

S/080/62/035/007/010/013  
D202/D307

AUTHORS: Bogoyavlenskiy, A.F., Kozyrev, Ye.M. and Belov, V.T.

TITLE: Investigating the process of filling anodic oxidized films on aluminum in chromate solutions by the method of radioactive tracers

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 7, 1962, 1560-1565

TEXT: Mixtures of dichromate and chromate in  $H_2SO_4$  were used as electrolytes at pH 3.2 to 6.2, to determine the chromium contents in the oxidized film after filling and after desorption.  $^{51}Cr$  was used as an indicator and  $^{35}S$  was employed for the determination of  $SO_4^{11}$  anions in the film after desorption. Conclusions: 1) The content of chromate anions in the film decreases with increasing pH despite the increase in the film's weight. 2) The desorption of Cr from the filled film proceeds more intensively when the filling process has been carried out in solutions of lower pH values. ✓

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Investigating the process ...

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3) There is practically no desorption of sulfate anions from the filled film in contact with acidified distilled water or an acid dichromate-chromate solution (pH = 5.6). From the latter result the authors conclude that no ionic exchange takes place between the sulfate and Cr ions during the filling process. There are 1 table and 5 figures.

SUBMITTED: April 4, 1961

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BOGOYAVLENSKIY, A.F.; BOGOYAVLENSKIY, V.F.; BOGOYAVLENSKIY, I.F.; MATYAZH, N.K.;  
RACHEVSKAYA, L.S.

Radiobiological effect of the action of irradiation on micro-organisms irradiated by a radioactive anodic  $Al_2O_3$  film. Radiobiologia 4 no.4:640-642 '64. (MIRA 17:11)

1. Kazanskiy aviatsionnyy institut, Kazan=kiy gosudarstvennyy meditsinskiy institut i Blagoveshchenskiy-na-Amure gosudarstvennyy meditsinskiy institut.

PAVELKINA, V.P.; BOGOYAVLENSKIY, A.F.

Inhomogeneous composition of an anodic oxide film on aluminum  
from the data of its chemical analysis. Zhur. prikl. khim.  
37 no. 4:820-823 Ap '64. (MIRA 17:5)

1. Kazanskiy aviatsionnyy institut.

BOGOYAVLENSKIY, A.F. zasl. deyatel' nauki i tekhniki Tatarskoy  
Avtonomnoy Sovetskoy Sotsialisticheskoy Respubliki,  
doktor khim. nauk, prof., red.; YEFISHKINA, L.S., inzh.  
red.

[Anodic protection of metals; reports] Anodnaya zashchita  
metallov; doklady. Pod red. A.F. Bogoyavlenskogo. Moskva,  
Mashinostroenie, 1964. 527 p. (MIRA 17:9)

1. Mezhvuzovskaya konferentsiya po anodnoy zashchite ot  
korrozii. Ist.

ACCESSION NR: AT4043069

S/0000/64/000/000/0089/0097

AUTHOR: Aleksandrov, Ya. I. (Doctor of chemical sciences, Professor);  
Bogoyavlenskiy, A. F.

TITLE: Some theoretical bases for the anodic oxidation of aluminum and ultramicroscopy of the circumanodic space

SOURCE: Mezhvuzovskaya konferentsiya po anodnoy zashchite metallov ot korrozii. 1st, Kazan, 1961. Anodnaya zashchita metallov (Anodic protection of metals); doklady\* konferentsii. Moscow, Izd-vo Mashinostroyeniye, 1964, 89-97

TOPIC TAGS: aluminum, anodized aluminum, organic anodization additive, pyrogallol, hydroquinone, anodic gas evolution, sodium carbonate electrolyte, barrier layer formation, circumanodic space analysis, ultramicroscopy

ABSTRACT: The composition of the gas liberated on a carbonate oxidized Al anode (5%  $\text{Na}_2\text{CO}_3$ , 30C, 30 min.) was found to be 96.5% oxygen and 3.5% hydrogen by volume. Addition of 0.1% hydroquinone or 0.6% pyrogallol to the bath terminated evolution of gas on the anode, but the forming oxide film retained the characteristics normal for a pure sodium carbonate electrolyte (weight 50.5 and 58.0  $\text{mg}/\text{dm}^2$ , respectively, VIAM corrosion test 18-20 min. at 18-21C, thickness and porosity normal). The authors therefore suggest

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some hypotheses on oxygen evolution during anodization of Al and on the adsorption of evolving hydrogen in the presence of pyrogallol or hydroquinone in the bath. A series of oscillographic charge curves was obtained for sheet aluminum electrodes (working surface  $1\text{cm}^2$ ) anodized at 18-20C in 2, 5 or 7%  $\text{Na}_2\text{CO}_3$ , at current densities of 0.05-0.18  $\text{a}/\text{dm}^2$ , without or with addition of up to 0.2% pyrogallol. The results indicate that the barrier layer forms in the first 6 or 7 seconds of oxidation. The overall process of anodization is not affected by the presence of an organic additive. Ultramicroscopy of the circumanodic space during anodization (procedure described) in a bath containing pyrogallol established the absence of colloidal particles. Orig. art. has: 2 tables, 6 figures and 2 equations.

ASSOCIATION: None

SUBMITTED: 13Mar64

ENCL:00

SUB CODE: MM

NO REF SOV: 016

OTHER: 006

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Card

ACCESSION NR: AT4043076

S/0000/64/000/000/0233/0241

AUTHOR: Bogoyavlenskiy, A. F. (Doctor of chemical sciences, Professor);  
Dobrotvorskiy, G. N.

TITLE: A study of penetration of electrolyte ions into an anodic aluminum oxide film during its formation by carbonate anodizing

SOURCE: Mezhevuzovskaya konferentsiya po anodnoy zashchite metallov ot korrozii. 1st, Kazan, 1961. Anodnaya zashchita metallov (Anodic protection of metals); doklady\* konferentsii. Moscow, Izd-vo Mashinostroyeniye, 1964, 233-241

TOPIC TAGS: clad alloy D16, anodized duralumin, sodium carbonate electrolyte, labeled electrolyte solution, anodization period, anodic oxide film, electrolyte temperature, electrolyte concentration, current density, electrolyte ion penetration, aluminum oxide film, carbonate anodizing, aluminum corrosion

ABSTRACT: Disks of clad alloy D16 (diameter=16mm) were degreased (acetone) and anodized in 5% sodium carbonate solution labeled with  $C^{14}$ ,  $W^{185}$  or  $Co^{60}$  to study the content of carbonate ions in the anodic film in relation to anodization period (3-60 min. at 30C, 0.5 a/dm<sup>2</sup>, specific activity  $1.82 \cdot 10^6$  counts/min·ml), current density

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ACCESSION NR: AT4043076

(0.25-4.5 a/dm<sup>2</sup>, 20 min.; 27C, 2.16·10<sup>6</sup> counts/min·ml), electrolyte temperature (10-50C, 0.5 a/dm<sup>2</sup>, 20 min, 1.82·10<sup>6</sup> counts/min·ml) and concentration (0.0075-1.0 M, 30C, 0.3 a/dm<sup>2</sup>, 20 min). Other experiments involved concentrations of 1.2-3.0 M Na<sub>2</sub>WO<sub>4</sub> + 0.05 M Na<sub>2</sub>CO<sub>3</sub> in solutions labeled with C<sup>14</sup> or W<sup>185</sup> (30C, 0.5 a/dm<sup>2</sup>, 20 min.) and introduction of CO<sup>60</sup> - labeled 1.2-3.0 M NH<sub>4</sub> [CO (NH<sub>3</sub>)<sub>2</sub> (NO<sub>2</sub>)<sub>4</sub>], or inactive salt into a solution containing C<sup>14</sup>. The results indicate that the content of carbonate ions increases nearly 100% as the anodizing period is extended from 3 to 60 min., rises from 0.8 to 5% as the current density increases from 0.25 to 1.5 a/dm<sup>2</sup>, decreases sharply as the electrolyte temperature rises (12-40C), and reaches a peak at concentrations of 0.05 M. The content of tungstate ions increases and that of carbonate decreases as the Na<sub>2</sub>WO<sub>4</sub> concentration rises. Similar results were obtained for Erdman salt-containing solutions. Orig. art. has: 8 graphs.

