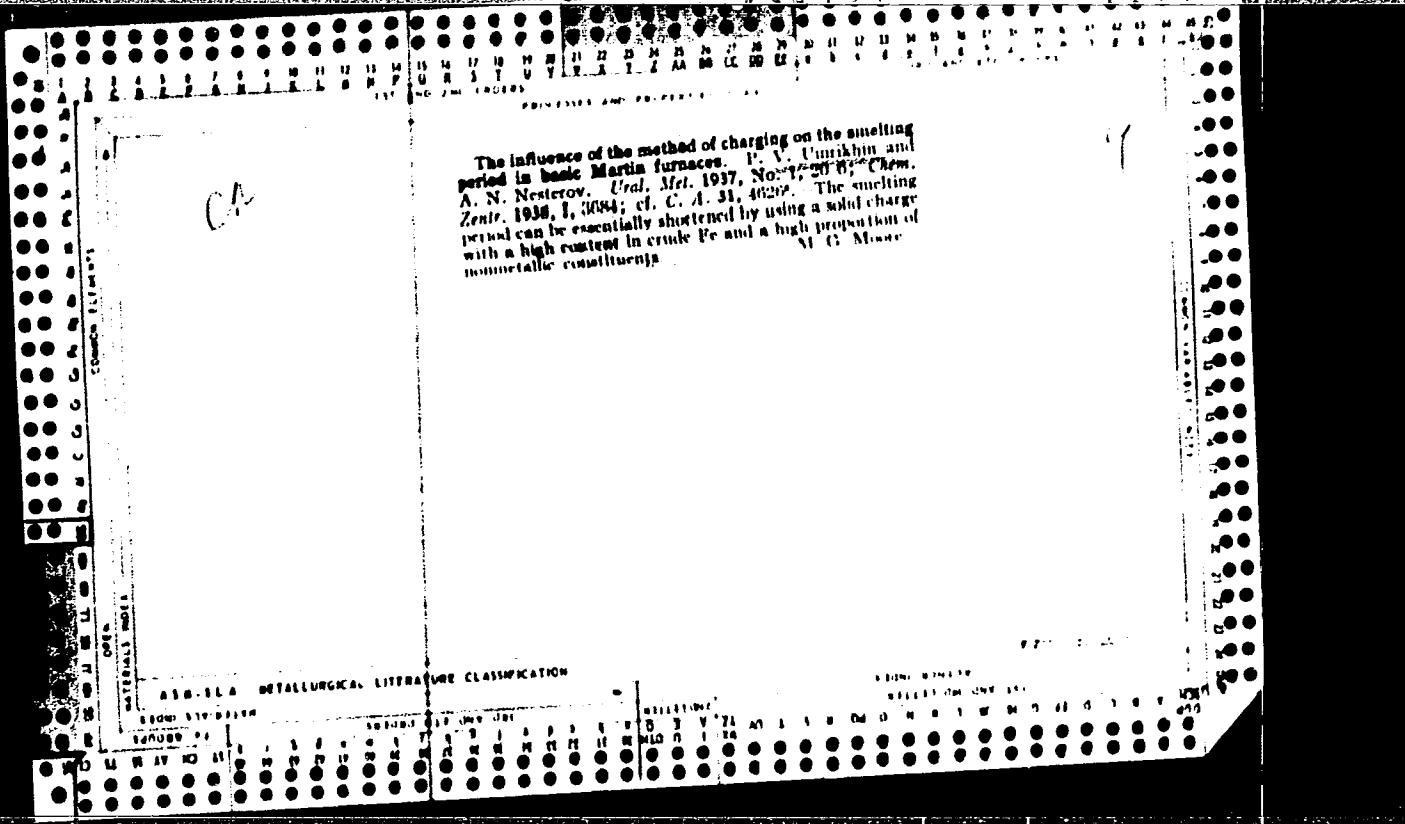
ALPHABETIC INDEX

DEF

GROUPS

ALPHABETIC INDEX

DEF



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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES - 6C1

7

5

The Effect of Heating the Heads of Ingots on the Reduction of the Piping Cavity. P. Umrikhin and E. Sukhova. (Stal, 1938, No. 1, pp. 22-29). (In Russian). An exothermic reaction mixture was considered to be the simplest means of heating the tops of ingots and thus preventing or reducing piping. A number of these mixtures containing various proportions of some or all of the following, ferro-allicon (25 and 45%), ferro-manganese (80%), sodium nitrate, charcoal, iron ore, manganese ore, white slag, and moulding sand, were tried. Experiments were carried out on the effect of adding these mixtures to 1250-kg. top-poured carbon steel ingots, as well as to some alloy steel ingots. The favourable influence (reduced piping, improved mechanical properties) of some of the mixtures was observed.

