Magnesium Alloys for Work at Elevated Temperatures

continuous-casting ingots show the minimum longitudinal values of σ_b for sheet 0.8-3.0 mm thick, and for extruded sections and rods, to be 26 kg/mm^2. The heat-resistance characteristics obtained at 200°C with specimens of extruded semifinished products are: σ_{100} 7-8 kg/mm^2, $\sigma_{0.2/100}$ 2.9 kg/mm^2, and at 250° σ_{100} 5 kg/mm^2, and $\sigma_{0.2/100}$ 1.7 kg/mm^2. Comparison of the properties of MA9 A with those of standard A (MA2, MA5, MA8, VM17, VM65-1) shows that at room temperature MA9 has higher strength characteristics than MA2, MA8, and VM17, and that at above 150° the strength of MA9 exceeds those of the above-indicated A. The advantage of MA9 alloy is manifested particularly in terms of $_s$, which at 150° is 65% higher than that of MA8. MA9 A contains no rare elements or elements in short supply, does not need heat treatment, is not subject to corrosion cracking under stress, and undergoes less oxidation in the molten state than do other Mg alloys. A characteristic peculiarity of MA9 A is the small level of softening which it undergoes after annealing. The good engineering properties of MA9 when subjected to pressworking make possible its use for a wide variety of semifinished products. The satisfactory mechanical properties of MA9 at room and elevated temperatures make it suitable for a wider range of uses in aircraft structures than other Mg A. E.K.

Card 2/2 1. Magnesium alloys--Thermodynamic properties 2. Heat resistant alloys--Development

DRITS, M.Ye.; SVIDERSKAYA, Z.A.; KADANER, E.S.

Effect of the distribution of alloying elements on the behavior of alloys at high temperatures. Issl. po zharopr. splav. 3:303-309 '58. (MIRA 11:11)
(Alloys--Metallography) (Metals at high temperatures)

SOV/24-58-5-22/31

AUTHORS: Drits, M. Ye., Kadaner, E. S. and Sviderskaya, Z. A. (Moscow)

TITLE: Variation of Micro-Heterogeneity of Alloys in Relation to the Character of the Interaction Between Their Components (Izmeneniye mikroneodnorodnosti splavov v svyazi s kharakterom vzaimodeystviya komponentov)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 5, pp 120-124 (USSR)

ABSTRACT: The effect of composition on the degree of micro-heterogeneity in the Al-Fe, Al-Zn, Mg-Ca and Mg-Zn alloys was investigated by the radioactive tracer technique. Only the Al- and Mg-rich alloys with less than 0.74% of the alloying element were studied, particular attention being paid to maintaining a constant rate of cooling through the crystallisation range when the experimental ingots were prepared. The degree of heterogeneity was expressed in terms of two coefficients : Coefficient K - indicating the total number of deviations from the nominal composition, and coefficient C - measuring the maximum deviation from the nominal composition of the alloy. The results (tabulated and reproduced in the form of graphs showing the variation of K and C with the composition) were correlated with the corresponding portions of the

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Variation of Micro-Heterogeneity of Alloys in Relation to the Character of the Interaction Between Their Components

equilibrium diagrams of the investigated systems and with the microstructure of the studied alloys. It is shown that:

(1) The absolute values of K and C are higher for systems whose components are mutually insoluble in the solid state (Al-Fe) than for those which form series of solid solutions.

(2) When the solidification range of the alloys changes slowly with the changing composition (Al-Fe, Al-Zn systems) K and C remain practically constant.

(3) The variation of K and C is most complex in systems with a limited solid solubility range, particularly if the solidification range increases rapidly with the rising content of the alloying element (e.g. Mg-Ca system). The K, C/composition curves for such systems pass through a maximum at a composition at which the proportion of the second phase present in the alloy reaches a certain minimum value. This indicates that in the two-phase regions of compositions micro-heterogeneity is determined mainly by the manner in which the second phase is

Variation of Micro-Heterogeneity of Alloys in Relation to the Character of the Interaction Between Their Components

distributed, while in the single-phase regions the segregation within the solid solution grains plays the most important part.
There are 5 figures, 1 table and 6 references, 3 of which are Soviet, 3 English.

ASSOCIATION: Institut metallurgii im. A. A. Baykova AN SSSR (Metallurgy Institute imeni A. A. Baykov, Ac.Sc. USSR)

SUBMITTED: October 21, 1957

BOCHVAR, A.A., akademik; DRITS, M.Ye., kand.tekhn.nauk; SVIDERSKAYA, Z.A., kand.tekhn.nauk; KADANER, E.S., kand.tekhn.nauk

Effect of temperature and preliminary heat treatment on cast and deformed alloys. Metalloved.i obrab.met. no.11:32-37 (MIRA 11:11)

1. Institut metallurgii AN SSSR.
(Alloys--Metallography) (Metals, Effect of temperature on)

18.1210

77733
SOV/149-60-1-22/27

AUTHORS: Zakharov, M. V., Sviderskaya, Z. A., Kadaner, E. S., Turkina, N. I.

TITLE: Effect of Copper and Magnesium on Properties of Aluminum-Manganese Alloys at Room and Elevated Temperatures

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Tsvetnaya metallurgiya, 1960, Nr 1, pp 145-149 (USSR)

ABSTRACT: A highly alloyed heat-resistant metal containing many excess phases is usually low-melting and cannot be recommended for the highest working temperatures. Conversely, if an alloy has a high mp, and a moderate number of excess phases, it will also be heat-resistant at adequately high working temperatures. From this point of view it was interesting to study the influence of a variable addition of s-phase (Al_2MgCu) on heat resistance of high-melting Al-Mn

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Effect of Copper and Magnesium on Properties of Aluminum-Manganese Alloys at Room and Elevated Temperatures

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SOV/149-60-1-22/27

(1.5% Mn) alloy. Cu and Mg content varied from 1.3 to 4.5 and from 0.5 to 2%, respectively. Alloy "A", free of these metals, and alloy VD17 (2.9% Cu, 2.2% Mg, 0.57 Mn, the rest Al) were also tested for comparison. Up to 0.1 Ti was added for finer grain structure. Ingots were cast in a water-cooled dipped mold, the specimens (10.5 mm rods) were extruded (in a 100 ton press) after 48 hr homogenizing at 480° C. Temperature of container was 400-420° C. Subsequent heat treatment comprised quenching in water from 500° C and artificial aging for 6 hr at 190° C. Samples to be tested for heat resistance were conditioned for 100 hr at the temperature of the test. The results of tests are shown in Table 1 and in Figs. 1 and 2.

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Effect of Copper and Magnesium on Properties of Aluminum-Manganese Alloys at Room and Elevated Temperatures

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SOV/149-60-1-22/27

Table 1. Mechanical properties of alloys.

A	B	ALLOY A (1,5% Mn, 0,3% Fe, 0,3% Si, 0,1% Ti, REST Al)	A + 1,3% Cu + 0,5% Mg (2,8% S-PHASE)	A + 2,5% Cu + 1,0% Mg (5,5 % S-PHASE)	A + 3,5% Cu + 1,5% Mg (7,5% S-PHASE)	A + 4,5% Cu + 2,0% Mg (10% S-PHASE)	ALLOY VD17 (2,9% Cu, 2,2% Mg, 0,5% Mn REST Al)
C	20[1]	33,0	57,5	100,0	120,5	128,0	112,0
	200[1]	20,5	39,0	60,0	67,0	79,0	74,5
	200[2]	15,5	31,0	50,0	55,5	62,5	58,0
	250[1]	17,0	24,0	33,0	40,0	44,5	43,5
	250[2]	10,0	16,0	23,0	27,5	32,0	31,0
	300[1]	12,0	16,5	18,5	22,5	23,5	23,0
	300[2]	7,0	8,5	10,5	12,5	14,0	12,5
D	20	11,5	24,0	37,5	44,5	49,5	42,5
	200	4,5	10,5	23,0	23,5	25,0	23,0
	250	4,0	9,0	14,5	14,5	16,0	16,5
	300	4,0	5,5	8,5	8,0	8,0	8,0

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Effect of Copper and Magnesium on Properties of Aluminum-Manganese Alloys at Room and Elevated Temperatures

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SOV/149-60-1-22/27

A	B	Alloy A (1.5% Mn, 0.3% Fe, 0.3% Si, 0.1% Ti, rest Al)	A + 1.3% Cu + 0.5% Mg (2.8% S-phase)	A + 2.5% Cu + 1.0% Mg (5.5% S-phase)	A + 3.5% Cu + 1.5% Mg (7.8% S-phase)	A + 4.5% Cu + 2.0% Mg (10% S-phase)	Alloy VD 17 (2.9% Cu, 0.2% Mg, 0.57% Mn, rest Al)
E	20	6.5	12.5	29.0	36.5	41.5	37.0
	200	3.0	7.5	20.0	18.5	21.0	20.5
	250	3.5	8.0	13.0	12.0	3.0	13.5
	300	3.5	4.5	8.0	6.5	7.0	7.0
F	20	34.5	20.0	11.0	7.0	7.0	10.0
	200	32.0	31.0	29.0	21.5	21.5	19.0
	250	33.5	35.0	29.0	19.5	20.5	23.5
	300	36.0	35.0	30.0	26.5	26.0	30.0

Key to Table 1: (A) Properties; (B) Test temperature, °C; (C) Hardness (H_b), kg/mm^2; (D) Tensile strength (σ_b) kg/mm^2; (E) Yield point ($\sigma_{0,2}$) kg/mm^2; (F) Elongation (δ) %; (G) Remark: action time of indenter: (1) 30 sec, (2) 60 min.

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Effect of Copper and Magnesium on Properties of Aluminum-Manganese Alloys at Room and Elevated Temperatures

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SOV/149-60-1-22/27

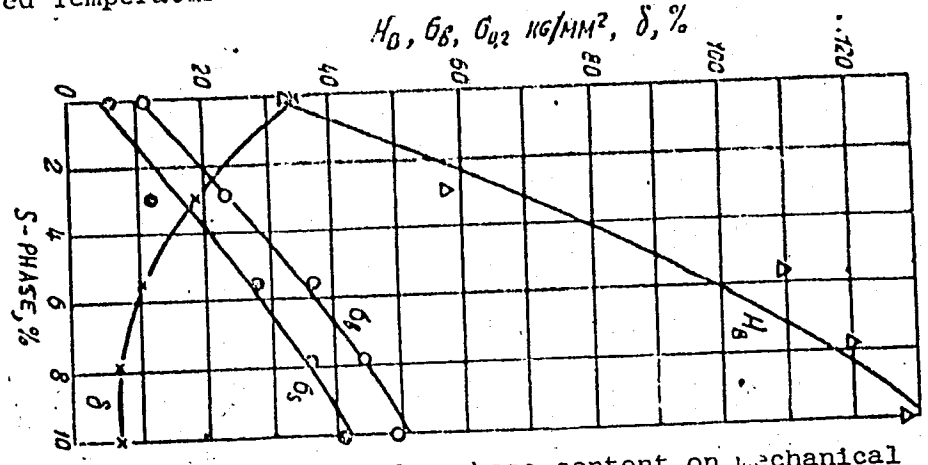

Fig. 1. Effect of s-phase content on mechanical properties of Al-Mn alloy at room temperature.