ASSOCIATION: none.

SUBMITTED: 13Mar64

SUB CODE: MM

NO REF SOV: 007

ENCL: 00

OTHER: 001

Card 2/2

ACCESSION NR: AT4043077

S/0000/64/000/000/0242/0250

AUTHOR: Bogoyavlenskiy, A. F (Doctor of chemical sciences, Professor)

TITLE: Anodic oxide films on aluminum as sources of radioactivity

SOURCE: Mezhevuzovskaya konferentsiya po anodnoy zashchite metallov ot korrozii. 1st, Kazan, 1961. Anodnaya zashchita metallov (Anodic protection of metals); doklady\* konferentsii. Moscow, Izd-vo Mashinostroyeniye, 1964, 242-250

TOPIC TAGS: anodized aluminum, anodized aluminum alloy, radioactive anodic film, radioactive anodizing, radioactive applicator, biological corrosion, therapeutic radiation source, radiometric system, aluminum corrosion, fungal growth, yeast growth

ABSTRACT: The author previously suggested two techniques for producing radioactive anodic oxide films, one based on using electrolytes with a natural (e.g.,  $S^{35}$  in a sulfate bath) or introduced (e.g.,  $P^{32}$  as phosphate) content of required isotope and the other based on the high capacity of an anodic oxide film to adsorb various ions (e.g., phosphate, dichromate). In the present work, applicator films prepared with  $P^{32}$ ,  $S^{35}$ ,  $Au^{198}$ ,  $W^{185}$  and other isotopes were studied as possible growth depressants for seven species of fungi and yeast cells. Tentative results indicate the feasibility of using such radioactive films

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in controlling biological corrosion. Subsequently,  $Zn^{65}$ , as zinc nitrate, was used in the carbonate oxidation (5% solution of sodium carbonate plus 0.5% caustic soda) of clad sheet duralumin DT16 (20-30C, 0.5 a/dm<sup>2</sup>, 20 min.) to obtain radioactive applicator films for use in described systems for signalling corrosion of heating elements caused by seepage of pickling and plating bath solutions. The system illustrated is sensitive to decreases in radiation intensity of up to 400 counts/min. from initial levels of 600 to 15,000 counts/min. Finally, reference is made to the advantages of radioactive  $Al_2O_3$  films for radiotherapeutic applications. "The experimental work was carried out in cooperation with N. K. Matyazh, docent R. Sh. Nigmatullin, docent Ye. M. Kozy\*rev, assistant A. P. Vedernikov and engineers S. D. Petrov, R. G. Tikhonov, A. P. Yur'yev, N. V. Grigor'yeva and V. D. V'yushin." Orig. art. has: 2 diagrams and 3 illustrations.

ASSOCIATION: none.

SUBMITTED: 13Mar64

ENCL: 00

SUB CODE: LS, MM

NO REF SOV: 007

OTHER: 000

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ACCESSION NR: AT4043078

S/0000/64/000/000/0251/0261

AUTHOR: Bogoyavlenskiy, A. F. (Doctor of chemical sciences, Professor);  
Rachevskaya, L. S.; Matyazh, N. K.

TITLE: Effect of current reversal on composition and properties of an anodic oxide film on aluminum, based on data obtained by the use of labeled atoms

SOURCE: Mezhevuzovskaya konferentsiya po anodnoy zashchite metallov ot korrozii. 1st, Kazan, 1961. Anodnaya zashchita metallov (Anodic protection of metals); doklady\* konferentsii. Moscow, Izd-vo Mashinostroyeniye, 1964, 251-261

TOPIC TAGS: aluminum AD1-M, anodized aluminum, phosphoric acid electrolyte, labeled atom analysis, current reversal, electrolyte temperature effect, anodizing period effect, electrolyte concentration effect, anode cathode ratio, anodic film thickness, anodic film corrosion resistance, anodic film porosity, labeled film radioactivity, aluminum corrosion, aluminum oxide film, radiophosphorus labeling

ABSTRACT: Samples of sheet aluminum AD1-M were anodized on one side in a  $P^{32}$ -labeled solution of phosphoric acid (60V, blue-gray transparent film, 0.4-2.5  $\mu$ , VIAM corrosion resistance 15 min.) and coated on the other side with lacquer AK-20. Electrolyte temperature, concentration, anodizing period and anode-cathode period ratios were varied (0-80C, 0-12N, 0-120 min., 1:0 to 0:1); the results are plotted graphically in

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relation to film weight, specific radioactivity, film thickness, percent content of phosphate ion, VIAM corrosion resistance, and film porosity. The phosphate-ion content was found to be 6.5% for standard anodizing and to vary with the anode-cathode ratio (table given) when current reversal is employed. Film radioactivity peaked at 30C, dropped sharply at 30-50C and increased again to even higher levels for 50-75C (related to chemisorption of the phosphate-ion). An increase in cathode period increased the activity by 150% over values without current reversal, the film thickness dropped and its corrosion resistance improved (100%) at a ratio of 1:1. Increasing the cumulative cathode period at a constant cumulative anode period significantly increased the radioactivity in the film. The highest radioactivity, film thickness and corrosion resistance were obtained at 25-30C. Different results are obtained with current reversal in a sulfate electrolyte. Orig. art. has: 13 graphs and 1 table.

ASSOCIATION: None

SUBMITTED: 13Mar64

SUB CODE: MM

NO REF SOV: 008

ENCL: 00

OTHER: 001

Card: 2/2

ACCESSION NR: AT4043079

S/0000/64/000/000/0262/0271

AUTHOR: Kozyrev, Ye. M. & Bogoyavlenskiy, A. F. (Doctor of chemical sciences, Professor); Belov, V. T.

TITLE: Some characteristics of the sorption process on an anodic oxide film over aluminum

SOURCE: Mezhvuzovskaya konferentsiya po anodnoy zashchite metallov ot korrozii. 1st, Kazan, 1961. Anodnaya zashchita metallov (Anodic protection of metals); doklady\* konferentsii. Moscow, Izd-vo Mashinostroyeniye, 1964, 262-271

TOPIC TAGS: aluminum AD1, anodized aluminum sulfate anodizing, anodic film filling, inorganic salt filling solution, filling solution acidity, filling process temperature, filling process duration, anodic film sorption capacity, anodic oxidation period, anodizing current density, filling solution anion concentration, aluminum corrosion, aluminum oxide film

ABSTRACT: Filling of  $Al_2O_3$  films in aqueous solutions of phosphates, chromates and sulfates was studied on anodized (20% sulfuric acid solution, 20C, 20 min., 1 a-min/dm<sup>2</sup>) stampings of sheet aluminum AD1 (18 cm<sup>2</sup>) in relation to pH of the filler solution (2.5-10.9), anion concentration (0-0.5M at pH=constant, 20C, 24 hrs.), temperature (0.6-95C for optimal pH values), time (5-180 min. at 95C and optimal pH), oxidation period and current density (0-200 a-min/dm<sup>2</sup>). The results indicate that sorption occurring at the solution-film boundary cannot be considered separately from a number of other processes

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ACCESSION NR: AT4043079

taking place during the filling of anodic films in aqueous solutions of inorganic salts. Sorption generally increased with increasing electrolyte concentration, temperature, filling time and current density. Modification of the electrochemical conditions of anodizing thus allows one to vary the sorption capacity of an anodic film. Orig. art. has: 10 graphs.