OPEN

NATIONAL INDEX

ASB-51A METALLURGICAL LITERATURE CLASSIFICATION

22041 BOM11V

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GROUPS

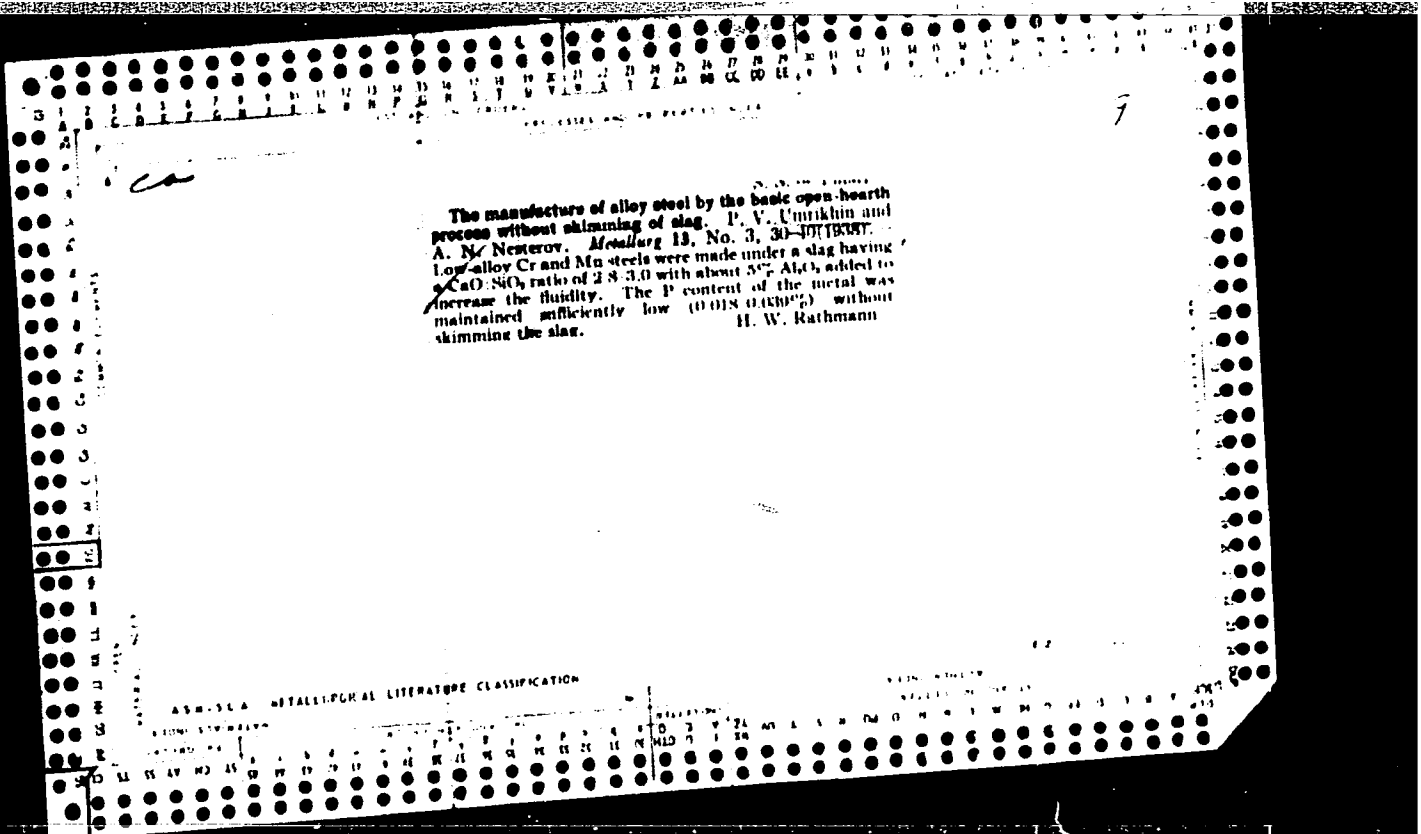
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