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Effect of Copper and Magnesium on Properties of Aluminum-Manganese Alloys at Room and Elevated Temperatures

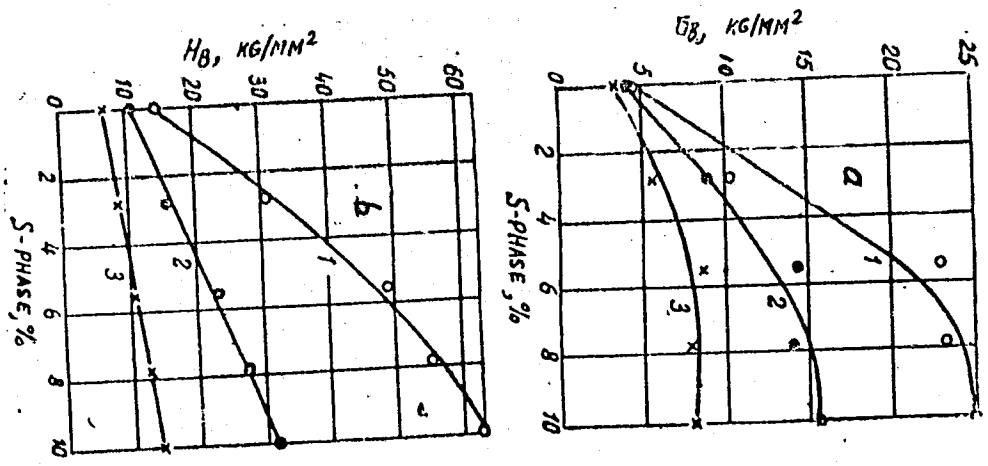

Fig. 2. Effect of s-phase content on tensile strength (a) and ultimate hardness (b) of Al-Mn alloy at elevated temperatures: (1) 200° C; (2) 250° C; (3) 300° C.

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Further tests for long-lasting strength at 250° C were carried out by determining strength after 20 and 100 hr. The results (on logarithmic scale) are shown in Fig. 4.

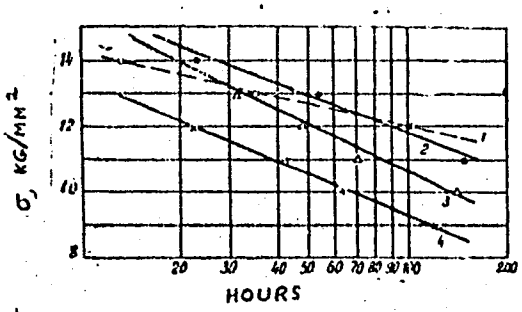

Fig. 4. Test results for long-lasting strength (at 250° C) of VD17 (1) and "A" alloy containing 7.8% sigma phase (2); 10% (3); 5.5% (4).

Effect of Copper and Magnesium on Properties of Aluminum-Manganese Alloys at Room and Elevated Temperatures

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SOV/149-60-1-22/27

The authors conclude that the optimum results (for 100 hr at 250° C) were shown by an aluminum alloy with 1.5% Mn and 7.8% s-phase (3.5% Cu and 1.5% Mg), meaning that moderate alloying by this binary phase results in higher characteristics than a 10% addition. There are 2 tables; 4 figures; and 7 Soviet references.

ASSOCIATION: Institute of Metallurgy, AS USSR and Krasnoyarsk Institute of Nonferrous Metals (Institut metallurgii AN SSSR i Krasnoyarskiy institut tsvetnykh metallov)

SUBMITTED: April 15, 1959

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KADANER, E.S.

PHASE I BOOK EXPLOITATION SOV/5869

Drits, Mikhail Yefimovich, Zoya Andreyevna Sviderskaya, and Esfir' Solomonovna Kadaner

Avtoradiografiya v metallovedenii (Autoradiography in Metal Science) Moscow, Metallurgizdat, 1961. 170 p. 3700 copies printed.

Ed.: L.M. Mirskiy; Ed. of Publishing House: Ye.I. Levit; Tech. Ed.: A.I. Karasev.

PURPOSE: This book is intended for technical personnel of metallurgical and metalworking plants and scientific research institutes. It may also be used by students at special schools of higher education.

COVERAGE: The book describes the autoradiographical method for the investigation of certain problems in metal science. A brief discussion of the physical fundamentals of autoradiography is presented. Particular attention is given to the

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application of this method for studying the processes of crystallization, modification, and the distribution of alloying elements and impurities in alloys. Problems connected with the use of this method for studying the redistribution of alloying elements in alloys taking place under the effect of deformation and heat treatment are discussed. Also included are data on the relationship between the distribution of alloying elements and the strength characteristics of alloys at room or elevated temperatures. No personalities are mentioned. There are 159 references, mostly Soviet.

TABLE OF CONTENTS:

KADANER, E.S.

PHASE I BOOK EXPLOITATION SOV/3402

Akademiya nauk SSSR. Institut metallurgii

Issledovaniye splavov tsvetnykh metallov; sbornik 2 (Analysis of Nonferrous Metal Alloys; Collection of Articles, [No.] 2) Moscow, Izd-vo AN SSSR, 1960. 204 p. Errata slip inserted. 2,800 copies printed.

Ed.: I.A. Oding, Corresponding Member, USSR Academy of Sciences; Ed. of Publishing House: V.S. Rzheznikov; Tech. Ed.: T.P. Polenova; Editorial Board: A.A. Bochvar, Academician; M.Ye. Drits, Candidate of Technical Sciences (Deputy Resp. Ed.); M.V. Zakharov, Professor, Doctor of Technical Sciences; E.S. Kadaner, Candidate of Technical Sciences (Resp. Secretary); A.M. Korol'kov, Doctor of Technical Sciences; M.V. Mal'tsev Professor, Doctor of Technical Sciences; and Z.A. Sviderskaya, Candidate of Technical Sciences.

PURPOSE: This collection of articles is intended for workers in scientific research institutes, metal and machine works, for teaching personnel, and for students attending schools of higher education.

COVERAGE: This is the second volume in a series of works on nonferrous and light-metal alloys prepared by the Institut metallurgii imeni A.A. Baykova AN SSSR (Institute of Metallurgy imeni A.A. Baykov of the Academy of Sciences USSR), and the Moskovskiy institut tsvetnykh metallov i zolota imeni M.I. Kalinina (Moscow Institute of Nonferrous Metals and Gold imeni M.I. Kalinin). The problems discussed concern the casting and physical metallurgy of nonferrous alloys. The effect of alloying and deformation on the properties of various alloys, and the problems connected with the study of the casting properties and with the plotting of phase diagrams for nonferrous alloys are discussed. No personalities are mentioned. References accompany most of the articles.

18.1245

28878
S/180/61/000/004/016/020
E201/E580

AUTHORS: Drits, M.Ye., Sviderskaya, Z.A., Kadaner, E.S. and Sinel'nikova, A.A. (Moscow)

TITLE: Recrystallisation and softening at elevated temperatures of magnesium alloys containing manganese, aluminium and calcium

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1961, No.4, pp.103-110

TEXT: An attempt is made to compare the effects of Mn, Al and Ca on the recrystallisation of magnesium with the effects of the same elements on the high-temperature strength. 10 mm thick blocks, cast in a metal mould, were hot rolled at 430°C to a thickness of 2.5 mm. The sheet obtained was annealed at 350-450°C to a grain size of about 20 μ, and cold rolled to a thickness of about 1 mm. The cold-worked layer was removed by treatment with an aqueous nitric acid solution. Recrystallisation was investigated by microscopic analysis (the appearance of new grains), hardness measurements (a point of inflexion in the hardness

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temperature curve) and by X-ray photographs. The results are given in the Table. The addition of Mn leads to an increase in the temperature of recrystallisation and to a decrease of grain size in the recrystallised structure. Up to 2% Al increases the recrystallisation temperature, further additions result in a sharp fall of the recrystallisation temperature. Additions of 0.1 to 0.5% Ca result in a marked increase in recrystallisation temperature; the effect is maintained up to 1.5% Ca. Fig.4 gives the relationship between recrystallisation temperature, t_{pekp}, °C, prolonged hardness, H_B, kg/mm^2 (1 hour at 250°C) and composition. This shows that the effects of alloying additions on recrystallisation temperature and on high-temperature strength are similar. There are 4 figures, 1 table and 25 references: 23 Soviet and 2 non-Soviet. The English-language reference reads as follows: Ref.14: Harrington, R.H. The effect of single addition metals on the recrystallisation, electrical conductivity and rupture strength of pure aluminium. Trans. ASME, 1949, v.61, 443.

SUBMITTED: December 10, 1960

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18.1210 2408, 2808, 2208, 1413 25549

S/149/61/000/004/006/008
A006/A101

AUTHORS: Zakharov, M. V.; Sviderskaya, Z. A.; Kadaner, E. S.; Turkina, N. I.

TITLE: The effect of lithium on the properties of aluminum-manganese alloys at room and elevated temperatures

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, no. 4, 1961, 134-138

TEXT: The authors studied the possibility of improving the properties of an aluminum-manganese alloy, by alloying it with lithium. Lithium forms with aluminum a rather extended zone of solid solutions and the solubility of lithium in solid aluminum decreases from 6.4 to 1.5% at temperatures dropping from 601 to 15°C. This indicates the possibility of heat treatment for these alloys. Investigations were made with Al alloys containing 1.5% manganese; 0.1% titanium; 0.3% iron and silicon each, and from 0.5 to 3.0% lithium. Optimum heat treating conditions were selected by measuring the hardness of the alloys in hot-pressed state; in water-quenched state after heating in a saltpeter bath at 600°C for 1 hour; after 5-day natural aging and after 10-day artificial aging at 150-250°C.

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25549 S/149/61/000/004/006/008
A006/A101

The effect of lithium on the properties ...

The properties of the alloys were studied by short-time tension at room and elevated temperatures (200, 250 and 300°C), and by the method of hot and long-lasting hardness. Specimens intended for high-temperature tests were subjected, in addition to heat treatment under optimum conditions (quench hardening at 600°C for 1 hour and artificial aging at 195°C for 6 hours), to 100-hour stabilization. The results obtained show that only alloys containing 2 - 3% Li are hardened by heat treatment. Heating to 250 and 300°C reduced the hardening effect of lithium. This is probably caused by coagulation processes of the hardening phase, developing at these temperatures. Strength properties of alloys with 3% Li approach those of Al-Cu-Mg alloys. Comparison tests showed the expediency of heat treatment for artificially aged alloys with 3% Li whose hardness exceeded that of not heat-treated hot-pressed alloys by 10 kg/mm^2. It is concluded that one of the basic factors of hardening the Al-Mn-Li alloy at elevated temperatures, is the development of a submicroscopical heterogeneity of the structure on account of dispersional precipitation of the hardening phase during the decomposition of the ternary solid solution, rich in aluminum. Apparently the hardening lithium phase has sufficiently stable properties at elevated temperatures and low proneness to coagulation when heated not over 200°C. This article was recommended for publication by the kafedra metallovedeniya Krasnoyarskogo instituta tsvetnykh metallov

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S/149/61/000/004/006/008/
A006/A101

The effect of lithium on the properties ...

(Department of Metal Science at the Krasnoyarsk Institute of Non-Ferrous Metals). There are 3 tables, 5 figures, and 9 references: 4 Soviet-bloc and 5 non-Soviet-bloc. The reference to the most recent English-language publication reads as follows: P. Frost, Techn. Rev. 8, no. 1, 1959)

ASSOCIATIONS: Institut metallurgii AN SSSR (Institute of Metallurgy of AS USSR); Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Institute of Non-Ferrous Metals)

SUBMITTED: June 27, 1960

Card 3/3

DRITS, Mikhail Yefimovich; SVIDERSKAYA, Zoya Andreyevna; KADANER, Esfir' Solomonovna; MIRSKIY, L.M., red.; LEVIT, Ye.I., red. izd-va; KARASEV, A.I., tekhn. red.

[Autoradiography in the study of metals] Avtoradiografiia v metallovedenii. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1961. 170 p. (MIRA 14:10)

(Metallography) (Autoradiography)

DRITS, M.Ye. (Moskva); SVIDERSKAYA, Z.A. (Moskva); KADAMER, E.S. (Moskva); SINEL'NIKOVA, A.A. (Moskva)

Recrystallization and softening of alloys of magnesium with manganese, aluminum and calcium at high temperatures. Izv. AN SSSR, Otd. tekh. nauk. Met. i topl. no.4:102-110 Jl-Ag '61. (MIRA 14:8)

(Magnesium alloys—Metallography)
(Metals at high temperatures)

ZAKHAROV, M.V.; SVIDERSKAYA, Z.A.; KADANER, E.S.; TURKINA, N.I.