ASSOCIATION: None

SUBMITTED: 13Mar64

ENCL: 00

SUB CODE: MM

NO REF SOV: 013

OTHER: 005

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Card

ACCESSION NR: AT4043080

S/0000/64/000/000/0285/0291

AUTHOR: Bogoyavlenskiy, A. F. (Doctor of chemical sciences, Professor);  
Dorofeyeva, N. D.

TITLE: Effect of some fillers on the protective properties of anodic aluminum oxide  
films formed in carbonate electrolyte

SOURCE: Mezhevuzovskaya konferentsiya po anodnoy zashchite metallov ot korrozii. 1st,  
Kazan, 1961. Anodnaya zashchita metallov (Anodic protection of metals); doklady\*  
konferentsii. Moscow, Izd-vo Mashinostroyeniye, 1964, 285-291

TOPIC TAGS: duralumin/DT16 clad duralumin, anodized duralumin, carbonate electro-  
lyte anodizing, sulfate electrolyte anodizing, anodic film filling, tea extract filler, tannin  
filler, filling process duration, filling temperature, filler concentration effect, electro-  
lyte composition effect, aluminum corrosion, anodic oxidation, aluminum oxide film

ABSTRACT: Samples of clad duralumin DT16 were degreased, rinsed, anodized (0.42-0.6  
a/dm<sup>2</sup>, 53-110v, 30-34C, 25 min., Fe cathode, carbonate or sulfate electrolyte), rinsed,  
dried, filled with 2% tea extract (30-90C, 0-10 min. at 90C, extract concentration 0-7%  
by weight of dry tea at 90-95C for 7 min.) or tannin (0.1-3.0% by weight, 30-90C in 0.5%  
for 3 min., 2-10 min. at 90C and 0.5%), then tested for corrosion resistance ( $\Delta \tau$ -VIAM  
test). The results indicate that filling of carbonate anodized films in 3-5% aqueous

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extracts of tea for 7 min. at 90-95% improves the resistance by 300-400%. Filling in 0.5% tannin solution under the same conditions improved resistance by 200-250%. The resistance of sulfate anodized film deteriorated when it was filled under conditions optimal for carbonate anodized films. Orig. art. has: 5 graphs.

ASSOCIATION: None

SUBMITTED: 13Mar64

SUB CODE: MM

NO REF SOV: 003

ENCL: 00

OTHER: 002

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Card

ACCESSION NR: AT4043089 S/0000/64/000/000/0461/0471

AUTHOR: Bngoyavlenskiy, A. F. (Doctor of chemical sciences, Professor); Oranskaya, I. P.

TITLE: Comparative evaluation of the passivation methods for magnesium alloys

SOURCE: Mezhdvuzovskaya konferentsiya po anodnoy zashchite metallov ot korrozii. 1st, Kazan, 1961. Anodnaya zashchita metallov (Anodic protection of metals); doklady\* konferentsii. Moscow, Izd-vo Mashinostroyeniye, 1964, 461-471

TOPIC TAGS: magnesium alloy, MAB alloy, casting ML5 alloy, ASTM AZ80 alloy, alloy passivation, electrochemical passivation, chemical passivation

ABSTRACT: The chemical and several electrochemical methods developed in the Soviet Union for forming protective films on wrought magnesium MAB alloy [1.5—2.5% Mn, 0.15—0.35% Ce] and casting magnesium ML5 alloy [ASTM AZ80] have been evaluated. Alloy specimens with protective films formed on them by various methods have been tested for corrosion in a 3% NaCl solution, wear resistance, and elasticity. Re-

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ACCESSION NR: AT4043089

sults of the comparative evaluation showed the absence of a single universal method capable of producing protective films with identical optimum properties for various magnesium alloys. In general, protective films obtained by the electrochemical methods have better properties than chemically produced films. Filling the films by immersing them for 30 min in a boiling 5% potassium chromate solution appreciably improves the protective properties of the films, regardless of the method by which the films were obtained. Orig. art. has: 4 figures and 4 tables.

ASSOCIATION: none

SUBMITTED: 13Mar64

SUB CODE: MM, IE

ATD PRESS: 3092

NO REF SOV: 010

ENCL: 00

OTHER: 001

Card 2/2

ACCESSION NR: AP4032502

S/0080/64/037/004/0819/0823

AUTHOR: Pavelkina, V. P; Bogoyavlenskiy, A. F.

TITLE: The heterogeneous structures of the anodic oxide coating on aluminum determined by its chemical analysis.

SOURCE: Zhurnal prikladnoy khimii, v. 37, no. 4, 1964, 819-823.

TOPIC TAGS: aluminum oxide coating, aluminum, anodized aluminum, chemical analysis, quantitative analysis, crystalline aluminum oxide coating, amorphous aluminum oxide coating, solubility, complexon III

ABSTRACT: Chemical methods for quantitatively determining the amorphous and crystalline form of the aluminum oxide coating on anodized aluminum were worked out. The coatings were freshly formed by anodizing aluminum foil in  $H_2SO_4$  electrolyte under standard conditions; isolating and washing to remove residual sulfate. The analyses are based on the solubilities of the two forms of aluminum oxide in different reagents. Both the amorphous and crystalline forms are soluble at 90-95C in a solution of chromic anhydride (20 gm/l) and phosphoric acid (35 ml/l) (A. V. Shreyder, ZhPKh XXX, 1, 84, 1957). Crystalline aluminum oxide is

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insoluble while amorphous aluminum oxide dissolves on boiling in a solution of cupric chloride and ammonium chloride (saturated when cold) (Z. S. Mukhina, Ye. I. Nikitina i dr. Metody\* analiza metallox i splavov. "Methods for analysing metals and alloys". Oborongiz, 375, 1959). Amorphous aluminum oxide dissolves, as does the aluminum hydroxide, in a solution of complexon III. Hence the isolated anodic coating may be boiled in a 0.05 M complexon III solution, filtered free of the crystalline aluminum oxide precipitate, titrated with  $ZnSO_4$  in the presence of acid chrome dark blue. In the samples examined the amorphous and crystalline  $Al_2O_3$  constituted 81-85% of the coating; and the remainder is believed to be electrolyte anions and chemically combined or adsorbed water. Coatings from aluminum foil anodized in chromic or phosphoric acid, or the unisolated coating from anodized aluminum AD-1M contained only the amorphous form of  $Al_2O_3$ . Orig. art. has: 2 tables and 2 equations.

ASSOCIATION: Kazanskiy aviatsionnyy institut (Kazan Aviation Institute)

SUBMITTED: 30Jul62

DATE ACQ: 11May64

ENCL: 00

SUB CODE: MM, GC

NO REF SOV: 009

OTHER: 004

Card: 2/2

BOGOYAVLENSKIY, A.F.; BELOV, V.T.; KOZYREV, Ye.M.