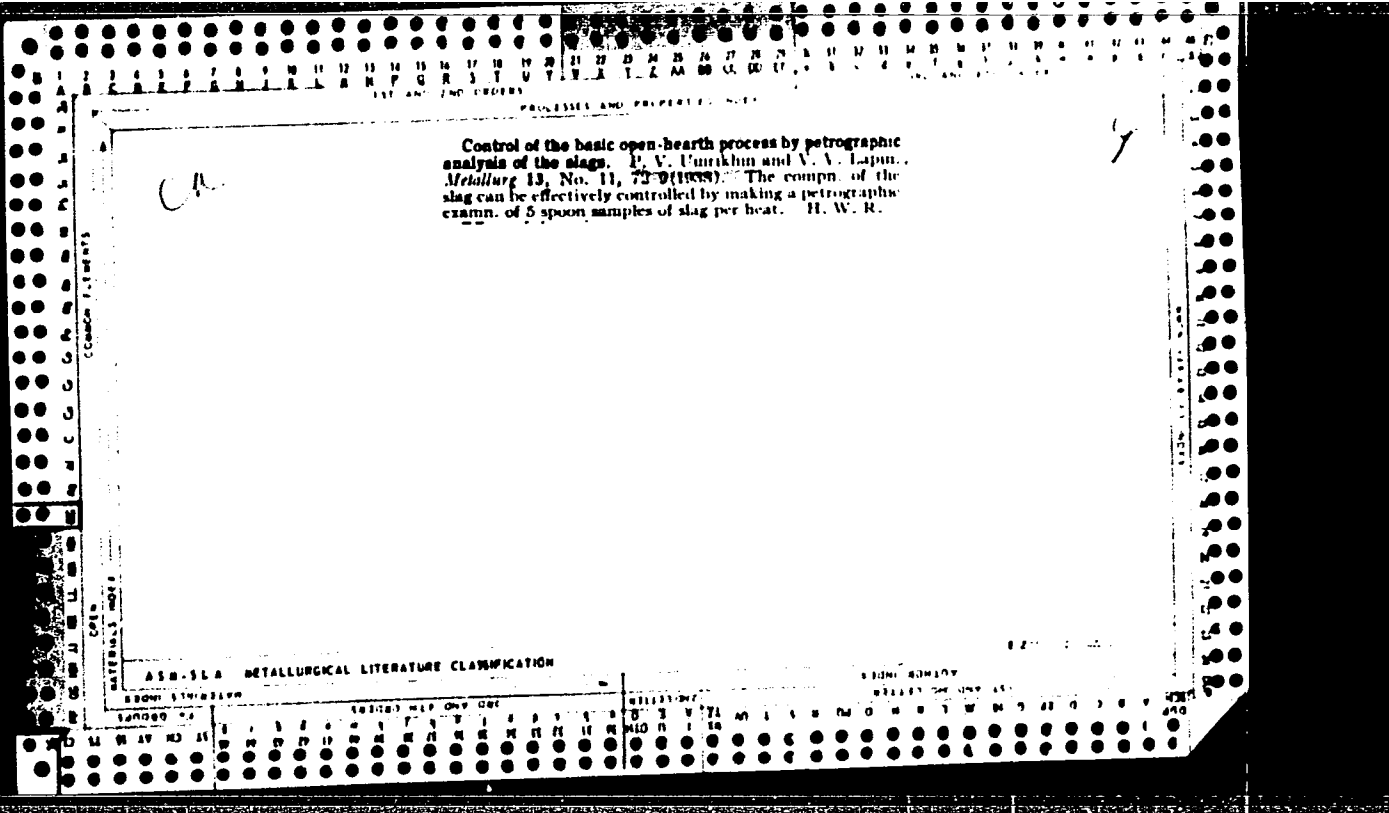
PROCESSES AND PROPERTIES INDEX

Control of the Basic Open-Hearth Process by the Method of Petrographic Analysis of the Slags. P. V. Umrikhin and V. V. Lapin. (Metallurg, 1938, No. 11, pp. 72-70). (In Russian). Open-hearth heats involving the following special operations were carried out: (1) Heats in which the slag was run off during the dephosphorising period and was replaced after that period by a slag of normal or increased basicity. (2) Heats without removal of the slags, which during the progress of the heat had an increased alumina content. (3) Heats under slags with increased alumina and magnesium oxide contents. Changes in the composition of the metal and the slag as well as the petrographic composition of the latter during a heat carried out by the first method are described in some detail. From these observations as well as from those made on heats by the second and third methods, some conclusions are derived regarding the connections between the constitution of the slag and its petrographic composition. It seems possible that the latter may be used as a quick check on the composition of the slag and hence indirectly on the metal during the progress of a heat. A number of micrographs illustrating the various petrographical constituents of slags are reproduced.

ASB-318 METALLURGICAL LITERATURE CLASSIFICATION

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7

THE SLOPE OF THE OPEN-HEARTH FURNACE TAP-HOLE. P. V. Umrikhin. (Metallurg, 1959, No. 3, pp. 37-46). (In Russian). In the first part of the paper some observations on theappings of a 35-ton acid open-hearth furnace are briefly recorded. These show how the inclination of the furnace bottom to the tap-hole and the dipth of the bath affect the relative times during which metal and metal plus slag are tapped off, and how this in turn affects the number of slag-inclusions. The greater part of the article is devoted to a description of laboratory experiments on a one-tenth scale model of the furnace hearth and tap-hole, using water and oil to represent the metal and the slag respectively. In a number of cases a concentrated zinc chloride solution was used in order to have the same ratio of specific gravities. The experiments showed that a 3° inclination of the tap-hole was insufficient and that a much better separation of the metal and the slag could be obtained by increasing this to 10°. In studying the actual pouring of the two liquids into a beaker representing the ladle, it was observed that undesirable breaking up of the oil (representing slag) into small droplets occurred when there was

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

COMMON ELEMENTS

INTERNAL MARKS

COMMON VARIABLE MARKS

only a small quantity of oil and a large quantity of water coming from the tap-hole. As the quantity of the oil became relatively larger, the drops into which it was broken up also became larger and were rapidly eliminated by rising out of the water (representing metal).

5

7

THE INFLUENCE OF MOULD DESIGN ON THE QUALITY OF BOTTOM-POURED INGOTS. P.V. Umrikhin and A. L. Nogoroskiy. (Metallurg, 1959, No. 6, pp. 18-29) (In Russian). The first part of the paper deals with the effect of the quality, temperature and rate of pouring of the steel and the mould temperature on the quality of the ingots, particularly with regard to piping, cavities and porosity. In the experiments particular attention was given to the conditions under which the ingot cooled; these were investigated by means of temperature measurements, using thermocouples inserted into the mould wall at various points. The existing mould design was found to be unsatisfactory from the point of view of heat flow. The unsatisfactory features were: (a) Excessive wall thickness of the hot-top portion, as well as of the main part of the mould; and (b) too small a volume of the ingot head and the tapering of the moulds towards the top. The above drawbacks were rectified in two new mould designs. Tests of these moulds are described with reference to the structures of the ingots obtained. Thin walls to give improved heat removal, larger volume of head

ASB-11A METALLURGICAL LITERATURE CLASSIFICATION

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for better feeding, and absence of taper, which gives a better
ingot surface, are the special features of the new moulds.