Effect of lithium on the properties of aluminum-manganese alloys at room temperatures and higher. Izv. vys. ucheb. zav.; tsvet. met. 4 no.4:134-138 '61. (MIRA 14:8)

1. Institut metallurgii AN SSSR i Krasnoyarskiy institut tsvetnykh metallov. Rekomendovana kafedroy metallovedeniya Krasnoyarskogo instituta tsvetnykh metallov.
(Alluminum-manganese-lithium-alloys--Metallography)
(Metals at high temperature)

34710
S/137/62/000/002/064/1
A006/A101

18.1245

AUTHORS: Drits, M. Ye., Sviderskaya, Z. A., Kadaner, E. S., Sinel'nikova, A. A.

TITLE: Recrystallization and softening of magnesium alloys with manganese, aluminum and calcium at higher temperatures

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 2, 1962, 20, 21120 ("Izv. AN SSSR, Otd. tekhn. n.", 1961, no. 4, 103 - 110)

TEXT: The authors investigated the effect of Mn (0.1 - 2%), Al (0.1 - 10%) and Ca (0.05 - 1.5%) on recrystallization of Mg. Ingots 10 mm thick, cast into metal molds were rolled in hot state at 430°C until 75% deformation. Sheet blanks were then rolled with 60% reduction until about 1 mm sheet thickness. Such deformation conditions were selected that recrystallization could not occur during the processing; this was checked by X-rays. Recrystallization was studied by measuring hardness, and by microscopical and X-ray analyses. A higher Mn content raises the temperature of beginning and completed recrystallization; the most intensive rise takes place at up to 0.5% Mn concentration. Addition of Al reduces sharply the temperature of beginning and terminated recrystallization, and

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7 - 10% Al predetermines completed recrystallization during the very deformation process. In Mg-Ca alloys hundredths of per cent of Ca do not change the temperature of recrystallization commencement, but raise the temperature of the end of recrystallization. Addition of Ca in amounts of 0.1 - 0.5% causes a sharp increase of recrystallization temperature (by 100 - 150°C). A further increase of the Ca content up to 1.5% maintains high recrystallization temperatures of all the alloys. The effect of Ca, is apparently determined by changes in the surface energy of Mg when introducing surface-active elements (up to 0.1%). At higher concentrations the effect of Ca manifests itself in the enrichment of boundaries and sub-grains with alloying component atoms. For Mg-Mn alloys the effect of Mn is connected with the inhibited development of diffusion processes. The authors show a certain analogy in representation of curves of recrystallization and endurance hardness, characteristic of the heat resistance. There are 25 references.

M. Matveyeva

[Abstracter's note: Complete translation]

KADANER, E.S.; ABABKOV, V.T.

Zirconium distribution in aluminum-copper-magnesium alloys in various conditions of deformation and heat treatment. Issl. splav. tsvet. met. no.3:34-41 '62. (MIRA 15:8)
(Aluminum-copper-magnesium alloys—Metallography)
(Zirconium)

S/806/62/000/003/004/018

AUTHORS: Kadaner, E.S., Ababkov, V.T.

TITLE: The distribution of zirconium in aluminum-copper-magnesium alloys in different conditions of deformation and heat treatment.

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Issledovaniye splavov tsvetnykh metallov. no.3. 1962, 34-42.

TEXT: The paper presents the results of an experimental investigation on the nature of the press effect in which β-radiating Zr^{95} (half-life 65.5 days) was used as a self-tracing (autoradiographic) alloying element. The basic alloy comprised 4.4% Cu and 1.5% Mg, with 0.2, 0.4, 0.6, and 0.8% Zr added in the form of an Al-Zr^{95} ligature. 35-mm diam ingots were cast for hot extrusion, flat billets for rolling. The billets were homogenized by soaking for 24 hrs at 480°C. 90% deformation was achieved by either method of pressure working. The extrusion billets were machined to 29-mm diam and extruded into 10.5-mm rods on a 100-t press. Billet T 480°, container T 400°. Rolling to 2.5-mm sheets was done on 480° billets through warm rolls. Heat treatment: 1-hr soaking at 500°, water quench, 5-day natural aging or 10-hr aging at 175, 200, 250, or 300°. Mechanical properties were determined at the various stages of hot-working and heat treatment. X-ray

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metallography was done on 1-mm-thick specimens with Cu radiation at a specimen-to-X-ray angle of 7°. The surface hardness was removed by etching in 40 cc HCl, 40 cc HNO_3, 10 cc HF, 150 cc H_2O, followed by electrical polishing. Specimens for autoradiography were 200 μ thick; they were polished, dried, and covered with an anticorrosion varnish. Exposure on an MP (MR) film of the NIKFI (All-Union Scientific Research Institute of Motion Picture Photography) was conducted for 7 to 10 days. The data obtained by mechanical tests are tabulated. Maximum strength and elongation is exhibited with 0.4% Zr; all strength characteristics are 12-15 kg/mm^2 higher in the extruded specimens than in the rolled specimens (press effect). All further tests were performed with the alloy containing 0.4% Zr. Mechanical-properties data for various aging procedures are tabulated. Natural or 175°C aging are nearly equivalent, but accelerated high-T aging results in a sharp drop in strength. Radioautographs showed a dendritic character of the structure in cast specimens, with the Zr, apparently, distributed primarily in the solid solution. Extruded specimens gave evidence of a sharply defined fibrous structure; rolled specimens had a structure more similar to that of the cast specimens, but less coarse and slightly directional. Heat treatment does not alter the character of the Zr distribution fundamentally, except that the microradioautographs show some equalization of the nonuniformities in the Zr distribution in the hot-worked specimens. In specimens aged naturally and at 175° the structures are about the same,

but in specimens aged at higher T more coarse Zr accumulations appear. It is assumed (although the radioautography method does not permit such far-reaching conclusions) that the banded Zr distribution in the heat-treated extruded alloys is due not only to intracrystalline liquation, but also to a directional segregation of dispersed particles formed in the decomposition of the solid solution. Microstructural and X-ray investigations were performed to clarify the influence of the recrystallization on the press effect. Prior to heat treatment, both extruded and rolled specimens had a deformed structure. After heat treatment, rolled specimens had recrystallized, whereas extruded specimens with 0.4% Zr had not recrystallized and extruded specimens with 0.2, 0.6, and 0.8% Zr had only partly recrystallized (microphotos shown). In summary it is concluded that the effectiveness of the effect of the Zr in raising the recrystallization temperature of the Al-Cu-Mg alloy – which appears to affect the press effect substantially – depends on the character of the Zr distribution in the solid solution. In the extruded material the Zr distribution in continuous bands oriented in the direction of the deformation, obviously, inhibits the development of recrystallization more effectively than do the isolated Zr inclusions in the rolled alloy. It is noted that H. Unkel (Metallwirtschaft, no.3, 1940, 37) has already mentioned the bandedness as one of the indications of the press effect. The significant experimental aspect of the present investigation is its use of the method of radioautography for

the distinctive identification of the character of the Zr distribution in the structure of alloys of the Al-Cu-Mg-Zr system. There are 4 figures, 2 tables, and 12 references (8 Russian-language Soviet, 1 French, 2 German, and 1 English-language: Tournaire, M., Renovard, M. J. of the Inst. of Metals, v.1, part II, 1952, 1358).

ASSOCIATION: None given.

DRITS, M.Ye., kand.tekhn.nauk; SVIDERSKAYA, Z.A., kand.tekhn.nauk; KADANER, E.S., kand.tekhn.nauk; FEL'GINA, S.B., inzh.

Effect of manganese, aluminum, and calcium on the kinetics of magnesium recrystallization. Metalloved. i term. obr. met. no.11:28-31 N '62. (MIRA 15:11)

1. Institut metallurgii imeni A.A. Baykova.
(Magnesium alloys--Metallography)
(Crystallization)

S/179/63/000/001/022/023
E040/E451

AUTHORS: Drits, M.Ye., Sviderskaya, Z.A., Kadaner, E.S., Fel'gina, S.B. (Moscow)

TITLE: Effect of some alloying elements on the recrystallization of magnesium

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Metallurgiya i gornoye delo. no.1, 1963, 191-198

TEXT: The effects were studied of the addition of thorium, neodymium, zirconium, nickel and barium on the recrystallization of magnesium, and its relationship with the strengthening and weakening of magnesium alloys at various temperatures. The test alloys were prepared from MPI (MGI)-grade magnesium (99.91% Mg), electrolytic nickel, barium (99.99% Ba), neodymium (99.9% Nd) and thorium (99.5% Th). The alloying additions were between 0.1 and 2.0 wt.% with Mg-Ba and Mg-Ni alloys, 0.1 and 0.6 wt.% with Mg-Zr alloys, 0.2 and 1.0 wt.% in Mg-Th alloys and from 0.1 to 4 wt.% in Mg-Nd alloys. All the test alloys were hot-deformed, cold-deformed and annealed at temperatures of 50 to 450°C for one hour before microstructural and X-ray examinations, in order to

Card 1/3

Effect of some alloying ...

determine the initial and final temperatures of recrystallization. The experimentally established phase diagrams of the various binary alloys produced from the results are given together with a graph showing the recrystallization kinetics of magnesium-base test alloys. The effect of the alloying elements on the physico-mechanical properties of the test alloys was investigated in detail and the data obtained are tabulated, the effect of each alloying element being examined individually. In most cases, recrystallization of magnesium-base alloys was found to depend mainly on the chemical reaction of the constituents, but the dimensional factor was also found to be prominent in some cases. Soluble alloying elements inhibit the recrystallization of magnesium much more than the insoluble ones but only if the influence of the dimensional factor is appreciable: e.g. 0.1 wt.% addition of zirconium to magnesium was found to have no effect on the recrystallization temperature of magnesium, as in this case the dimensional factor is nil, but a 0.15 wt.% addition of Zr raised the recrystallization temperature of magnesium quite significantly, due to the appearance of a second segregated phase.

S/279/63/000/001/022/023
E040/E451

Effect of some alloying ...

Additions of thorium and neodymium raised the initial recrystallization temperature of magnesium alloys very considerably, and nickel and barium additions to a much smaller extent. The role of recrystallization in weakening magnesium-base alloys at elevated temperatures was examined by creep tests on Mg-Ni specimens carried out for 100 hours at 200°C under a stress of 1.75 kg/mm^2, after prior annealing at 450°C for 1 hour. Hardness tests were carried out on specimens with 0.14% Ni at the test temperature of 125°C. The data obtained are tabulated and their significance is assessed. It is concluded that recrystallization plays an important role in the deformation resistance of Mg alloys at elevated temperatures. There are 6 figures and 3 tables.

SUBMITTED: April 20, 1962

Card 3/3

DRITS, M.Ye.; KADANER, E.S., prinimali uchastiye: FEL'GINA, S.B., inzh.; ORESHKINA, A.A., inzh.

Recrystallization and recovery of magnesium alloys. Issl. splav tsvet. met. no.4:211-223 '63. (MIRA 16:8)

(Magnesium alloys—Metallography)
(Strains and stresses)

DRITS, M.Ye. (Moskva); SVIDERSKAYA, Z.A. (Moskva); KADANER, E.S. (Moskva); FEL'GINA, S.B. (Moskva)

Effect of thorium and zinc on the recrystallization of magnesium. Izv. AN SSSR. Met. i gor. delo no.5:129-133 S-O '63. (MIRA 16:11)

ACCESSION NR: AT4009499 S/2509/63/000/014/0130/0138

AUTHOR: Kadaner, E. S.; Oreshkina, A. A.