Study of the sorption properties of the anode oxide film on aluminum by the tracer technique. Part 4: Sorption of inorganic anions as a function of their concentration in solution. Izv.vys. ucheb.zav.; khim.i khim.tekh. 7 no.6:962-966 '64. (MIRA 18:5)

1. Kazanskiy aviatsionnyy institut, kafedra khimii.

ACCESSION NR: AP4043765

S/0080/64/037/008/1743/1748

AUTHOR: Bogoyavlenskiy, A. F.; Belov, V. T.

TITLE: The role of the nature of anion of an electrolyte-charger in the settling process of an anode oxide film on aluminium

SOURCE: Zhurnal prikladnoy khimii, v. 37, no. 8, 1964, 1743-1748

TOPIC TAGS: anion, electrolyte, anode, oxide, aluminium, charge solution, sulfuric acid

ABSTRACT: The purpose of this work was to establish the character of clogging of film pores during the settling process. In the capacity of charge solutions the following potassium salt solutions were used:  $K_2Cr_2O_7/K_2CrO_4$ ,  $K_2SO_4$  and  $KH_2PO_4$ . The pH value of the charge solutions equalled 4.8-5.2, i.e. it corresponded to the maximum sorption capability of the film in the area of its lowest solubility. Anode oxide films were formed on aluminum samples of the AD-1 type in a 20% solution of sulfuric acid at 20°C over a period of 20 minutes. The current density was 1 A/dm<sup>2</sup>. The samples were then rinsed in a vessel with distilled water until the ions  $SO_4^{2-}$  disappeared from the water. After an aging period of 15 hours in an exsiccator, the sulfuric acid was supplemented at 95°C with 0.1 m of solution of the

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above mentioned salts, marked by corresponding radioactive isotopes (chromium-51, sulfur-35, phosphorus-32). The charged samples were further processed in a mixture containing 45 mg/l orthophosphoric acid and 2 g/l chromium anhydrite. The results have shown that in process of charging the film in sulphate and chromatic solutions the corresponding anions hinder insignificantly the swelling process. As the duration of the charging period increases the pore openings become more and more contracted and it becomes difficult for the resolving mixture to penetrate into the pores. The authors concluded that the duration of the charging period of an anode film in phosphate solutions has an extremely insignificant effect on the durability of the film. In the case of chromatic and sulphatic charges the resistance of the film toward dissolving increases considerably. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 28Sep62

ENCL: 00

SUB CODE: CC, MM

NO REF SOV: 014

OTHER: 003

Card 2/2



L 8578-65 EWT(m)/EWP(g)/EWP(b) IJP(s)/ASD(m)-3/ASD(r) JD/WB/MLK 2  
ACCESSION NR: AT4043087 S/0000/64/000/000/0440/0446

AUTHOR: Bogoyavlenskiy, A. P. (Doctor of chemical sciences, Professor); Borodina, S. A.

TITLE: Some peculiarities of the anodic behavior of titanium and its alloys in sulfuric-acid solutions 27

SOURCE: Mazhvuzovskaya konferentsiya po anodnoy zashchite metallov ot korrozii. 1st, Kazan, 1961. // Anodnaya zashchita metallov (Anodic protection of metals); doklady konferentsii. Moscow, Izd-vo Mashinostroyeniya, 1964, 440-446

TOPIC TAGS: titanium, VT1<sup>8</sup>titanium, VT5D titanium alloy, titanium anodizing, titanium alloy anodizing, oxidation film composition, oxidation film property, oxidation film 4

ABSTRACT: The effect of the applied voltage and time of anodizing on the properties and composition of films formed on VT-1 commercial-grade titanium and VT-5D titanium alloy (4.5-6% Al, 0.3 max% Fe, 0.15 max% Si, 0.05 max% each O, C, H, and N) has been investigated. Anodizing was carried out in a 20% sulfuric-acid electrolyte at 20C,

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at a current density of  $0.6 \text{ a/dm}^2$ , and at a voltage of 5 to 60v. The maximum time of anodizing was 15 min. It was found that to each value of the anodizing voltage, a specific film color corresponded. With increasing voltage, the film thickness increased, e.g., from 0.3 to 1.7  $\mu$  for an applied voltage of 10 and 50v, respectively. Films formed at the same voltage were thicker on VT-5D alloy than were those on VT-1 titanium. Film thickness increased rather rapidly during the first 3—5 min, and then more slowly. The film appears to be a complex mixture of  $\text{TiO}$ ,  $\text{Ti}_2\text{O}_3$ , and  $\text{TiO}_2$  oxides, which is formed not only by simple superimposition of the oxide layers, but also by some interaction between them. Anodizing almost completely protected titanium against corrosion in a 100-hr test in 40% sulfuric acid at room temperature; it was, however, inadequate for protecting titanium in 78% sulfuric acid or in 10% hydrochloric acid. With an increasing voltage, the total amount of sulfate ions in the film increases, while their percent content decreases. This is probably because sulfate ions are adsorbed only by the outer layers of the film and do not penetrate the deeper layers. Orig. art. has: 4 figures and 2 tables.

ASSOCIATION: none

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ACCESSION NR: AT4043087

SUBMITTED: 13Mar64

ATD PRESS: 3102

ENCL: 00

SUB CODE: HM, EM

NO REF SOV: 009

OTHER: 008

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Card 3/3

BOGOYAVLENSKIY, A.F.; BELOV, V.T.

Nature of the anion of an electrolyte-filler and its role in the process of condensation of anodic oxide film on aluminum. Zhur. prikl. khim. 37 no. 8:1743-1748 Ag '64.

(MIRA 17:11)

I 20218-65 EWI(m)/EPR/EWP(t)/EWP(b)/EWA(h) Ps-4/Peb IJP(c) JD  
ACCESSION NR: AP4047125 S/0080/64/037/010/2256/2262

AUTHOR: Bogoyavlenskiy, A. F., Kochergina, V. A., Tumbinskiy, V. A. B

TITLE: Anodic oxidation of aluminum with application of an ultrasonic field

SOURCE: Zhurnal prikladnoy khimii, v. 37, no. 10, 2256-2262 18

TOPIC TAGS: anode film, anodic oxidation, aluminum oxidation, ultrasound,  
anode film structure

ABSTRACT: The purpose of this work was to study the influence of an ultrasonic field on the microscopic hardness, porosity, elasticity, and structure of the anode film formed during anodic oxidation by the sulfuric acid and carbonate methods. The ultrasonic field employed had an intensity of 2-2.5 W/cm<sup>2</sup> and a frequency of 23,000 cps. The samples to be anodized were made out of D16TA aluminum. Cathodes of 1Kh18N9T steel were used in a 20% solution of sulfuric acid or 5% solution of Na<sub>2</sub>CO<sub>3</sub>. It was found that ultrasonic vibrations do not appreciably affect the mechanism of the anodizing process at a current density of 1 A/dm<sup>2</sup>; at 3-5 A/dm<sup>2</sup>, the sulfuric acid method made it possible to prepare good-quality oxide films without the disadvantages usually associated with the

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L 20218-65

ACCESSION NR: AP4047125

use of high current densities. Films obtained in the ultrasonic field were found to have a lower porosity and greater hardness, and to be highly resistant to corrosive media. Electron microscopy showed that a micellar structure was common to anodic films obtained in sulfuric acid and carbonate electrolytes. The colloidal particle size of the micelles of the films was demonstrated. Orig. art. has: 3 figures and 3 tables.