187 AND 190 OTHERS PROCESSES AND PROPERTIES INDEX 190 AND 191 OTHERS

Ca *9*

Slag formation in the melting period of a scrap process.
P. V. Umrikhin. *Slag* 7, 596-602(1947).—Of the materials comprising an open-hearth charge, the slag-forming components have the lowest thermal cond. The arrangement of the charge has a telling effect on the thermal processes and this problem was investigated on a no. of variations which can roughly be classified according to the location of the slag-formation components: (a) on top of the metal, (b) on the floor of the hearth, and (c) interlayered between layers of metal. As judged from the duration of the melting process (a) was the least efficient while (c) was the most efficient. The interlaying of the slag materials gave a normal slag characterized by a rising concn. of Ca. Such slag insured a minimal gas and P in the metal. M. Hoesch

ASS. S.L.A. METALLURGICAL LITERATURE CLASSIFICATION

FROM STIMBATH FROM BOWENY

187 AND 190 OTHERS 190 AND 191 OTHERS

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

PROCESSES AND PROPERTIES INDEX

S

11-36. Microfurnace for Determination of the Melting Point of Slags. (In Russian). P. V. Umrikhin and V. I. Dyachkov. Zavodskaya Laboratoriya (Factory Laboratory), v. 13, Oct. 1947, p. 1260-1261.

And improved "furnace" directly connected to the microscope.

METALLURGICAL LITERATURE CLASSIFICATION

FROM SOURCE

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INDEX

UMRIKHIN, P.V. -

UMRIKHIN, P.V.; ARKHAROV, V.I.; KICHIGINA, Z.P.

X-ray investigation of the scale on pig iron contained in open-hearth furnace burdens at the initial stage of steel smelting.
Trudy Inst. fiz. met. no.11:44-46 '50. (MLRA 10:8)
(Cast iron--Metallography) (Metals at high temperature)
(Oxidation)

UMRIKHIN, P. V.

Kokarev, N. I., jt. au. Principles of accelerated open-hearth smelting; theory and practice Sverdlovsk, Gos. nauchno-tekh. otdel. vo lit-ry po chernoi i tsvetnoi metallurgii, 1951. 131 p. (54-40371)

TN740.U5

to Mix its...

... of slag formation on smelting of furnace charge.

UMRIKIN PV

UMRIKHIN, P.V., SOKOLOV, V.E.

"About the Problems of Low Carbon Steel Deoxidation,"
lecture given at the Fourth Conference on Steelmaking, A.A. Baikov Institute of
Metallurgy, Moscow, July 1-6, 1957.

UMRIKHIN, P.V., STARTSEV, V.A.

"Interaction of Metallic Baths and Furnace Bottom-Dress in Open-Hearth Furnaces,"
lecture given at the Fourth Conference on Steelmaking, A.A. Baikov Institute of
Metallurgy, Moscow, July 1-6, 1957

SOV/137-58-10-20548

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 10, p 28 (USSR)

AUTHOR: Umrikhin, P.V.

TITLE: The Kinetics of Steel Desulfurization in the Basic Open-hearth Process (O kinetike obesserivaniya stali v osnovnom martenovskom protsesse)

PERIODICAL: V sb.: Fiz.-khim. osnovy proiz-va stali. Moscow, AN SSSR, 1957, pp 94-111. Diskus., pp 160-187

ABSTRACT: Experimental heats are run in furnaces of 60-130 t capacity. Samples of metal and slag are taken at 25-30 min intervals during the melting period. No desulfurization takes place in heats in which there is no addition of lime for FeO-Fe₂O₃-MnO-SiO₂ slags. In high molten-pig-iron practice with 100-t furnaces where 4.5-5.5% lime is added during the first half of the melting period, the coefficient of S distribution, L_S, usually drops, followed by somewhat of an increase in L with rise in CaO/SiO₂. The rate of desulfurization of the metal in the melting period depends to a significant degree upon a number of process factors, of which the most important is the rapid formation of

Card 1/2

SOV/137-58-10-20548

The Kinetics of Steel Desulfurization in the Basic Open-hearth Process

highly fluid basic ferriferous slags. Employment of the melting period for desulfurization of the metal makes it possible to derive a finished steel of lower S contents. Examples are adduced of the running of heats with early making of ferriferous basic slag. It is found that the desulfurization rate rises with the degree of reduction of the Mn and the decarburization rate.

I.K.

1. Steel--Properties
2. Sulfur--Separation
3. Open hearth furnaces--Operation
4. Oxides--Chemical effects

Card 2/2

137-58-4-6669

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 4, p 50 (USSR)

AUTHORS: Kurochkin, K. T., Umrikhin, P. V.

TITLE: Effect of the Gas Content of Transformer Steel on Its Electromagnetic Properties (Vliyaniye sodержaniya gazov v transformatornoy stali na yeye elektromagnitnyye svoystva)

PERIODICAL: V sb.: Fiz. -khim. osnovy proiz-va stali. Moscow, AN SSSR. 1957, pp 570-585: Diskus. pp 650-655

ABSTRACT: An investigation was made of the gas content of transformer steel in the course of six experimental heats in a 90-95% t basic open hearth furnace heated by heavy oil (5-15% moisture content) and six in a basic 20/25 t electric furnace, during the smelting process and after rolling and annealing of these steels. The charge of the open hearth heats consisted 40% of pig iron, 5% of swarf, and 15% of Fe, the rest being open-hearth department returns and rolling department scrap. 100 kg pig iron were added before tapping. Ferrosilicon (75% Si) was added in the runner simultaneously with the desulfurizer mix and 2.5 kg/t Al. In the electric furnace heats the charge consisted 8% of pig iron, 36% of billets, 45% electric furnace scrap and 10% first-class

Card 1/2

137-58-4-6669

Effect of the Gas Content (cont.)

scrap. Addition of ore and partial slagging-off was performed 40-60 min. before the smelting of the charge. It was found that there is a constant increase in [H] during an open-hearth heat up to the very pouring of the metal while in electric steel making it diminishes even after the oxidizing slag has been removed. The rate of oxidation of C makes for elimination of N and for some increase in [H]. After the addition of the Fe-Si and the Al, [H] rises. [N] diminishes until pouring, but rises during the pour period. The [H] and [N] of steel diminish during rolling and annealing. O and H increase wattage losses, and in addition H diminishes the magnetic induction.