TITLE: Investigation of recrystallization of Mg-Ce alloys

SOURCE: AN SSSR. Institut metallurgii. Trudy*, no. 14, 1963. Metallurgiya, metallovedeniye, fiziko-khimicheskiye metody* issledovaniya, 130-138

TOPIC TAGS: magnesium recrystallization, binary alloy, heat resistant alloy, magnesium, cerium, magnesium alloy, magnesium cerium alloy

ABSTRACT: In explaining the strengthening of magnesium alloys at high temperatures, the influence of alloying elements on magnesium recrystallization processes is of considerable importance. The present investigation considered the recrystallization of binary magnesium-cerium alloys, the basis of heat-resistant industrial alloys. The alloy was hot rolled and annealed, after which samples were etched, and subjected to microscopic analysis and hardness tests. The temperatures at the beginning and end of recrystallization were determined. The results of X-ray analysis coincided with the microscopic data. The introduction of small fractions of a percent of cerium (up to 0.23% by weight) into magnesium greatly retarded recrystallization, but a further increase did not change the process. The

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ACCESSION NR: AT4009499

energy of activation of recrystallization also increased up to the same value (0.23% cerium). The investigation also considered the influence of atomic size of the recrystallization temperature. The low diffusive capacity of cerium in magnesium and the weak coagulation of cerium when the alloy is heated tend to increase the recrystallization temperature of Mg-Ce alloys. Hardness and creep resistance tests show that annealed samples have higher values. It is concluded that recrystallization has a positive effect on heat resistance if a structure of higher stability is created. Orig. art. has: 9 figures and 2 tables.

ASSOCIATION: Institut metallurgii AN SSSR (Metallurgical Institute, AN SSSR)

SUBMITTED: 00	DATE ACQ: 25Jan64	ENCL: 00
SUB CODE: MM	NO REF SOV: 004	OTHER: 001

Card 2/2

DRITS, M. Ye.; KADANER, E.S.; PADEZHNOVA, Ye.M.; BOCHVAR, N.R.

Determination of the mutual solubility boundaries of manganese and cadmium in solid aluminum. Zhur. neorg. khim. 9 no.6:1397-1402 Je '63 (MIRA 17:8)

L 12599-63 BDS/EWP(q)/EWT(m) AFFTC/ASD JD

ACCESSION NR: AP3003477 S/0078/63/008/007/1661/1667

56

AUTHOR: Drits, M. Ye.; Kadaner, E. S.; Padezhnova, Ye. M.

TITLE: Phase diagram of the aluminum-manganese-cadmium system in the area of high aluminum concentration

SOURCE: Zhurnal neorganicheskoy khimii, v. 8, no. 7, 1963, 1661-1667

TOPIC TAGS: Al, Mu, cadmium, mechanical property, corrosion property, eutectic property

ABSTRACT: Research on the interaction of components in the system Al-Mn-Cd is of practical interest since alloying with manganese and cadmium indicates a favorable effect on mechanical and corrosion properties. Study of the ternary diagram for Al-Mn-Cd was begun from triangulation of the system by 2 polythermal sections with constant content of aluminum equal to 99 and 95% in order to determine that in the aluminum angle there are 3 areas of primary crystallization: MnA_{14}, MnA_{16} and Alpha. The data obtained agreed best with results of work by Dix, Fink and Wiley which determined

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L 12599-63
ACCESSION NR: AP3003477

eutectic temperature at 658.5C, content of manganese at eutectic 1.95%, temperature of first peritectic reaction during cooling 680F and during heating 710C. Orig. art.has: 9 figures.

ASSOCIATION: none

SUBMITTED: 2Aug62 DATE ACQ: 02Aug63 ENCL: 00

SUB CODE: CH, ML NO REF SOV: 003 OTHER: 016

Card 2/2

SVIDERSKAYA, Z.A.; KADANER, E.S.; TURKINA, N.I.; KUZ'MINA, V.I.

Boundary of the solid solution region in the aluminum corner of the system aluminum - manganese - lithium. Metalloved. i term. obr. met. no.12:2-6 D'63. (MIRA 17:2)

KADANER, E.S.; ORESHKINA, A.A.

Investigating the recrystallization of magnesium-cerium alloys.
Trudy Inst. met. no.14:130-138 '63 (MIRA 17:8)

ACCESSION NR: AP4019816 S/0279/64/000/001/0166/0169

AUTHOR: Sviderskaya, Z. A. (Moscow); Kadaner, E. S. (Moscow)

TITLE: Effect of Fe on solubility of Li in Al

SOURCE: AN SSSR. Izv. Metallurgiya i gornoye delo, no. 1, 1964, 166-169

TOPIC TAGS: aluminum alloy, aluminum lithium alloy, lithium alloy, lithium solubility, solid solution solubility, aluminum alloy iron impurity

ABSTRACT: Specimens of binary Al alloys with up to 6% by weight of Li and ternary Al alloys with 0.25-6% Li and 0.04-1.6% Fe were obtained in a resistance furnace (details given) and subjected to subsequent high-temperature treatment (30 hours at 600C, then water quenched; one lot was then kept for 300 hours at 400C, another for 800 hours at 200C, then water quenched). Results are tabulated (see Table 1 in the Enclosure) and indicate that the presence of up to 1.6% Fe in Al-Li alloys has practically no effect on the Li content in the solid solution. The author concludes that the presence of even relatively large amounts of Fe should not exert a negative effect on the hardening of Al-Li alloys during heat treatment. "R. S. Rozhkova and V. Ye. Mogilevskaya took part in the work." Orig. art. has: 2 graphs, 1 table.

Card 1/3

ACCESSION NR: AP4019816

ASSOCIATION: none

SUBMITTED: 10Jun63	DATE ACQ: 31Mar64	ENCL: 01
SUB CODE: ML	NO REF SOV: 003	OTHER: 007

Card 2/3

ACCESSION NR: AP4039264 S/0078/64/009/006/1397/1402

AUTHOR: Drits, M. Ye.; Kadaner, E. S.; Padezhnova, Ye. M.; Bochvar, N. R.

TITLE: Determination of the boundaries of mutual solubility of manganese and cadmium in solid aluminum

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 6, 1964, 1397-1402

TOPIC TAGS: aluminum, cadmium, manganese, aluminum alloys, phase equilibria, electric properties, microstructure, solubility, mutual solubility

ABSTRACT: A small amount of cadmium in aluminum alloys has an extremely beneficial effect on the mechanical as well as the corrosion properties of the alloy. Consequently, in recent years cadmium is used as an alloying element in aluminum alloys which are used under deformation conditions, specifically in the refractory alloy of the system Al-Cu-Li-Mn-Cd. In order to determine the nature of the strengthening of cadmium containing aluminum alloys it is necessary to have data on the nature of the interaction of cadmium with aluminum and other alloying components. This work was concerned with the determination of the mutual solubility of cadmium and manganese in solid aluminum. In this investigation binary and ternary alloys

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ACCESSION NR: AP4039264

were prepared containing up to 2 % of manganese and up to 1 % of cadmium. The determination of the solubility was conducted by the microscopic analysis method of the faces of specimens which were subjected to preliminary electrolytic polishing and measurement of electrical systems. The solubility of cadmium and manganese in aluminum is shown in figure 1. Orig. art. has: 4 tables and 4 figures.

ASSOCIATION: None

SUBMITTED: 04Jul62 ENCL: 01

SUB CODE: MM NO REF SOV: 002 OTHER: 013

Card 2/3

ACCESSION NR: AP4039264 ENCLOSURE: 01

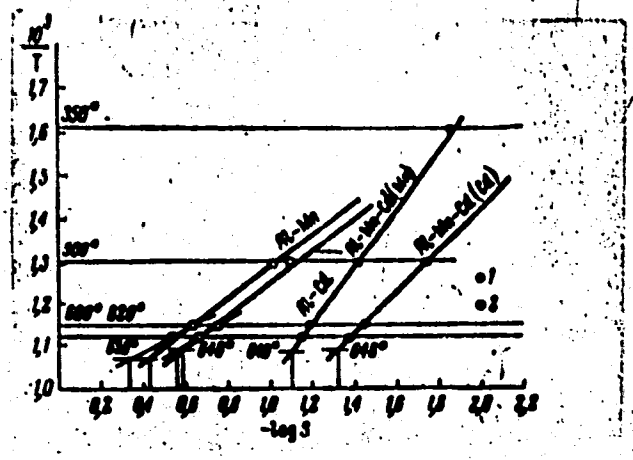

Fig. 1. Solubility of manganese and cadmium in aluminum: 1- Cd; 2- Mn. T is the absolute temperature and S is the maximum concentration of the dissolved element expressed in at. percent.

Card 3/3

DRITS, M.Ye., doktor tekhn. nauk, otv. red.; BOCHVAR, A.A., akademik, red.; BELOV, A.F., doktor tekhn. nauk, red.; DOBATKIN, V.I., doktor tekhn. nauk, red.; MAL'TSEV, M.V., doktor tekhn. nauk, red.; FRIDLYANDER, I.N., doktor tekhn. nauk, red.; SVIDERSKAYA, Z.A., kand. tekhn. nauk, red.; YELAGIN, V.I., kand. tekhn. nauk, red.; BARBANEL', R.I., kand. tekhn. nauk, red.; SHAROV, M.V., kand. tekhn. nauk, red.; KADANER, E.S., kand. tekhn.nauk, red.; TROKHOVA, V.F., red.; CHERNOV, A.N., red.

[Metallography of light alloys] Metallovedenie legkikh splavov. Moskva, Nauka, 1965. 226 p. (MIRA 18:10)

1. Moscow. Institut metallurgii.

L 1707-66 EWT(d)/EWT(m)/EWP(w)/EPF(n)-2/EWP(v)/T/EWP(t)/EWP(k)/EWP(b)/EWA(c)
ACCESSION NR: AP5021222 IJP(c) MJW/JD/WW/HM/JG/EM UR/0125/65/000/008/0026/0030
621.791.0:620.183:546.3-19

AUTHOR: Drits, M. Ye. (Doctor of technical sciences); Kadaner, E. S. (Candidate of technical sciences); Vashchenko, A. A. (Engineer)

TITLE: Study of the structure of the welded joints of some aluminum alloys

SOURCE: Avtomaticheskaya svarka, no. 8, 1965, 26-30

TOPIC TAGS: aluminum alloy, zinc containing alloy, magnesium containing alloy, manganese containing alloy, zirconium containing alloy, alloy welding, alloy weld, weld structure

ABSTRACT: The structure of the welded joints of two AMts-type aluminum alloys containing 1) 4.6% Zn, 1.9% Mg, 0.6% Mn and 2) 4.6% Zn, 1.9% Mg, 0.6% Mn, and 0.2% Zr has been investigated. Alloy sheets 2.5 mm thick were heat treated (solution annealed at 440C for 1 hr, water quenched, and aged at 100C for 100 hr) and TIG welded with filler wire of the same composition. Microscopic examination showed that the segregation-induced heterogeneity of the solid solution and the precipitation of secondary phases at the grain boundaries occur mainly in the weld-adjacent zone, which makes this zone the most probable place for stresses and microcracks to

Card 1/2

L 1707-66

ACCESSION NR: AP5021222

3

originate.. The addition of zirconium, in addition to refining the structure of the base metal, also modifies the structure of cast metal of the weld-adjacent zone and prevents the formation of a continuous network at grain boundaries. Orig. art. has: 6 figures. [AZ]

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Institute of Metallurgy)

SUBMITTED: 30Jul64 ENCL: 00 SUB CODE: MM

NO REF SOV: 003 OTHER: 001 ATD PRESS: 4093

Card 2/2

L 32927-66 EWT(m)/EWP(t)/ETI IJP(c) JH/JD/JG/WB

ACC NR: AP6020915 SOURCE CODE: UR/0369/66/002/002/0183/0187

AUTHOR: Drits, M. Ye.; Kadaner, E. S.; Orekhova, A. N.; Romanov, V. V.