ASSOCIATION: None

SUBMITTED: 23Nov63

ENCL: 00

SUB CODE: IC

NO REF SOV: 007

OTHER: 001

Card 2/2

L 17528-65

EWI(m)/EWA(d)/EPR/EWP(t)/EWP(b)

Pa-4

DIAAP/IJP(c)/AFETR/AFTC(p)

HJV/JD

ACCESSION NR: AP5000513

S/0080/64/037/011/2531/2533

AUTHOR: Bogoyavlenskiv, A. F. , Oranskaya, I. P.

TITLE: Incorporation of oxidation cathion into MgO anode film as determined by the method of labeled atoms B

SOURCE: Zhurnal prikladnoy khimii, v. 37, no. 11, 1964, 2531-2533

TOPIC TAGS: anode oxidation, anode film, magnesium alloy, aluminum alloy, magnesium oxide film, anion incorporation, phosphate incorporation, sulfate incorporation, electrolysis

ABSTRACT: Anode oxidation of <sup>31</sup>magnesium alloy (ML-5)<sup>6</sup> sheets was carried out in a solution containing 55g/liter NaOH and 35g/liter Na<sub>3</sub>PO<sub>4</sub>. To the prepared electrolyte, P32 was added as trisodiumphosphate and the reaction was carried out at 70C and a current of 1.5 A/dm<sup>2</sup>. After oxidation, the samples were washed to remove free PO<sub>4</sub><sup>-3</sup> ions and the samples were dried and counted. The counts obtained showed increasing radioactivity in the samples, indicating that there was binding of phosphate ions by the oxidized anode film. Since they could not be washed away, there is a strong union between the two. The relative content of electrolyte anion in thin films reached 5% by weight, but as the oxide film increased in thickness the relative content of phosphate ions decreased, reaching

Card 1/2

L 17528-65

ACCESSION NR: AP5000513

2-2.5% after 30 minutes. Comparison of these results with earlier experiments on the incorporation of sulfate ions into oxidized aluminum revealed an analogy between these processes in magnesium and aluminum alloys. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: None

SUBMITTED: 24Apr63

ENCL: 00

SUB CODE: IC, MM

NO REF SOV: 006

OTHER: 000

Card 2/2



L 25297-65 EWT(1)/EWT(m)/EWA(d)/T/EWP(t)/EWP(b) RWI/JD/WB

ACCESSION NR: AP5002475

S/0032/65/031/001/0079/0080

AUTHORS: Bogoyavlenskiy, A. F.; Belov, V. T.TITLE: Correction coefficient for volume of pores in calculating anode film thickness23  
22  
B

SOURCE: Zavodskaya laboratoriya, v. 31, no. 1, 1965, 79-80

TOPIC TAGS: anodic protection, aluminum oxide, electrolytic plating, platingABSTRACT: To determine accurately the thickness of  $Al_2O_3$  anode films by the weight method, it is necessary to introduce a porous volume correction factor $K = (V_B + V_{por})/V_B$  into the equation for the film thickness  $\mu = (P \cdot K)/d \cdot S$  (whereP = weight of anode oxide film, d = specific weight, S = area of metal covered by film,  $V_B$  = actual film volume,  $V_{por}$  = porous volume). The porosity of the film canbe determined by filling the pores with a fluid and weighing the amount of fluid required. Then the thickness of the film is given by  $\mu = (P/d + g/\gamma)/S$  (where g and  $\gamma$  are the weight and specific weight of the filler respectively). To check the necessity of a correction coefficient, the anode oxide film thickness was measured by both methods for a large range of formation parameters (20%  $H_2SO_4$ , 20C,

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L 25297-65

ACCESSION NR: AP5002175

0.5-4.0 amp/dm<sup>2</sup>, 10-120 min) and was compared with values obtained with a microscope. It was found that in all cases the uncorrected film thickness values were wrong by as much as 40%, while the corrected values agreed very well with microscopically measured results. Orig. art. has: 2 tables.

ASSOCIATION: Kazanskiy aviatsionnyy institut (Kazan Aviation Institute)

SUBMITTED: 00

ENCL: 00

SUB CODE: MM

NO REF SOV: 013

OTHER: 002

Card 2/2

L 57742-65 ENT(1)/ENT(m)/EPF(r)/ENP(i)/ENA(d)/EPR/ENP(t)/ENP(b) Ps-4 IJP(c)

ACCESSION NR: AF5017091

JD/WB

UR/0032/65/031/007/0816/0818  
620.197

AUTHOR: Bogoyavlenskii, A. F.; Balov, V. T.; Trofimov, A. A.; Shigalina, G. V.;  
Vagina, I. A.; L'vov, G. E.

TITLE: Quick method of evaluating the protective properties of anodic oxide film  
on aluminum

SOURCE: Zavodskaya laboratoriya, v. 31, no. 7, 1965, 816-818

TOPIC TAGS: anodic oxide film, oxide film, galvanic circuit, electrolyte solution,  
electromotive force, protective film/ VIAM electrolyte (solution of potassium bi-  
chromate in sulfuric acid)

ABSTRACT: The authors describe a method they developed for the quick determination  
of the protective properties of oxide film on aluminum, based on utilizing the  
e.m.f. of the aluminum|electrolyte solution|platinum galvanic circuit. The pre-  
sence of an oxide film on aluminum prevents the rise of an e.m.f. On using an  
electrolyte that disintegrates the anode film the protective properties of this  
film can be determined according to the time instant at which a specific e.m.f.  
arises in the circuit. A series of different electrolytes was tested out. A drop-

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L 57742-65

ACCESSION NR: AP5017091

1st of electrolyte solution 1 (see figures) was deposited on the purified and degreased surface 2 of non-anodized aluminum so as to immerse part of the vertically positioned platinum wire 3 in this droplet. Wire 3 is linked to the specimen by external circuit 4. The platinum wire was fastened on plexiglas bracket 5. Of the electrolyte solutions tested, the VIAM electrolyte (25 cc HCl (sp. gr. 1.19), 3 g  $K_2Cr_2O_7$ , 75 cc  $H_2O$ ) proved to be the most suitable. The method was verified with the aid of anode-formed oxide films on aluminum in a sulfuric acid solution and compared with the results of the customary visual determination based on the presence or absence of green color in the droplet. A special time indicator, triggered once a specific e.m.f. arose in the circuit, was used. The tabulated findings indicate that the proposed method is definitely acceptable for comparative appraisal of the protective features of anode films. This method not only reduces testing time, compared with the droplet color test, but also is more precise and objective. Orig. art. has: 1 figure, 3 tables.

ASSOCIATION: Kazanskij aviatsionny institut (Kazan' Aviation Institute)

SUBMITTED: 00

ENCL: 01

SUB CODE: KI, MI

NR REF SOV: 002

OTHER: 000

Card 2/3

BOGOYAVLENSKIY, A.F.; MATYAZH, N.K.

Process of inclusion of the  $[\text{Ag}(\text{CNS})_2]^{-1}$  anion labeled with  
an  $\text{Ag}^{110}$  isotope into a forming anodic oxide film on aluminum.  
Zhur. prikl. khim. 38 no.4:952-954 Ap '65.

(MIRA 18:6)

BOGOYAVLENSKIY, A.F.; BELOV, V.T.; KOZYREV, Ye.M.