V. M.

1. Steel--Electromagnetic properties 2. Gas--Effects--Applications

Card 2/2

AMERICAN, P.V.

19-23.—The vacuum applied and the heated was similar to that described by Yavdarov (Zhurnal Khim. Fiz. 1954, 30, 1045) and by Peckel, Metallurgiya, 1954. The rate of solution of liquid Fe-C alloys was found to decrease as the C content increased to 4.5%. The H concn. in alloys solidified in a H atm. gradually increased when the C concn. increased to 4.3%. At C concn. above 4.3% the H concn. in the solidified alloys increased sharply, which is explained by the effects

of graphite sepn. The H solub. in the liquid Fe-C alloys is expressed by $[H] = k p^s$ at varying p values, where $s = 0.5$. The H solub. rose with the temp. and the temp. coeff. between 1450 and 1500° varied with the C content from 0.74 cc./100 g., 100°, with 1.2% C to 0.55 cc./100 g., 100° with 4.0% C. The heat effect of soln. of at. H decreased when the C content increased to 4.3%, presumably owing to carbide formation. Other conditions remaining const., the rate of H soln. does not depend on the C content.

W. M. Starberg

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UMRIKHIN P.V.

KHODAKOVSKIY, V.V.; YEFIMOV, V.A., kand. tekhn. nauk, starshiy nauchnyy rabotnik; KOSENKO, P.Ye., kand. tekhn. nauk; KAZAKEVICH, S.S.; LAPITSKIY, V.I., prof., doktor tekhn. nauk; FILIP'YEV, O.V.; STROGANOV, A.I., kand. tekhn. nauk, dots.; DEMIDOVICH, A.V.; BORNATSKIY, I.I., kand. tekhn. nauk; MEDZHIBOZHSKIY, M.Ya., dots.; KOCHO, V.S., prof., doktor tekhn. nauk; RYN'KOV, V.I.; LOMAKIN, L.M., mladshiy nauchnyy sotrudnik; KOKAREV, N.I., dots.; KLYUCHAREV, A.P.; PLYUSHCHENKO, Ye.A.; KAPUSTIN, Ye.A., kand. tekhn. nauk, dots.; KOBNEZA, I.I., kand. tekhn. nauk, nauchnyy sotrudnik; SHIROKOV, G.I.; UMRIKHIN, P.V., prof., doktor tekhn. nauk; LEZHAVA, K.I.; ZHIGULIN, V.I.; MOROKOV, P.K.; KHLIBNIKOV, A.Ye., prof., doktor tekhn. nauk, starshiy nauchnyy sotrudnik; TARASOV, N.S.; NIKOLAYEV, A.G.

Discussions. Biul. TSNIICM no.18/19:40-66 '57.

(MIRA 11:4)

1. Starshiy inzhener Glavspetsstali Ministerstva chernoy metallurgii SSSR (for Khodakovskiy).
2. Institut gaza (for Yefimov).
3. Direktor Dneprodzerzhinskogo metallurgicheskogo instituta (for Kosenko).
4. Nachal'nik laboratorii Leningradskogo instituta ogneuporov (for Kazakevich).
5. Zaveduyushchiy kafedroy metallurgii stali Dnepropetrovskogo metallurgicheskogo instituta (for Lapitskiy).
6. Nachal'nik laboratorii Giprostali (for Filip'yev).
7. Chelyabinskii politekhnicheskii institut (for Stroganov).
8. Nachal'nik teplotekhnicheskoy laboratorii Severskogo metallurgicheskogo zavoda (for Demidovich).
9. Zamestitel' nachal'nika TSentral'noy zavodskoy laboratorii Makeyevskogo metallurgicheskogo zavoda (for Bornatskiy).

(Continued on next card)

KHODAKOVSKIY, V.V.---(continued) Card 2.

10. Sibirskiy metallurgicheskiy institut (for Medzhibozhskiy).
11. Zaveduyushchiy kafedroy metallurgii stali Kiyevskogo politekhnicheskogo instituta (for Kocho).
12. Ispolnyayushchiy obyazannosti glavnogo inzhenera Beloretskogo metallurgicheskogo kombinata (for Ryn'kov).
13. Vsesoyuznyy nauchno-issledovatel'skiy institut metallurgicheskoy teplotekhniki (for Lomakin).
14. Ural'skiy politekhnicheskoy teplotekhniki (for Kokarev).
15. Zamestitel' nachal'nika teplotekhnicheskoy laboratorii Nizhne-Tagil'skogo metallurgicheskogo kombinata (for Klyucherov).
16. Nachal'nik teplotekhnicheskoy laboratorii Tsentral'noy zavodskoy laboratorii zavoda im. Voroshilova (for Plyushchenko).
17. Zhdanovskiy metallurgicheskiy institut (for Kapustin).
18. Institut metallurgii im. Baykova AN SSSR (for Kobeza).
19. Nachal'nik laboratorii martenovskikh pechey Vsesoyuznogo nauchno-issledovatel'skogo instituta metallurgicheskoy teplotekhniki (for Shirokov).
20. Zaveduyushchiy kafedroy metallurgii stali Ural'skogo politekhnicheskogo instituta (for Umrikhin).
21. Nachal'nik metallurgicheskoy laboratorii Tsentral'noy zavodskoy laboratorii Zakavkazskogo metallurgicheskogo zavoda (for Leshava).
22. Zamestitel' glavnogo inzhenera zavoda im. Petrovskogo (for Zhigulin).
23. Nachal'nik martenovskogo tsekha Kuznetskogo metallurgicheskogo kombinata (for Morokov).
24. Institut metallurgii im. Baykova AN SSSR (for Khlebnikov).
25. Glavnyy inzhener Petrovsk-Zabaykal'skogo metallurgicheskogo zavoda (for Tarasov).
26. Nachal'nik tsekha Magnitogorskogo metallurgicheskogo kombinata (for Nikolayev).