ORG: Institute of Metallurgy im. A. A. Baykov (Institut metallurgii)

TITLE: Effect of small additions of copper and silver on corrosion of Al-Zn-Mg alloys

SOURCE: Fiziko-khimicheskaya mekhanika materialov, v. 2, no. 2, 1966, 183-187

TOPIC TAGS: aluminum alloy, zinc containing alloy, magnesium containing alloy, copper containing alloy, silver containing alloy, alloy corrosion, stress corrosion, corrosion resistance

ABSTRACT: Cold- and hot-rolled sheets (2.5 mm thick) of high strength Al-Zn-Mg alloy containing a total of 7.5% Zn and Mg at a Zn/Mg ratio of 2, 0.6% Mn, 0.15% Zr, 0.2% Fe and 0.1% Si, and additionally alloyed with 0.3% each Cu and Ar, were tested for resistance to general and stress corrosion. Test specimens were solution annealed at 450C for 30 min, water quenched, and aged at 140C for 24 hr (temper T6) which ensured the highest strength characteristic of the alloy. Stress tests done in a 30 g/l NCl + 20 g/l $NaHCO_3$ solution under a stress equal to 0.8 of the yield strength showed that the initial alloy failed in 23 hr,

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L 32927-66 3

ACC NR: AP6020915

while alloys with Cu, or Ar, or Cu and Ar did not fail even with 100—110 hr exposure. Alloying with silver was more effective in increasing the stress-corrosion resistance than alloying with copper, but the highest stress-corrosion resistance was achieved with combined alloying with both Cu and Si. Alloys (with Cu and Ar) additionally alloyed with 0.6% Mn or 0.3% Cr or 0.2% each Mn and Cr had still higher resistance to stress corrosion. These alloys did not fail in 200 hr under a stress equal to the yield strength, but their strength characteristics decreased somewhat compared with alloys without Mn or Cr. In prolonged stress-corrosion tests, the alloys with 0.3% Cu or 0.3% each Cu and Ar sustained a stress equal to 0.9 yield strength for 254—556 hr, while the initial alloy failed in 60 hr. In stress-corrosion tests under conditions of anodic polarization under a stress equal to 0.9 yield strength, the rupture life of the initial alloy increased from 25 to 51 min with alloying with Cu and Ar, and to 75—93 min with alloying with Cr. Additions of Cu and Ar, however, noticeably decreased the resistance of the alloy to general corrosion. This harmful effect can be reduced to some extent by additional alloying with Cr, which shows that the addition of Cr improves the alloy resistance to both general and the stress corrosion. The beneficial effect of additional Cr is probably associated with the increased stability of the protective oxide film on the metal. Orig. art. has: 4 tables. [MS]

SUB CODE: 11/ SUBM DATE: 23Aug65/ ORIG REF: 006/ OTH REF: 017/ ATD PRESS: 5028

Card 2/2

L 46967-66 EWP(k)/EWT(d)/EWT(m)/T/EWP(w)/EWP(v)/EWP(t)/ETI IJP(c) EM/JD/JH

ACC NR: AT6024925 (A,N) SOURCE CODE: UR/2981/66/000/004/0159/0169

AUTHOR: Drits, M. Ye.; Kadaner, E. S.; Vashchenko, A. A.; Shiryayeva, N. V.; Fridlyander, I. N.

ORG: none

TITLE: Structure of weld joints of V96-type alloys

SOURCE: Alyuminiyevyye splavy, no. 4, 1966. Zharoprochnyye i vysokoprochnyye splavy (Heat resistant and high-strength alloys), 159-169

TOPIC TAGS: aluminum zinc alloy, alumimum alloy property, weld evaluation / V96 aluminum zinc alloy

ABSTRACT: The purpose of the study was to determine the influence of various alloying elements on the structure of V96-type weld joints by using filler wire of various compositions. A definite relationship was found between the tendency of the alloys to form hot cracks during welding and the structure of the transition zone of the weld joint. As a rule, the structure of the transition zone differs from the center of the seam in that it has coarser agglomerates of second excess phases along the grain boundaries; in most cases, these phases form a continuous network. The coarser the structure of the transition zone, greater its extent, more pronounced the network character of the structure, and greater the enrichment of the boundaries with brittle second phases, the more distinct is the tendency of the alloys to form hot cracks dur-

Card 1/2

L 16967-66
ACC NR: AT6024925

ing welding. Conversely, a fine, regular structure of the transition metal zone and a discontinuity of the network of second phases correspond to lower values of the cracking coefficient. By selecting optimum welding conditions, one can influence the process so as to obtain a favorable structure in the transition zone and thus reduce the danger of failure of the weld joints. Orig. art. has: 7 figures.

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 003/ OTH REF: 001

Card 2/2

ACC NR: AP700417[illegible] (N) SOURCE CODE: UR/0369/66/002/006/0621/0623

AUTHOR: Drits, M. Ye.; Kadaner, E. S.; Romanov, V. V.

ORG: Institute of Metallurgy im. A. A. Baykov AN SSSR, Moscow (Institut metallurgii AN SSSR)

TITLE: Effect of copper and chromium on the corrosion properties of Al-Zn-Mg alloys

SOURCE: Fiziko-khimicheskaya mekhanika materialov, v. 2, no. 6, 1966, 621-623

TOPIC TAGS: aluminum ~~zinc magnesium~~ base alloy, magnesese containing alloy, zirconium containing alloy, copper containing alloy, chromium containing alloy, ~~alloy~~ corrosion resistance, ~~alloy~~, property, stress corrosion, corrosion rate, corrosion resistant alloy

ABSTRACT: Ingots of Al-Zn-Mg aluminum alloys containing (%) 5 Zn, 2.5 Mg, 0.2—0.5 Mn, 0.15 Zr, additionally alloyed with up to 0.75% Cu and/or 0.16% Cr were hot and cold rolled into 2.5 mm-thick sheets. The sheets were solution annealed at 450C, quenched, naturally aged for 7 days or artificially aged at 100C for 10 hr or at 140C for 24 hr, and then tested for mechanical properties and corrosion resistance. Corrosion tests were done in a solution of 30 g/l of NaCl + 20 g/l of $NaHCO_3$. The general corrosion rate was investigated on specimens fully submerged for 200 hr. The stress corrosion was investigated on specimens under a tensile stress equal to 90% of the yield strength for 500 hr. The stressed alloys, without Cu or Cr additions, aged at 100 and 140C

Card 1/2 UDC: none

ACC NR: AP7004179

failed after 45—68 and 66—124 hr, respectively. Addition of 0.03% Cu increased the life of the specimens of the alloys aged at 140C to 91—131 hr but had a negligible effect on alloys aged at 100C. Chromium additions increased the stress corrosion of the alloys more than copper additions, expecially of the alloys aged at 100C. Chromium also lowered the corrosion rate, while copper accelerated it in unstressed specimens. In combined alloying with Cr and Cu, additions of 0.3% Cu to alloys with a constant Cr content increased the life of the alloy specimens to more than 500 hr. An alloy containing 0.5% Cu aged at 100C for 100 hr had the highest stress corrosion resistance (more than 550 hr). The stress corrosion of all other alloys increased with aging at 140C. Copper additions increased the stress corrosion resistance of Al-Zn-Mg alloys with chromium substantially more than that of alloys without chromium. For example, 0.3% copper addition had practically no effect on the life of Al-5% Zn-2.5% Mg-0.5% Mn-0.15% Zr, while the same addition of copper to the alloy with 0.16% Cr increased its life by several times, even at a lower (0.2%) manganese content. Combined alloying with Cu and Cr increased the tensile strength of the initial alloy from 48.5 to 51.7 kg/mm^2, the yield strength from 38.5 to 40.5 kg/mm^2, and the elongation from 13.1 to 31.7%. Orig. art. has: 2 tables. [MS]

SUB CODE: 11/ SUBM DATE: 08Jun66/ ORIG REF: 001/ OTH REF: 001/ ATD PRESS: 5115

Card 2/2

KADANER, L.I.

Copper plating of iron objects in acid electrolytes. Part 1. Contact deposition of copper on iron. Ukr.khim.zhur.17 no.2:224-234 '51. (MLRA 9:9)

1.Khar'kovskiy institut sovetskoy torgovli.
(Copper plating) (Iron)

KADANER, L.I.

Copper plating of iron objects in acids electrolytes. Part2.Contact deposition of copper on tinned iron. Ukr.khim.zhur.17 no.2:235-238 '51. (MLRA 9:9)

1.Khar'kovskiy institut sovetskoy torgovli.
(Copper plating) (Iron)

KADANER, L.I.

Copper plating of iron objects in acid electrolytes. Part 3. Study of factors influencing the electrolytic deposition of copper on an iron cathode. Ukr.khim.zhur.17 no.5:723-726 '51. (MLRA 9:9)

1.Khar'kovskiy institut sovetskoy torgovli.
(Copper plating) (Iron)

KADANER, L.I.

Copper plating of iron objects in acid electrolytes. Part 4. Effect of compound processing of the surface on the continuity and strength of adhesion of copper coatings. Ukr.khim.zhur.17 no.5: 727-735 '51. (MLRA 9:9)

1.Khar'kovskiy institut sovetskoy torgovli.
(Copper plating)

KADANER, L.I.

USSR/Chemistry - Electrodeposition of Metals — Oct 51

"Criterion of the Uniformity of Distribution of Metal on the Cathode and Methods of Its Determination," L. N. Kadaner, Chair of Chem, Khar'kov Inst of Soviet Trade

"Zhur Prik Khim" XXIV, No 10, pp 1033-1040

Proposes objective criterion for uniformity of distribution of metal layer on cathode surface. Choice of arbitrary criterion leads to wrong conclusions. Gives formulas for calcg criterion in generalized

190T37

USSR/Chemistry - Electrodeposition of Metals (Contd) — Oct 51

differential form. It is possible to calc the criterion on the basis of data obtained by exptl methods (e.g., Kudryavtsev's method).

190T37

KADANER, L. I.

USSR/Chemistry - Electroplating Aug 52

"The Problem of Improving the Quality of Electroplated Deposits," L. Kadaner, Inst of Soviet Trade, Khar'kov

"Zhur Prik Khim" Vol 25, No 8, pp 850-859

PA 228T9

In electroplating, the article states, a momentary (10-30 sec) application of high cd at the beginning of the process leads to an increase in the compactness of the metal deposits. This method sharply lessens the porosity when electrolytebaths which contain colloids (e.g., the acid electrolyte

(1) 228T9

of tinplating and the acid electrolyte for copperplating) are used. It was established that the preliminary passivation of the metal's surface, preceding the deposit of the coating, leads to a significant reduction of the porosity and an increase in the strength of the adhesion of the coating to the basic metal. The favorable influence of passivation subjects to doubt, the article states, the universally accepted conviction concerning the injurious effect of very thin oxide films on the process of electroplating. According to the article, the results indicate feasibility of direct copperplating of iron in acid

(2) 228T9

electrolytes. They also suggest, the article notes, the possibility of increasing the resistance to corrosion and the useful life of metal products by reducing porosity.

KADANER, L.