Study of the sorption properties of an anodic oxide film on aluminum by the tracer method. Part 5: Effect of temperature sorption as dependent on the concentration of solution filler at high temperatures. Izv. vys. ucheb. zav.; khim. i khim. tekh. 8 no.3:407-410 '65. (MIRA 18:10)

1. Kazanskiy aviatsionnyy institut, kafedra khimii.

L 54032-65

EWT(1)/EWT(m)/EWP(1)/EPR/EWP(t)/EWP(b) P<sub>6-1</sub> IJP(c) JD

ACCESSION NR: AP5013521

UR/0076/65/039/005/1108/1111  
541.8

AUTHOR: Bogoyavlenskii, A. F.; Belov, V. T.; Vagina, I. A.; Lipatova, N. Ye.

TITLE: Hydration of anodic oxide film on aluminum in aqueous solutions of inorganic salts

SOURCE: Zhurnal fizicheskoy khimii, v. 39, no. 5, 1965, 1108-1111

TOPIC TAGS: aluminum oxide, hydration, anodic oxide film

ABSTRACT: The volume of hydrogen formed by interacting water vapor and calcium hydride was measured to determine the water content of anodic oxide films filled with water at 95°C in sodium dichromate, sulfate, and phosphate solutions (10<sup>-4</sup> to 1 mol/l). In the order of their effect on hydration of the oxide film, the ions are: H<sub>2</sub>PO<sub>4</sub><sup>-</sup> > HCrO<sub>4</sub><sup>-</sup> > SO<sub>4</sub><sup>2-</sup>. When the films are filled in phosphate solutions, the quantity of the sorbed phosphate ion increases with the concentration of the latter in the solution, and the water content decreases. In dichromate solutions, the water content of the filled film depends only slightly on the solution concentra-

Card 1/2

L 54032-65  
ACCESSION NR: AP5013521

tion, but the water content increases with rising concentration. In sulfate solutions, the water content of the film increases with the concentration of the solution, and the sorption of the sulfate ion either promotes or does not interfere with the adsorption of water. Differences in filling conditions have a pronounced effect on the state of the surface of the anodic film; the sorption of anions and the hydration of the film are variously affected. Orig. art. has: 1 figure.

ASSOCIATION: Kazanskiy aviatsionnyy institut (Kazan Aviation Institute)

SUBMITTED: 12Dec63

ENCL: 00

SER CODE: 00

NO REF SER: 012

OTHER: 006

Card 2/2



L 30097-00 EWP(m)/EWP(e)/EWP(t)/ETI IJP(c) JD/JXT(44)/WH/JH

ACC NR: AT6014325

SOURCE CODE: UR/2529/62/000/070/0022/0031

AUTHORS: Bogoyavlenskiy, A. F. (Doctor of chemical sciences, Professor); Shames, S. I.

ORG: none \*

TITLES: Preparation of enamel anodic oxidative coatings on aluminum and its alloys

SOURCE: \*Kazan. Aviatsonnyy institut. Trudy, no. 70, 1962. Aviatsonnaya tekhnologiya i organizatsiya proizvodstva (Aviation engineering and organization of production), 22-31

TOPIC TAGS: *anodization, enamel,* aluminum alloy, protective coating, anodic oxidation / AD-1 aluminum alloy, D16T aluminum alloy, AMtsM aluminum alloy, Ematal *protective coating*

ABSTRACT: Results of preparative and testing studies of anodic enamel type coatings on aluminum and its alloys are reported. The preparative process consists of two stages: 1) preliminary treatment of the metallic surface (degreasing), and 2) anodic oxidation in the presence of salts of titanium, thallium, and zirconium, which yields a product covered with the "Ematal" coating. Kinetics of the process has been studied on alloys AD-1, D16T, and AMtsM at various temperatures and the protective indices of "Ematal" coatings have been determined. The "Ematal" coating is 30--50 times thinner and 3--10 times lighter than the usual paint and varnish coating. The "Ematal" coatings are highly resistant to corrosion and abrasion (see Fig. 1), are very elastic, and have poor electrical conductivity. It was shown that the pH of the electrolyte

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L 36097-66

ACC NR: AT6014325

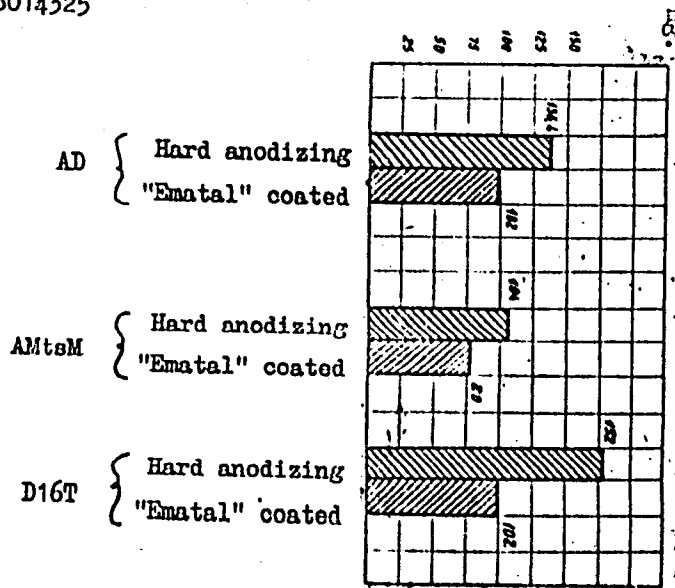


Fig. 1.

may be safely increased to 3. The disadvantage of the method is the high cost of the components of the electrolytic bath. Orig. art. has: 7 figures.

SUB CODE: // / SUBM DATE: 15May61/ ORIG REF: 002

LS  
Card 2/2

L 46840-66 EWT(1)/EWT(m)/EWP(t)/ETI IJP(c) JD/CD/JH

ACC NR: AT6024968 (N) SOURCE CODE: UR/0000/65/000/000/0126/0128

AUTHOR: Bogoyavlenskiy, A. F.; Belov, V. T.

56  
B+1

ORG: Kazan Aviation Institute (Kazanskiy aviatsionnyy institut)

TITLE: Testing of filled anodic oxide films on aluminum with cathodic current in a nitric acid solution

SOURCE: AN SSSR. Otdeleniye obshchey i tekhnicheskoy khimii. Zashchitnyye metallicheskiye i oksidnyye pokrytiya, korroziya metallov i issledovaniya v oblasti elektrokhimii (Protective metallic and oxide coatings, corrosion of metals, and studies in electrochemistry). Moscow, Nauka, 1965, 126-128

TOPIC TAGS: anodic oxidation, aluminum oxide, dielectric breakdown

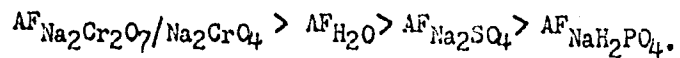
ABSTRACT: Cathodic current was used to evaluate the comparative stability of oxide films on aluminum, which were formed anodically in sulfuric acid solution and filled with solutions of sodium phosphates, sulfate, dichromate, and chromate with an anion concentration of 0.1 mole/l, and also with distilled water. The solution temperature was found to be a major factor in the filling of the aluminum films in dichromate-chromate and sulfate solutions, but not in phosphate solution. The filling effect in water surpasses that in sulfate solution, but is less pronounced than in dichromate-chromate solution. Based on testing with cathodic current in a 2% HNO<sub>3</sub> solution, the comparative stability of the anodic oxide films filled at 50-95° in aqueous solutions

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L 46840-66

ACC NR: AT6024968

of inorganic salts in the range of pH 4.5-5.3 can be expressed by the series (AF = anodic film)



The stability of films filled in phosphate solution is comparable to that of the other filled films only at low filling temperatures. Orig. art. has: 2 figures.