(Open-hearth process)

UMRIKHIN, P.V.

BOGATYEV, E.P.; KUROCHKIN, K.T.; UMRIKHIN, P.V.

Влияние концентрации и вязкости шлаков на их
водородопровителенность.

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

MOSCOW — 30 J68 888

PHASE I BOOK EXPLOITATION 914

Uarikhin, Petr Vasil'yevich, Doctor of Technical Sciences,
Professor

Shlakoobrazovaniye v osnovnom martenovskom protsesse (Slag
Formation in the Basic Open-hearth Process) Sverdlovsk,
Metallurgizdat, 1958. 192 p. 3,300 copies printed.

Ed.: Dubrov, N. F.; Ed. of Publishing House: Luchko, Yu. V.;
Tech. E.: Zef, Ye. M.

PURPOSE: The book is intended for engineers and technicians em-
ployed in steel-making plants and it may be of use to vtuz
students taking courses in the metallurgy of steel.

COVERAGE: The book discusses the theoretical and practical problems
of slag formation arising in the basic open-hearth process of
steel making. The work is based on the author's research and that
of his colleagues associated with the department of steel
metallurgy at the Ural Polytechnic Institute imeni S. M. Kirov.

Card 1/6

Slag Formation (Cont.)

914

Soviet and foreign literature and data acquired from open-hearth plants were used in preparing the book. Chemical and petrographic methods of analysis are presented. Problems of slag formation are considered as kinetic factors of the process. Experimental and industrial data were consulted, including data on the possibility of further accelerating the dephosphorization, desulfurization and decarbonization of metals and the production of steels with lower hydrogen content. There are 119 references, 7 of which are German and 6 English.

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12-15-58

SOV/163-58-1-7/53

AUTHORS: Bogatenkov, V. F.; Umrikhin, P. V.; Kurochkin, K. T.

TITLE: The Hydrogen Permeability of Liquid Basic Slags
(Vodorodopronitsayemost' zhidkikh osnovnykh shlakov)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958.
Nr 1, pp 31-36 (USSR)

ABSTRACT: In the present paper the results of investigations on the hydrogen permeability in slags, in relation to their chemical composition are given. The hydrogen permeability of the slags is influenced by the chemical composition of the slags and by their physical properties. The chemical composition of the slags investigated was divided into 4 groups, and the basicity of the slags was represented by the ratio $\frac{CaO}{SiO_2}$. The basicity of the first group of slags varies between 0,87 - 3,40, the basicity of the second group from 2,12 - 2,20, the basicity of the third group from 2,20 - 2,25 and that of the fourth group from 2,20 - 2,25.

Card 1/3 It was found that the hydrogen permeability of the slags

The Hydrogen Permeability of Liquid Basic Slags

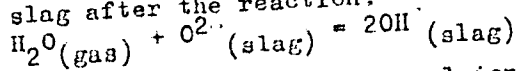
SOV/163-58-17/53

depends on the content of MnO, FeO and MgO. This dependence was also graphically shown.

The viscosity of the slags increases abruptly according to their increase in basicity.

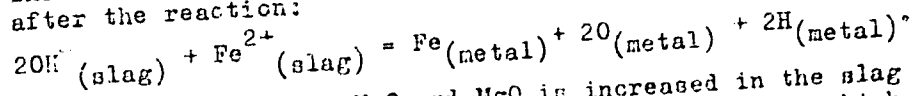
The process of the transition of hydrogen through the layer of the liquid slag is divided into three stages:

1) The transition of the hydrogen from the gas phase to the slag after the reaction:



2) The diffusion of the hydroxyl ion through the layer of the slag metal.

3) The transition of the hydrogen from the slag in the metal after the reaction:



When the content of FeO, MnO and MgO is increased in the slag the binding energy of O^{2-} in the molten slag increases, which decreases the activity; in consequence of this the first stage takes place more slowly. The higher content of FeO in the slag decreases the activity of O^{2-} and the hydrogen

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The Hydrogen Permeability of Liquid Basic Slags

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permeability of the slag to a greater extent than MnO. When the MgO content in the slag is increased the viscosity of the slag is increased. An increase in the MgO content of the slag causes a very sharp decrease in the hydrogen permeability of the slag. There are 3 figures, 2 tables, and 4 references, 4 of which are Soviet.

ASSOCIATION: Ural'skiy politekhnicheskiy institut
(Ural Polytechnical Institute)

SUBMITTED: October 7, 1957

Card 3/3

SOV/137-58-10-20558

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 10, p 30 (USSR)

AUTHORS: Kurochkin, K.T., Butakov, D.K., Umrikhin, P.V., Baum, B.A.