(3)

228T9

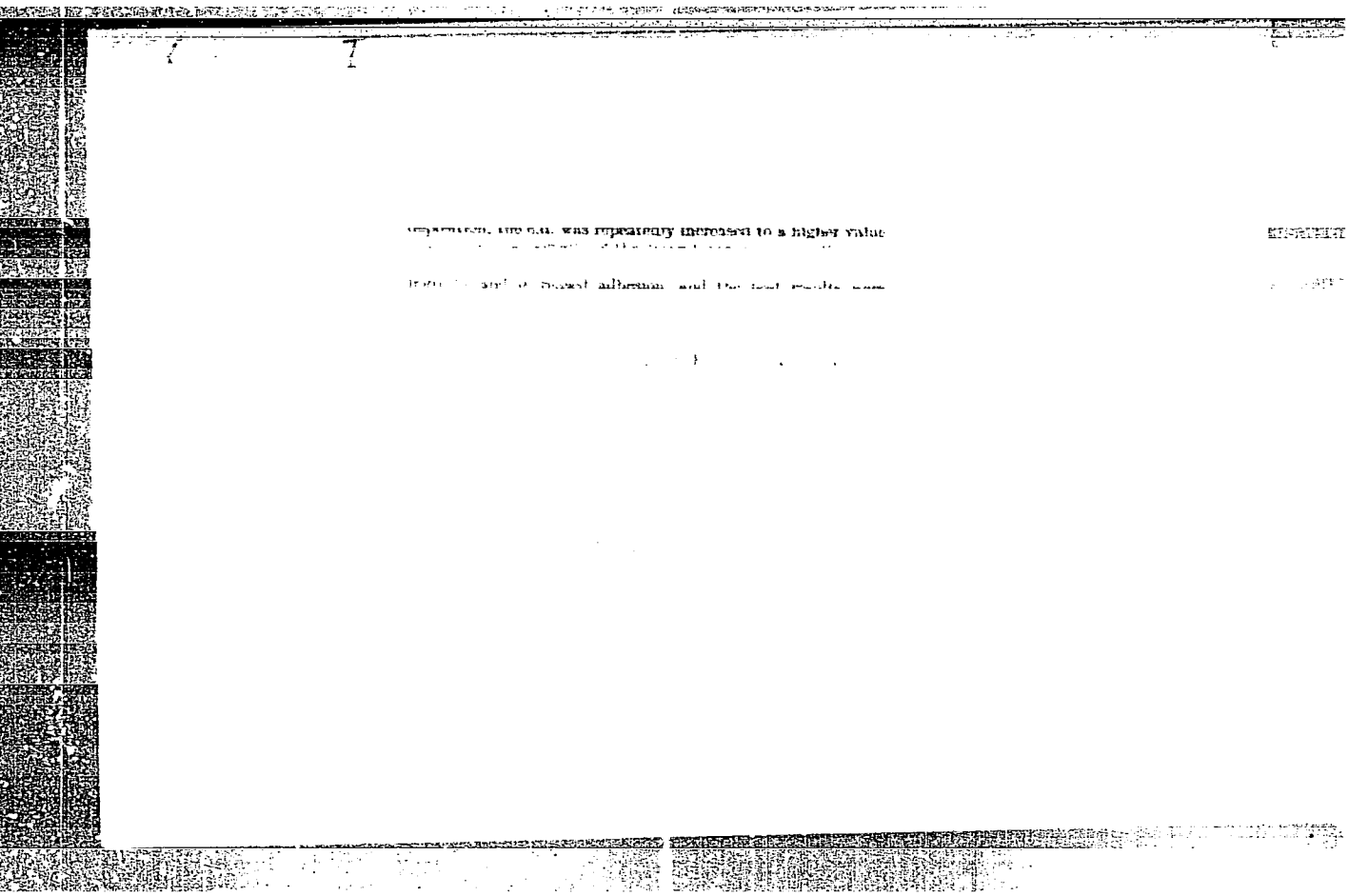
1. KADANER, L. I.; GNUSIN, N. P.; KHAD'MASH, G. G.

2. USSR (600)

4. Metals

7. Criterion of the uniformity of metal distribution on the cathode. Zhur. prikl. khim. 25, No. 10, 1952.

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

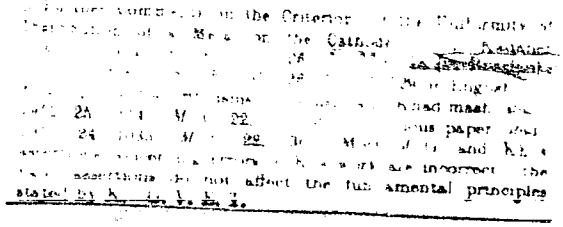


KADANER, L. I.; TSARIKHIN, D. A.:

Galvanizing

Some factors contributing to the economy of non-ferrous metals and electric energy in galvanizing shops. Avt. trakt. prom. No. 1, 1953.

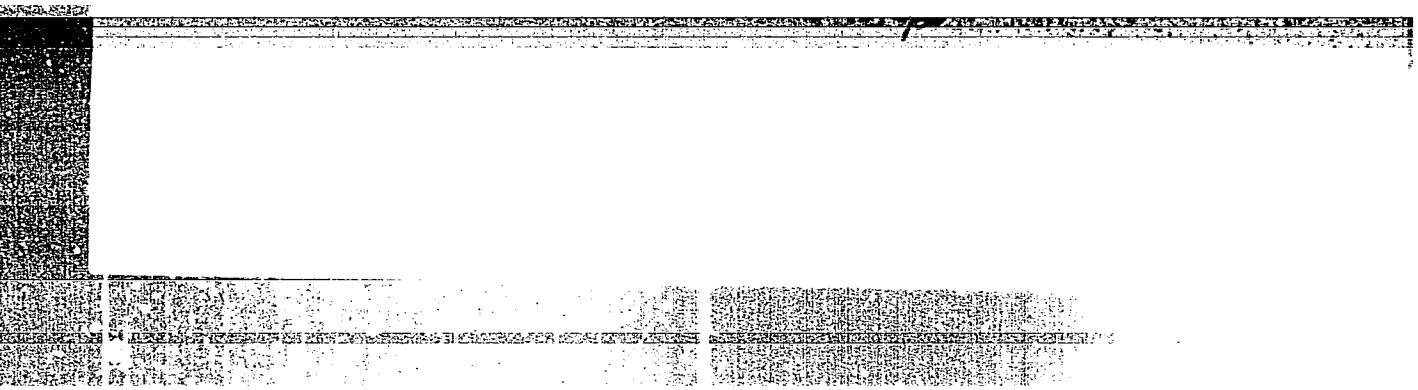
Monthly List of Russian Accessions, Library of Congress, June 1953, Uncl.



MASHOVETS, V.P.; KADANER, L.I.

Criterion of the uniformity of distribution of metal on a cathode. Zhur. prikl.khim. 26 no.7:775-779 Jl '53. (MLRA 6:7)
(Electroplating) (Kadaner, L.I.)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000519820016-9"



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KADANER, L.I.

Criterion for the uniform distribution of metal on the cathode.
Zhur.prikl.khim. 28 no.11:1174-1178 N '55. (MLRA 9:3)

1. Institut sovetskoy torgovli, Khar'kov.
(Electroplating)

Kadaner, L. I.

USSR/Physical Chemistry - Electrochemistry, B-12

Abst Journal: Referat Zhur - Khimiya, No 1, 1957, 517

Author: Kadaner, L. I.

Institution: None

Title: On the Dispersing Properties of Electrolytes

Original Periodical: Zh. fiz. khimii, 1955, Vol 29, No 5, 832-838

Abstract: A discussion is given of current criteria for the evaluation of the dispersing properties of electrolytes as well as of methods used in studying them. A simplified method for the study of the current distribution over an inclined cathode, proposed by the author, is given; the method necessitates the carrying out of a short electrolysis. A critical review is given of the paper by A. V. Izmaylov (Referat Zhur - Khimiya, 1954, 37492). See also Referat Zhur - Khimiya, 1954, 31200 and 1955, 52518.

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KADANER, Lev Il'ich; ALEKSANDROV, N.V., kandidat khimicheskikh nauk, otvetstvennyy redaktor; CHERNYSHENKO, Ya.T., tekhnicheskiy redaktor

[Protective coatings for metals] Zashchitnye plenki na metallakh. Khar'kov, Izd-vo Khar'kovskogo ordena trudovogo krasnogo znameni gos. univ. im. A.M.Gor'kogo, 1956. 282 p. (MLRA 9:9)
(Metals--Finishing) (Protective coatings)

Kadaner L.I.

USSR/ Physical Chemistry - Electrochemistry B-12

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 11346

Author : Kadaner L.I.
Inst : Khar'kov Institute of Soviet Commerce
Title : Problems of Distribution of Current and Metal at Electrodes

Orig Pub : Nauch. zap. Khar'kovsk. in-ta sov. torgovli, 1956, No 5(7), 165-180

Abstract : An analytical solution is presented of the problem of current distribution over the surface of electrodes. For the combinations: 1) cathode -- -- circular cylinder, anode -- plate of infinite dimension parallel to axis of cathode, and 2) cathode -- circular cylinder, anodes -- two parallel plates (anodes and electrolyte are limited by insulating walls) use is made of the method of mirror images, utilized in electrostatics for the solution of analogous problems. For the combination of cathode and anode -- parallel plates -- use is made of the method of conformal representation, used to calculate the field of a plane condenser. There is proposed a procedure for taking into account the influence of polarization on current distribution with the above-stated configurations of electrodes, which is based on a previously described graphic method

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USSR/ Physical Chemistry - Electrochemistry B-12

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 11346

(Sukhodskiy V.A., Korroziya i bor'ba s ney, 1936, 1, No 2, 103). Deductions are carried out up to computation formulas. Briefly considered is the problem of maximum output of a galvanic cell, i.e., of the maximum amount of parts (cathodes) that can be charged into the cell in order to attain coatings of satisfactory quality, which is determined by maximum and minimum current density over different areas of cathode, and the latter, in turn, depends upon the mutual disposition of cathodes (see also RZhKhim, 1956, 64596, 71287).

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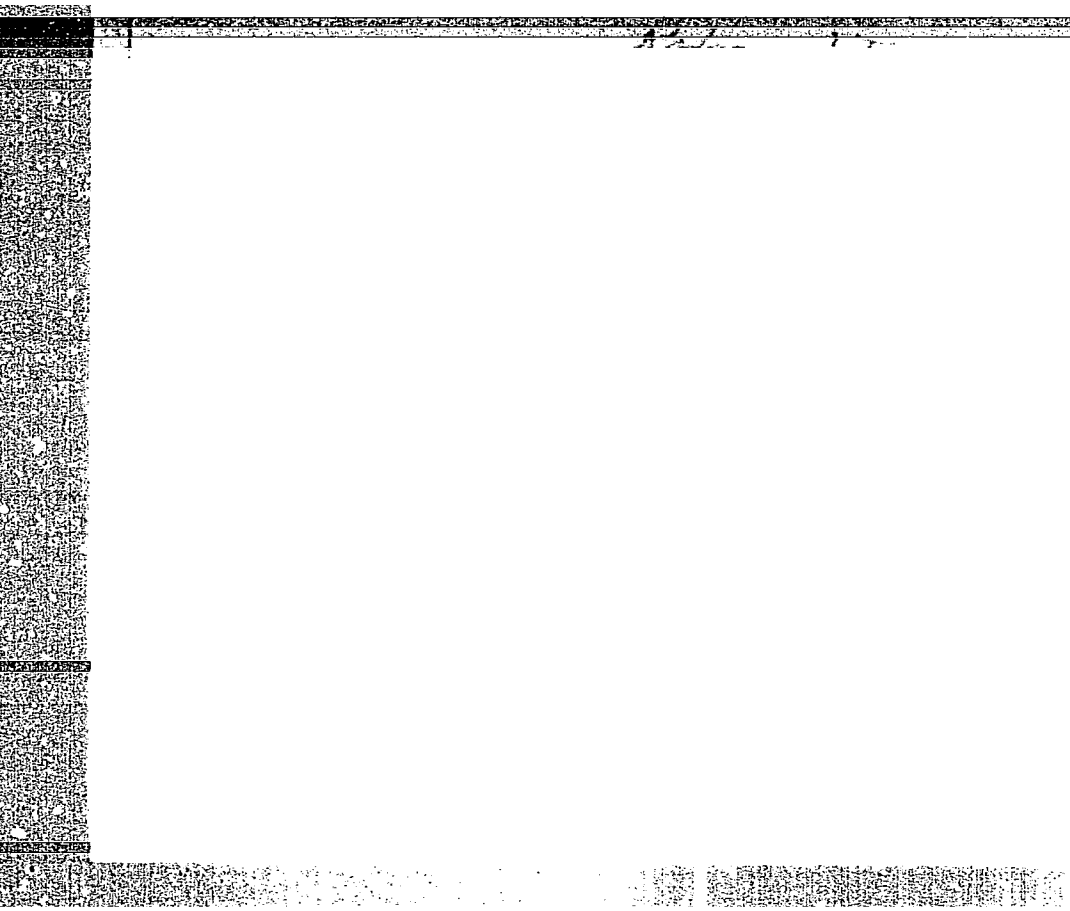

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KADANER, L. I.