SUB CODE: 11/07/SUBM DATE: 06Dec63/ ORIG REF: 004/ OTH REF: 001

Card 2/2 blg

L 46841-66 EWT(l)/EWT(m)/EWP(v)/T/ EWP(t)/ETI/EWP(R) LRP(c) JD:RM/ND  
ACC NR: AT6024969 SOURCE CODE: UR/0000/65/000/000/0128/0131

AUTHOR: Bogoyavlenskiy, A. F.; Oranskaya, I. P.; Shipulina, G. V. 59

ORG: Kazan Aviation Institute (Kazanskiy aviatsionnyy institut) B+1

TITLE: Effect of temperature, current density, and electrolyte concentration on the composition and structure of anodic films on ML-5 alloy

SOURCE: AN SSSR. Otdeleniye obshchey i tekhnicheskoy khimii. Zashchitnyye metallicheskiye i oksidnyye pokrytiya, korroziya metallov i issledovaniya v oblasti elektrokhimii (Protective metallic and oxide coatings, corrosion of metals, and studies in electrochemistry). Moscow, Nauka, 1965, 128-131

TOPIC TAGS: magnesium alloy, phosphate, anodic oxidation, *radioisotope, temperature effect, ion / ML-5 alloy*

ABSTRACT: Using the <sup>32</sup>P radioisotope, the authors studied the incorporation of electrolyte ions (PQ<sub>4</sub><sup>3-</sup>) in the anodic film on the magnesium alloy ML-5 as a function of the conditions of the process. As the temperature rises above 60°, the amount of PQ<sub>4</sub><sup>3-</sup> incorporated in the film tends to decrease. Part of the PQ<sub>4</sub><sup>3-</sup> ions become structurally incorporated in the film, and part are held by adsorption forces, and as the temperature rises, the quantity of adsorbed PQ<sub>4</sub><sup>3-</sup> ions decreases. As the current density rises, the relative content of PQ<sub>4</sub><sup>3-</sup> increases, reaching 3% of the weight of the film; this is attributed to changes in the structure of the film (increase in porosity, true surface, etc.) caused by high current densities. As the electrolyte con-

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1004-00  
ACC NR: AT6024969

contration increases, so does the quantity of  $PQ_4^{3-}$  ions (up to 6 wt. %), probably owing to an increase in their adsorbed fraction. Orig. art. has: 6 figures and 1 table.

SUB CODE: 07/1/8/SUBM DATE: 16Dec63/ ORIG REF: 005

Card 2/2 b1g

L 01302-67 EWT(1)/EWT(m)/I/EWP(t)/ETI IJP(c) JD

ACC NR: AP6002205

(N)

SORCE CODE: UR/0153/65/008/005/0753/0757 47  
46  
B

AUTHOR: Belov, V. T.; Bogoyavlenskiy, A. F.; Kozyrev, Ye. M.; Khristoforov, V. A.

ORG: Kazan' Aviation Institute, Department of Chemistry (Kazanskiy aviatsionnyy institut, Kafedra khimii)

TITLE: Investigation of the sorption properties of anodic oxide film on aluminum.  
VI. Electron microscopic study of anodic oxide films on aluminum after filling

SOURCE: IVUZ. Khimiya i khimicheskaya tekhnologiya, v. 8, no. 5, 1965, 753-757

TOPIC TAGS: anodic oxidation, aluminum, electron microscopy

ABSTRACT: Samples of aluminum AD-1, 18 cm<sup>2</sup> in surface, were degreased by acetone and subjected to anodic oxidation for 20 minutes in 20% H<sub>2</sub>SO<sub>4</sub> at 20C at a current density of 1 amp/dm<sup>2</sup>. After washing in distilled H<sub>2</sub>O and drying in a desiccator over H<sub>2</sub>SO<sub>4</sub>, the oxide film weighed 0.155 g/dm<sup>2</sup>, had a thickness of 5-6μ, a porosity of 15-18%, and contained 15-16% by weight of sulfate ions. Filling of oxide films was made in distilled H<sub>2</sub>O and in 0.1M solution of sodium phosphate or chromate at various pH. The electron microscope study was made from lac and, in some cases, titanium replicas. The reaction of the oxide film with H<sub>2</sub>O at 95C caused a noticeable swelling and an intense hydration which narrowed the pores and changed the observable relief of the film surface. The

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UDC: 620.197 : 537.533.35

L 01302-67

ACC NR: AP6002205

chemical-sorption reaction of the film substances with anions of the inorganic solution-filler resulted in the formation of dense chemical-sorption layers, decreasing noticeably the swelling affected by H<sub>2</sub>O. In addition, the phosphate and chromate solution-fillers, which reacted with film substances with a low dissolving effect (pH 4.5-6.5), somewhat smoothed the frontal surface of the film in the most protruding places. The exposure of film to air at 110C did not change its surface, but exposure of film to 330C brought about the deformation of the film surface. Evidently the decreases in weight, observed in both cases, were caused in the first case by the liberation of adsorption water from pores, whereas in the second case it was caused by the dehydration of oxide and removal of structural water. The data obtained substantiated the theory, advanced previously, on the presence of dissolving, hydration, and sorption of anions during filling of films in aqueous solutions of inorganic salts. It was noticed that, during filling of films in solutions of Na phosphate, hydration was smaller than during filling in bichromate - chromate solutions. The paper was presented at the Fourth All-Union Conference on Electron Microscopy (IV Vsesoyuznoye soveshchaniye po elektronnoy mikroskopii) held at Sunny, 12-14 Mar 1963. Orig. art. has: 2 fig. and 1 table.

SUB CODE: 1120/SUBM DATE: 09Sep63/ ORIG REF: 004/ OTH REF: 002

Card 2/2 *llh*



ACC NR: AP7003141

SOURCE CODE: UR/0080/66/039/012/2705/2711

AUTHOR: Bogoyavlenskiy, A. F.; Belov, V. T.

ORG: none

TITLE: Filling of anodic oxide film on aluminum in aqueous solutions of certain inorganic salts and its comparative effectiveness

SOURCE: Zhurnal prikladnoy khimii, v. 39, no. 12, 1966, 2705-2711

TOPIC TAGS: aluminum, anodic oxidation, surface film

ABSTRACT: Continuing their study of the mechanism of filling of anodic oxide films on aluminum in solutions of inorganic salts, the authors found that during such filling the anions have different capacities for penetrating the film and for desorption. It is shown that sulfate ions which have penetrated the film in the course of its formation pass into the filler solution in negligible amounts and do not determine the sorption of the anion of the solution. It is concluded that no single mechanism of filling of the anodic oxide film on aluminum can be proposed; in each individual case, the mechanism is determined by the nature of the filler solution, condition of the surface, and conditions of the filling. Filling of the film in solutions of phosphate salts contributes relatively little to an increase in its protective properties, but in solutions of sulfate and chromate salts improves the protective properties of the film. Authors express their thanks to Ye. M. Kozyrev and I. A. Vagina for their par-

Card 1/2

UDC: 620.197:539.163:620.199

ACC NR: AP7003141

ticipation in the experiments. Orig. art. has: 6 figures and 2 tables.

SUB CODE: 07/ SUBM DATE: 15Dec64/ ORIG REF: 012

Card 2/2

BOGOYAVLENSKIY, A. N.