TITLE: Change in Hydrogen and Nitrogen Contents in the Smelting of High-alloy Chromium-nickel-molybdenum Steel by the Basic Open-hearth Process (Izmeneniye sodержaniya vodoroda i azota pri vyplavke vysokolegirovannoy khromonikelemolibdenovoy stali osnovnym martenovskim protsessom)

PERIODICAL: Izv. vyssh. uchebn. zavedeniy. Chernaya metallurgiya, 1958, Nr 1, pp 34-40

ABSTRACT: Experimental heats (He) are run in 30, 45, and 65-t open-hearth furnaces. [H] is determined from pre-hardened samples by the method of the Department of Steel Metallurgy of the Urals Polytechnic Institute, while [N] was determined by the method of dissolution. As a rule, [H] rises during the He and, for example, is $3.96 \text{ cm}^3/100 \text{ g}$ fusion, on the average, for a 30-t furnace, while it is 4.05 at the onset of pure boil and $7.20 \text{ cm}^3/100 \text{ g}$ prior to deoxidation. As the metal temperature rises, [H] in the He and the ladle also increases. The minimum [H] is observed at a slag basicity ($\text{CaO} \% / \text{SiO}_2 \%$) of

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SOV/137-58-10-20558

Change in Hydrogen and Nitrogen Contents (cont.)

3.1-3.5. As [C] rises, [H] diminishes. The [N] diminishes in the course of the He, increases after deoxidation and during pouring, and in a 30-t furnace comes to 0.00327% upon fusion, 0.00258% at the start of pure boil, and 0.00224 and 0.00264% prior to and after deoxidation, respectively.

A.S.

1. Steel--Production
2. Steel--Properties
3. Hydrogen--Effectiveness
4. Nitrogen--Effectiveness

Card 2/2

UMRIKHIN P.V.

133-2-5/19

AUTHORS: D'yachkov, V.I. (Cand. Tech.Sc.), Umrikhin, P.V. (Prof. Dr. of Tech.Sc.), Slesarev, S.G. (Engineer) and Fadeyev, I.G. (Engineer)

TITLE: Development of the Technology of Smelting and Teeming of High Chromium Nickel-molybdenum Steel (Usovershenstvovaniye tekhnologii vyplavki i razlivki vysokokhromistoy nikel'molibdenovoy stali)

PERIODICAL: Stal', 1958, Nr 2, pp.120-126 (USSR)

ABSTRACT: In view of the high proportion of defective semis (up to 12.85%) and finished articles (13.75%) from the above steel, an investigation of the causes of defects and methods of their prevention was carried out. As a result of this investigation smelting and ingot teeming practices were developed which reduced the proportion of defective semis to 7.6% and of finished articles to 1.5-2.2%. An investigation of the nature of the defects indicated that in the majority of cases they were related to the presence of oxide inclusions. Steel was normally produced in 135 ton basic open hearth furnaces. It was necessary to add to the burden during deoxidation and alloying, about 6.5% of ferroalloys which cooled the metal considerably and the steel with high chromium content (2.45-2.85%) becomes

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Development of the Technology of Smelting and Teeming of High Chromium Nickel-molybdenum Steel.

viscous. Moreover, ferroalloys contained a large proportion of high melting inclusions. Therefore in 1951 the production of this steel was transferred to 75 ton acid open hearth furnaces, but no substantial improvement was obtained. A statistical study of operating data indicated that the main factor determining the proportion of defects on manufacturing works was the temperature of steel during teeming. With increasing temperature the proportion of defects decreases (Fig.1). Studies of the distribution of non-metallic inclusions in ingots indicated that the main cause of defects in finished articles were non-metallic inclusions and hair cracks (Figs.2, 3, 4). In order to increase the temperature of the metal on teeming, the technology of its production was modified, namely the addition of chromium was carried out in 2-3 portions during the boiling period. The procedure and the results obtained are described in some detail. In order to decrease the proportion of rejects due to surface defects four methods of teeming were tested:

- 1) teeming without frames with observation on the behaviour

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Development of the Technology of Smelting and Teeming of High Chromium Nickel-molybdenum Steel.

of "crust" in all 4 moulds; 2) teeming with frames on all 4 moulds without observation on the behaviour of metal in moulds during the process of their filling; 3) teeming with frames in 3 moulds and the observation of the behaviour of metal in the fourth mould and 4) teeming with frames in all four moulds, but with the observation and control of the velocity of filling in one mould until it is one third full. The results obtained (Table 4) indicated that the fourth method was the most suitable. The following participated in the work: P.P.Semenenko, V.A. Nosov, L.Ya.Sukhman, L.A.Magidson and V.Ye.Sokolov. There are 4 tables, 5 figures and 8 Russian references.

ASSOCIATION: Ural Polytechnical Institute and Works im.A.K.Serov.
(Ural'skiy politekhnicheskii institut i zavod im.A.K.Serova)

AVAILABLE: Library of Congress.

Card 3/3

SOV/137-58-8-17855

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 8, p 236 (USSR)

AUTHORS: Kurochkin, K. T., Umrikhin, P. V., Baum, B. A.

TITLE: The Effect of Hydrogen and Nitrogen on the Electromagnetic Properties of Transformer Steel (Vliyaniye vodoroda i azota na elektrotekhnicheskiye svoystva transformatornoy stali)

PERIODICAL: Izv. vyssh. uchebn. zavedeniy. Chernaya metallurgiya, 1958, Nr 2, pp 143-150

ABSTRACT: The effect of H on the magnetic properties of transformer steel (TS) was investigated. It is established that H increases the electrical losses and the magnitude of H_C and reduces the magnetic permeability of the TS. The greatest reduction of the magnetic permeability was observed in weak magnetic fields. The harmful effects of N on the magnetic properties of the TS are not as strongly pronounced as those of the H. At a saturation temperature of 850°C and 950°C, the electrical losses and the H_C reach a maximum when the pressure of N amounts to 200 mm Hg. Since the actual pressure of N during smelting is considerably greater than 200 mm Hg, the influence of N present in TS cannot be eliminated under standard industrial conditions. I. B.