USSR/Physical Chemistry - Electrochemistry. B-12

Abs Jour : Referat Zhur - Khimiya, No 6, 25 March 1957, 18700

Author : Kadaner, L.I.
Inst : RZhKhim, 1957, 11346.
Title : Analytical Method of Computation of Distribution of the Current on Electrodes.

Orig Pub : Zh. fiz. khimii, 1956, 30, No 7, 1560-1571

Abstract : By the method of mirror images used in electrotechnics the author computed the primary field and the distribution of current upon a cylindrical cathode located in front of flat infinite anode. Then, with certain assumptions, he computed the distorting influence of the electrode polarization upon the primary distribution of current. The error due to the accepted assumptions is estimated. Examples are given of computing the distribution of current upon a cylindrical cathode depending on its radius and distance from anode, with reference to the

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USSR/Physical Chemistry - Electrochemistry. B-12

Abs Jour : Referat Zhur - Khimiya, No 6, 25 March 1957, 18700

nickel and zinc cyanide electrolytes. The distribution of current on cathode is more uniform at the greater distance between the electrodes. The influence of cathode polarization is stronger when the linear dimensions of the electrolyzer are small.

See also RZhKhim, 1957, 11346.

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tly removed from it, and also on two electrodes ... form of hyperbolic cylinders. In a general way, the course of computation of polarizability of electrodes is shown

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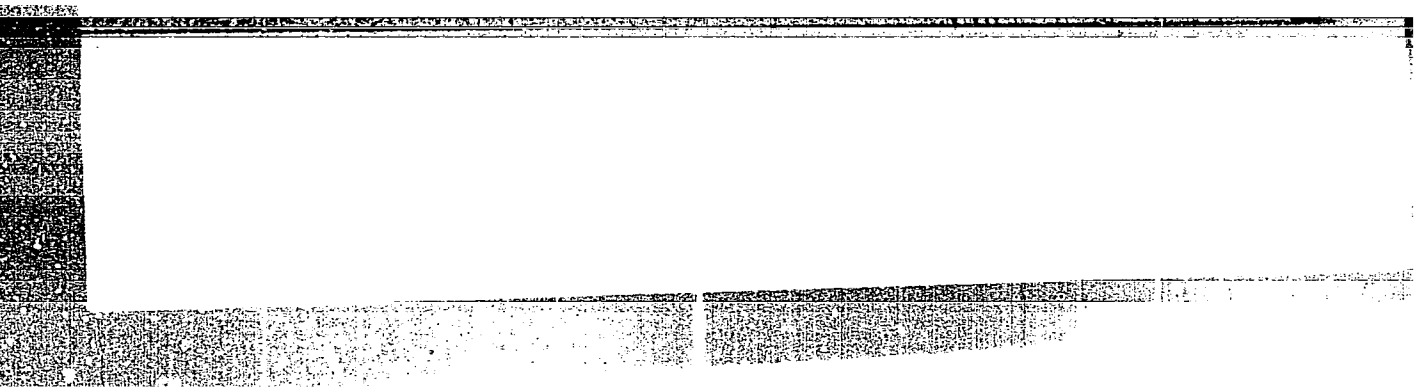

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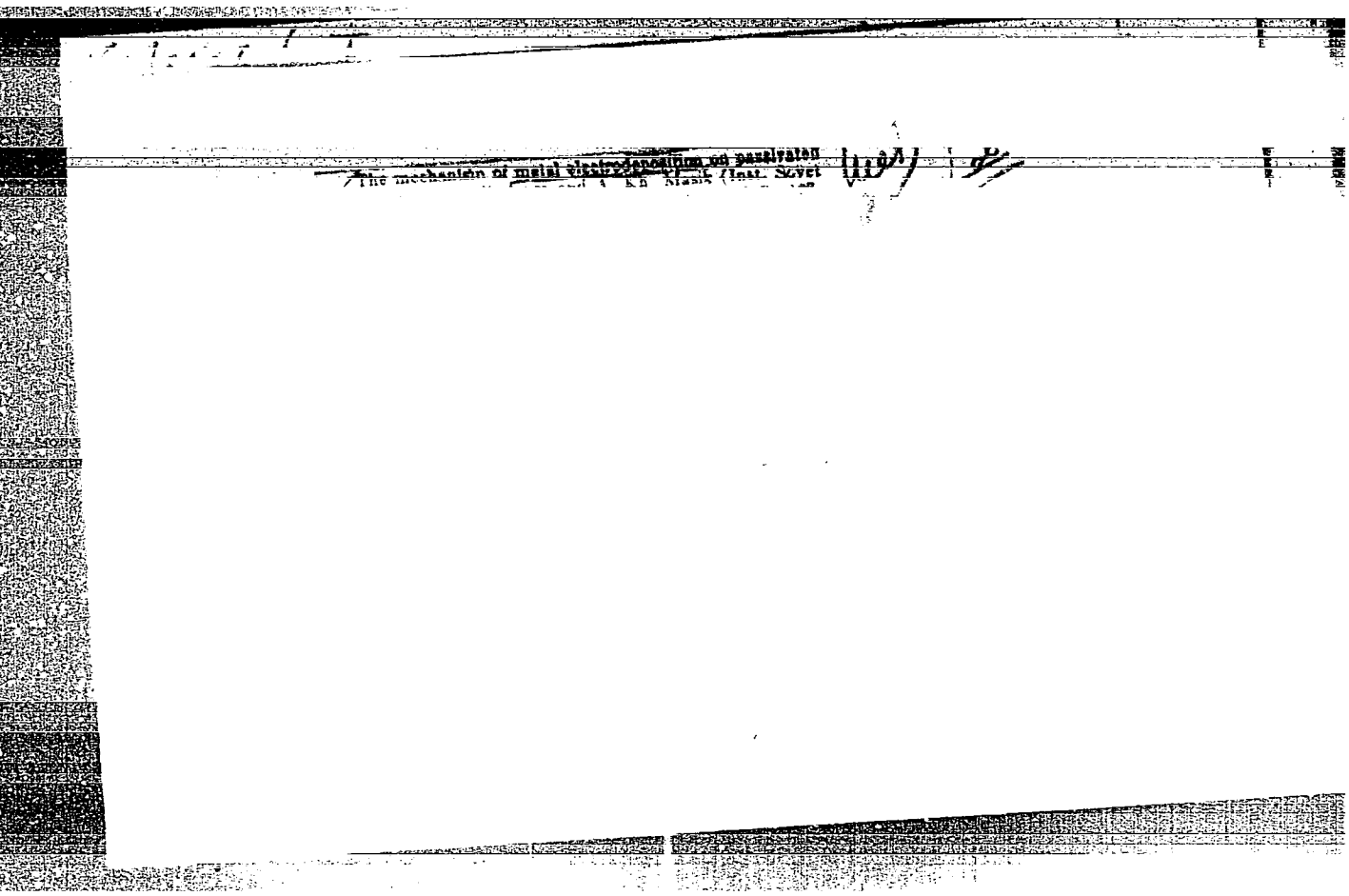

SOV/137-57-11-22114 D

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 11, p 206 (USSR)

AUTHOR: Kadaner, L.I.

TITLE: Distribution of Current and Metal on Electrodes (Raspredeleniye toka i metalla na elektrodakh)

ABSTRACT: Bibliographic entry on the Author's dissertation for the degree of Doctor of Technical Sciences, presented to the Mosk. in-t tsvetn. met i zolota (Moscow Institute of Nonferrous Metals and Gold), Moscow, 1957

ASSOCIATION: Mosk. in-t tsvetn. met i zolota (Moscow Institute of Nonferrous Metals and Gold), Moscow

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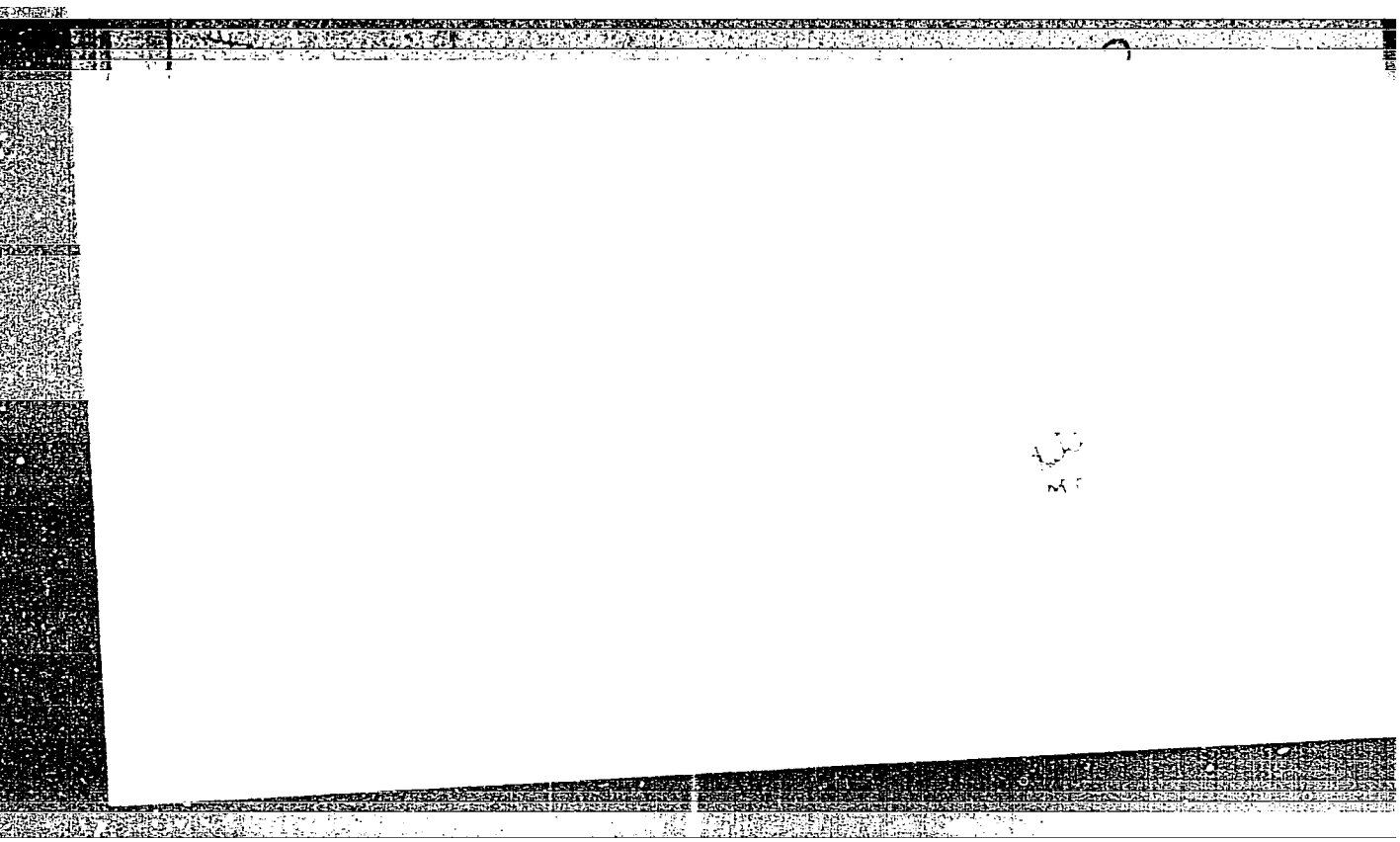

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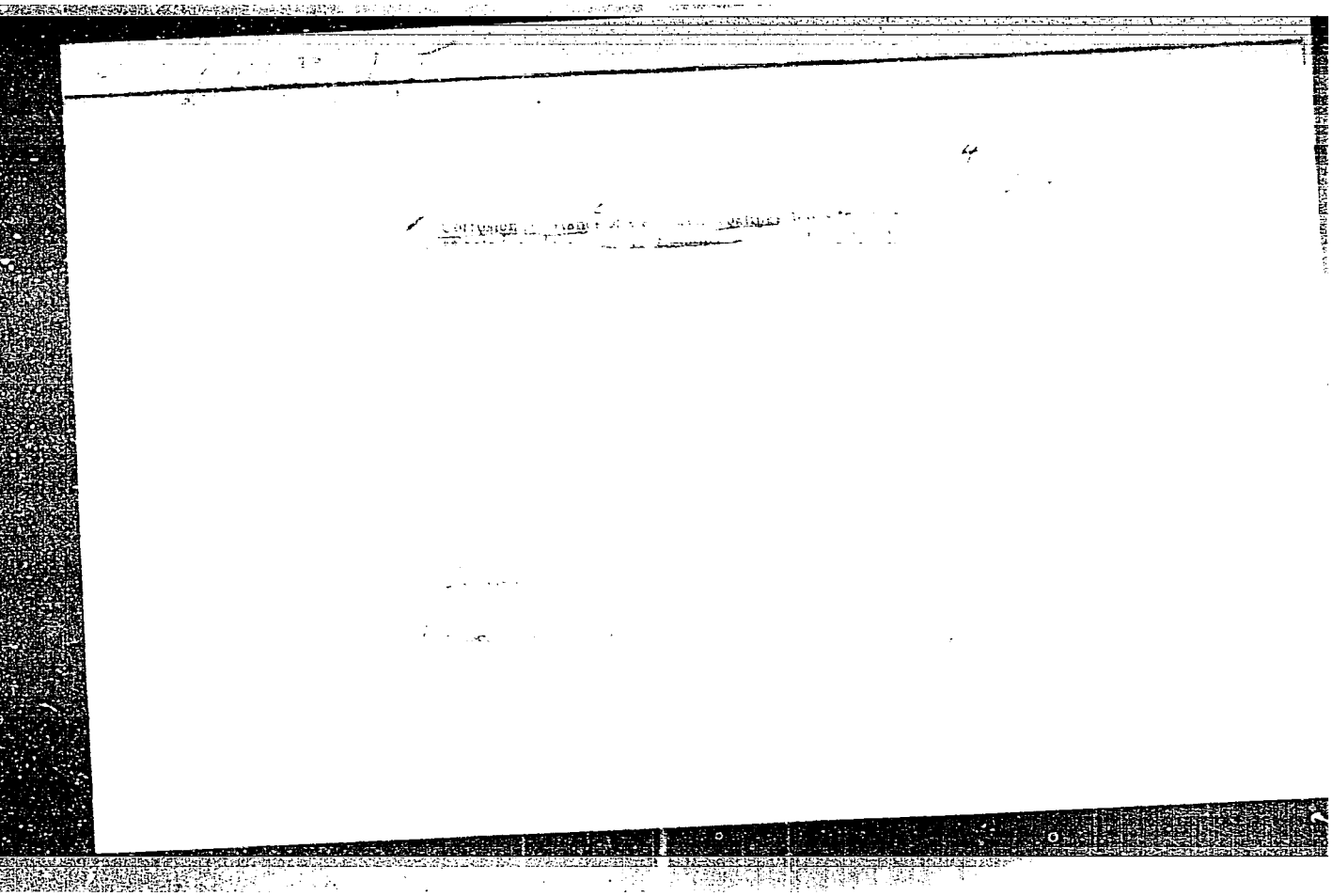
KADANER, L.I.

KADANER, L.I.; MASIK, A.Kh.

Effect of porosity on the corrosion rate of anode platings. Zhur. prikl.khim. 30 no.5:796-799 My '57. (MIRA 10:10)
(Electrolysis) (Corrosion and anticorrosives)



APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000519820016-9"

KADANER, L.I.

Distribution of current in a slit and in a cylindrical hole when the external plane surface of the cathode is also involved [with summary in English]. Zhur.fiz.khim. 31 no.9:2085-2092 S '57. (MIRA 11:1)

1.Institut sovetskoy torgovli, Khar'kov.
(Electric currents) (Electrolysis)

KADANER, L.I.

Conference on the current distribution in the electrodeposition of metals. Zhur.fiz.khim. 31 no.9:2149-2150 S '57. (MIRA 11:1)
(Electroplating)

KADANER, L.I.

76-10-12/34

AUTHORS: Kadaner, L.I., Tsukernik, V.M.

TITLE: The Distribution of Current on Parallel Plane Electrodes in a Rectangular Electrolyzer (Raspredeleniye toka na ploskikh parallel'nykh elektrodakh v pryamougol'nom elektrolizere)

PERIODICAL: Zhurnal Fizicheskoy Khimii, 1957, Vol. 31, Nr 10, pp. 2253 - 2259 (USSR)

ABSTRACT: Referring to the papers of one of the authors (Kadaner) in Zhurnal Fizicheskoy Khimii , 1956, Vol. 30, pp. 1560 and 1760, a precise method for the computation of the current distribution for the case of parallel electrodes with finite dimensions which are in electrolyte with non conducting walls is given. It is shown that in the case of sufficiently great distances between the electrodes and small polarization of the electrodes (in acid copper- or zinc electrolytes, in electrolytes for chrome-and nickel plating) the actual current density distribution will differ only to a small extent from the calculated one and therefore the calculation data can be immediately used for the election of the optimum geometric parameters of the electrolyzers. Finally the computation of the current distribution is carried out with tak-

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5(2) PHASE I BOOK EXPLOITATION SOV/2916

Kadaner, Lev Il'ich

Novi metaly suchasnoyi tekhniky (New Metals in Present-Day Engineering) Kyyiv, Derzhtekhvydav URSR, 1958. 39 p. (Series: Naukovo-populyarna biblioteka) 8,500 copies printed.

Ed.: O. Novik; Tech. Ed.: Z. Kukharenko.

PURPOSE: This booklet is intended for the general reader interested in the preparation, fabrication, and properties of metals and rare earths.

COVERAGE: This booklet describes the preparation, fabrication, and properties of metals and rare earths used in atomic engineering, telemechanics, and electronics. Both metals and products made from them are discussed. The author cites the directives of the 20th Congress of the Communist Party relating to the Sixth Five-Year Plan (1956-1960), calling for more research in the field

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of metals and in their application to modern industry. No personalities are mentioned. No references are given.

TABLE OF CONTENTS:

New Metals in Present-Day Engineering SOV/2916

Structural Metals in High Speed, High Temperature, and High Pressure Engineering

AVAILABLE: Library of Congress (TA459.K24)

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24(3) PHASE I BOOK EXPLOITATION SOV/2750

Kadaner, Lev Il'ich

Elektricheskiye polya v elektrolizerakh (Electric Fields in Electrolyzers) Kharkov, Metallurgizdat, 1959. 163 p. Errata slip inserted. 2,700 copies printed.

Ed.: V.M. Tsukernik; Ed. of Publishing House: Ye.K. Sinyavskaya; Tech. Ed.: S.P. Andreyev.

PURPOSE: The book is intended for engineering and technical personnel in industry, for specialists working in design and scientific research institutes, and also for students in advanced courses in electrometallurgy and electrochemistry

COVERAGE: The book describes methods of developing and calculating d-c fields for the design of electrolyzers. Results of experimental investigation are reported and computations are presented of fields most often encountered during the removal of metals from water solutions and during the electrolysis of smelted media. Problems of the influence of impurities on conductivity of electrolytes and on the distribution of current on the electrodes are investigated

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as well as the influence of the microrelief on the distribution of current on the electrodes. The role of magnetic fields in powerful electrolyzers is briefly described. No personalities are mentioned. There are 74 references: 55 Soviet (1 of which is a translation), 15 English, 2 German and 2 Italian.

TABLE OF CONTENTS:

AVAILABLE: Library of Congress

Card 4/4 JP/jb
1-6-60

VITKIN, Aleksandr Isaakovich. Prinimali uchastiye: KADANER, L.I.; OLEFIR, F.F.; SELIVANOV, A.D.; FOMIN, N.V., red.; OZERETSKAYA, A.L., red.izd-va; VAYNSHTEYN, Ye.B., tekhn.red.

[Manufacture of electrolitically tinned plate] Proizvodstvo elektroliticheski lushenoi zhesti. Moskva, Gos.nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1959. 309 p. (MIRA 12:11)

(Tin plating) (Electroforming)

KADANER, L. I.

[illegible]

5(4) PHASE I BOOK EXPLOITATION SOV/2216

Soveshchaniye po elektrokhimii. 4th, Moscow, 1956.

Trudy...: [sbornik] (Transactions of the Fourth Conference on Electrochemistry; Collection of Articles) Moscow, Izd-vo AN SSSR, 1959. 868 p. Errata slip inserted. 2,500 copies printed.
Sponsoring Agency: Akademiya nauk SSSR. Otdeleniye khimicheskikh nauk.

Editorial Board: A.N. Frumkin (Resp. Ed.) Academician, O.A. Yesin, Professor; S.I. Zhdanov (Resp. Secretary), B.N. Kabanov, Professor, S.I. Zhdanov (Resp. Secretary); B.N. Kabanov, Professor; Ya. M. Kolotyrkin, Doctor of Chemical Sciences; V.V. Losev, P.D. Lukovtsev, Professor; Z.A. Solov'yeva; V.V. Stender, Professor; and G.M. Florianovich; Ed. of Publishing House: N.G. Yegorov; Tech. Ed.: T.A. Prusakova.

PURPOSE: This book is intended for chemical and electrical engineers, physicists, metallurgists and researchers interested in various aspects of electrochemistry.

COVERAGE: The book contains 127 of the 138 reports presented at the Fourth Conference on Electrochemistry sponsored by the Department of Chemical Sciences and the Institute of Physical Chemistry, Academy of Sciences, USSR. The collection pertains to different branches of electrochemical kinetics, double layer theories and galvanic processes in metal electrodepositon and industrial electrolysis. Abridged discussions are given at the end of each division. The majority of reports not included here have been published in periodical literature. No personalities are mentioned. References are given at the end of most of the articles.

Card 20/34

S/076/60/034/009/022/022
B015/B056

AUTHORS: Galinker, I. S., Urazovskiy, S. S., Budnikov, P. P., Kadaner, L. I., Gorbanev, A. I.

TITLE: Andrey Nikitich Sysoyev (1901-1959)

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 9, pp. 2130-2133

TEXT: An obituary note is given in honor of the Head of the kafedra elektrokhimicheskikh proizvodstv Khar'kovskogo politekhnicheskogo instituta im. V. I. Lenina (Chair of Electrochemical Products of the Khar'kov Polytechnic Institute imeni V. I. Lenin), Professor A. N. Sysoyev, who died on January 4, 1960. Following the obituary, a list of the scientific works published by him is given. In 1926, the deceased finished his studies at the Khar'kovskiy tekhnologicheskiy institut (Khar'kov Technological Institute). From 1924 to 1925 he worked with Professor A. N. Shchukarev on "Electrolysis Without Electrodes by Means of a Spark Gap", on which occasion several experiments made by Professor L. Pisarzhevskiy were repeated, and as a result of the contra-

Card 1/2

KADANER, Lev Il'ich, doktor tekhn. nauk; DASHEVSKAYA, I.Ya., ved. red.; SHLUGER, M.A., red.; SOROKINA, T.M., tekhn. red.

[Electrodeposition of precious and rare metals; survey of foreign technology] Elektroosazhdenie blagorodnykh i redkikh metallov; obzor zarubezhnoi tekhniki. Moskva, GOSINTI, 1962. 58 p. (Tema 4) (MIRA 17:4)