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1. Steel--Magnetic properties
2. Hydrogen--Magnetic effects
3. Nitrogen--Magnetic effects

SOV/163-58-3-11/49

AUTHORS: Sokolov, V. Ye., Umrikhin, P. V.,
D'yachkov, V. I.

TITLE: The Problem of Using the Alloy AMS in the Case of a Previous
Desoxidation of Low Carbon Steels (K voprosu primeneniya splava
AMS dlya predvaritel'nogo raskisleniya nizkouglerodistoy stali)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958,
Nr 3, pp 60 .. 65 (USSR)

ABSTRACT: Armco-type steels with a low carbon content and an oxygen
content of 0,120% were used for the investigations. These
alloys were molten in high-frequency furnaces with a
special vacuum arrangement. They had the following chemical
composition:
Alloy I: 8,72% Mn; 4,82% Si; 5,19% Al.
Alloy II: 17,71% Mn; 4,92% Si; 5,89% Al.
Alloy III: 29,68% Mn; 6,77% Si; 5,78% Al.
First the steel samples were molten at a certain temperature
and then the AMS alloy was added. The results obtained show
that on this addition to the steel sample larger quantities
of desoxidation are formed which rapidly rise to the surface.
The desoxidation products formed in using the alloy AMS

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The Problem of Using the Alloy AMS in the Case of a Previous Desoxidation of Low Carbon Steels SOV/193-58-3-11/49

have a different manganese content. The composition of these products is given in figure 1. When using an AMS alloy with a higher manganese content a rapid and complete desoxidation of the metal takes place. The influence exerted by the AMS alloy in the steel melts was determined by three methods. A mixing of the steel melt at the moment of the addition of the AMS alloy as well as a higher temperature of the steel melt promote a rapid separation of the desoxidation products to the surface of the metal melt. The desoxidation process was investigated as dependent on the silicon content of the steel and it was found that within five minutes after the increase of the silicon content the oxygen content is considerably decreased. There are 4 figures, 3 tables, and 2 references, which are Soviet.

ASSOCIATION: Ural'skiy politekhnicheskii institut (Ural Polytechnical Institute)

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2

SOV/137-59-1-376

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 1, p 47 (USSR)

AUTHORS: Sokolov, V. Ye., Umrikhin, P. V., D'yachkov, V. I.

TITLE: Oxide Inclusions in Deoxidized Low-carbon Steel (Oksidnyye vklyucheniya v raskislennoy nizzkouglerodistoy stali)

PERIODICAL: Izv. vyssh. uchebn. zavedeniy. Chern. metallurgiya, 1958, Nr 4, pp 47-54

ABSTRACT: The authors studied the effect of the procedures of deoxidation (D) on the content of oxygen and oxide inclusions in unalloyed low-carbon and Cr-alloyed steels. Preliminary D of steel was carried out in accordance with three different procedures: 1) Initial addition of 45% of Fe-Si to slag followed by 10% Fe-Si and Si-Mn; 2) initial addition of 10% of Fe-Si followed by Si-Mn; 3) initial addition of Si-Mn followed by 10% of Fe-Si. The D of steel was accomplished by the standard method: Addition of 45% Fe-Si and Al, the operation being performed in a ladle. The rate at which the O₂ content in the liquid metal decreases during the preliminary D is at a maximum in the beginning but decreases toward the end of the soaking period of the steel in the furnace (the first version of D produces the lowest,

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Oxide Inclusions in Deoxidized Low-carbon Steel

the third version the highest rate). In the first D procedure, a uniform and rapid distribution of the Si throughout the volume of the hearth is not assured after the Fe-Si is added. Variations in the Si content at various points of the liquid metal may attain values of up to 160%. In the process of the D in accordance with the second procedure, the Si is distributed uniformly, the O₂ content is reduced at a faster rate and larger inclusions are formed; this is explained by the agitation of the liquid metal resulting from the evolution of gases generated during decarburization processes occurring when the 10% Fe-Si are added to the still oxidized liquid metal. Addition of the Si-Mn, both in the first and in the second case, affects neither the quantity and the composition of products of D nor the rate at which the oxygen content of the steel is reduced. This may be explained by the fact that the Si-Mn does not take part in the D reactions. The effect of the Si-Mn becomes apparent during D in accordance with the third procedure: The inclusions formed in the beginning of the D are larger and the O₂ content is reduced at a speedier rate than in the case of the first two versions. As the steel is maintained in the furnace for greater periods of time, the MnO content in the products of the D is reduced, the SiO₂ content is increased, and the size of the inclusions is diminished. Regardless of what D procedure is employed, the inclusions contained in the steel prior to its discharge from the furnace are composed of globular silicates. The inclusions in the steel after its discharge into the ladle are composed

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Oxide Inclusions in Deoxidized Low-carbon Steel

of particles of almost pure Al_2O_3 of irregular crystalline shape. In the course of the discharge of steel from the furnace and during its soaking in the ladle, the content of the oxide inclusions (or O_2) is significantly decreased (approximately by one-half in individual smeltings during the 10-15 minutes required for the process of discharge and soaking in the ladle). This is explained by the mechanical agitation of the steel in the ladle and by the agitation produced by convection currents. Compared with Cr steels, the O_2 content in carbon steels decreases to a greater degree during the discharge of the metal.

V. M.

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