"On the Kinetics of Development of Individual Grains of a Photographic Emulsion,"  
Acta Phys., 16, Nos. 5-6, 1952

Dept. Colloidal Chem., Moscow State U.

BOGOYAVLENSKIY, A. N.

✓ **Chemistry of the Kurile-Kamchatka trench waters.**  
 A. N. Bogoyavlenskii. *Trudy Inst. Okeanogr. Akad. Nauk S.S.S.R.* 12, 161-75 (1955). — Samples from different depths were obtained, and O, phosphates, SiO<sub>2</sub>, alk. reserve, nitrites, and in some instances nitrates were detd. Top-layer waters (spring modification), 60 m. deep, are greatly affected by the biogenic activity and temp. Before the phytoplankton began to flower the following data were obtained: O 7.8-8.0 cc./1000 cc., phosphates 60 mg./cu. m., SiO<sub>2</sub> as Si 0.125, which corresponds to an alk. reserve of 2.27-2.29 meq./1000 cc., nitrate N 300-350 mg./cu. m., nitrite N 1.0-3.5 mg./cu. m., CO<sub>2</sub> pressure about  $4.0 \times 10^{-4}$  atm. After the flowering period began, O increased up to 110%, P and Si were down to 20 and 1000 mg. In some places P disappeared entirely and Si dropped to 200 mg. The pH rose to 8.2 and sometimes to 8.53; the alk. reserve was above 2.30 meq./1000 cc.; nitrate N was down to 20 mg./cu. m. A decrease in nitrites in top layers and an increase lower down, 50-100 m., was noted. CO<sub>2</sub> was down to  $1.0 \times 10^{-4}$  atm. These changes were found at a depth of about 40 m. On the basis of the above data (losses of CO<sub>2</sub>, P, Si, etc.) it was possible to calc. the biogenic productivity for 1 month, since the ratios of C, Si, N, and P are very close to those found through analysis of diatomic planktons. The productivity is high when compared with that of other Pacific areas. The increase of alky. is most probably due

to absorption of nitrates by the phytoplankton and formation of carbonates. No significant changes were found in the so-called cold intermediate layer extending down to 200 m. A different picture is presented by the adjoining layer stretching down to 850 m., the so-called warm intermediate: O 0.5 cc./1000 cc., P 85-95 mg./cu. m., Si 2000-4000 mg./cu. m.; pH is down at some places to 7.5, alk. reserve 2.45 meq./1000 cc., CO<sub>2</sub> pressure  $16 \times 10^{-4}$ . The values of O, P, and pH vary with the seasons. On the basis of these variations it was possible to calc. the velocity of the water flow 2 cm./sec., the coeff. of vertical interchange 3 sq. cm./sec., and the velocity of O absorption 0.4 cc./yr. Further down, 850 to 3000 m., O is up to 2-2.5 cc./1000 cc. P is down to 70 mg./cu. m., Si reaches a max. of 4500 mg./cu. m., pH is up to 7.85, and alk. reserve varies between 2.45 and 2.55 meq./1000 cc. The next stratum, from 3000 m. to nearly down to the bottom, differs sharply from the overlying layer (higher temp., lower alkali/Cl coeff., and P content). The lowest stratum, between the bottom and a few tens of meters above it, shows a low P content and an increase of alk. reserve and pH. This is probably due to dissolved carbonates. The above data when properly interpreted may help to clarify the problem of the origin, trans-mechanism, and circulation of the deep waters, also the undergoes.

A. S. Mirkin

Bogoyavlenskii, A.N.  
3(5,7)

PHASE I BOOK EXPLOITATION

SOV/2193

Sovetskaya antarkticheskaya ekspeditsiya, 1955-1958

Informatsionnyy byulleten', Vyp. 3 (Information Bulletin of the Soviet Antarctic Expedition, Nr 3) Leningrad, Izd-vo "Morskoy transport," 1958. 102 p.  
1,500 copies printed.

Sponsoring Agencies: USSR. Ministerstvo morskoy flot. Glavnoye upravleniye Severnogo morskogo puti. Arkticheskii i Antarkticheskii nauchno-issledovatel'skiy institut.

Ed. of this Vol.: P. V. Ushakov; Resp. Ed.: M. M. Somov; Editorial Board:  
A. P. Andriyashev, V. Kh. Buynitskiy, I. M. Dolgin, S. V. Kalesnik, Ye. S. Korotkevich, I. V. Maksimov (Deputy Resp. Ed.), A. P. Nikol'skiy, M. G. Ravich, G. M. Tauber, A. F. Treshnikov (Deputy Resp. Ed.), S. B. Slevich (Resp. Secretary); Ed.: L. G. Kaplinskaya; Tech. Ed.: L. P. Drozhzhina.

PURPOSE: This book is intended for natural and earth scientists interested in the research activities of the diesel-electric ship "Ob" in the Antarctic. It

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Information Bulletin of the Soviet (Cont.)

SOV/2193

is of particular interest to marine biologists, meteorologists, and geophysicists.

COVERAGE: This issue of the Information Bulletin on the Soviet Antarctic Expedition reports on the fauna found in various regions of the Southern Hemisphere, the hydrology and hydrochemistry of Antarctic and Subarctic waters, and the geomorphology of the Antarctic shelf. The reports were read at the First Conference on the Study of Antarctica's Marine Fauna in December 1958. No references are given.

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Andriyashev, A. P., K. A. Brodskiy, and P. V. Ushakov [Doctors of Biological Sciences], Biological Investigations of the Soviet Antarctic Expedition Aboard the Diesel-Electric Ship "Ob'"

11

The following research workers, associated with the Zoological Institute, Academy of Sciences of the USSR, the Institute for Oceanology, Academy of Sciences of the USSR, the All-Union Scientific Research Institute for Fishing and Oceanography, and the Paleontological

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## Information Bulletin of the Soviet (Cont.)

SOV/2193

Institute of the Academy of Sciences of the USSR, took part in the expedition: in the first voyage - A. P. Andriyashev, V. A. Arsen'yev, G. M. Belyayev, K. A. Brodskiy, M. Ye. Vinogradov, A. K. Tokarev, and P. V. Ushakov; in the second voyage - V. A. Arsen'yev, V. V. Barsukov, K. V. Beklemishev, A. V. Gusev, V. S. Korotkevich, F. A. Pasternak, and Yu. Ye. Permitin; in the third voyage - A. P. Andriyashev, K. A. Brodskiy, B. A. Zenkovich, A. A. Kirpichnikov, V. M. Koltun, A. G. Naumov, F. A. Pasternak, and Yu. Ye. Permitin.

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- Bogoyavlenskiy, A. N. [Senior Scientific Worker]. Certain Peculiarities in the Distribution of Oxygen, Phosphates and Silicic Acid in Antarctic Waters 19
- Zhivago, A. V., and A. P. Lisitsyn [Candidates of Geological Sciences]. Bottom Relief and the Deposits of the Southern Ocean 21

Card 3/8

Information Bulletin of the Soviet (Cont.)

SOV/2193

- Brodskiy, K. A. [Doctor of Biological Sciences], K. K. Markov [Professor],  
and V. I. Shil'nikov [Junior Scientific Worker]. Zoning of the Temperate  
and High Latitude Regions of the Southern Hemisphere 23
- Brodskiy, K. A. Plankton Investigations of the Soviet Antarctic Expedition 25
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BOBOYAVLENSKIY, A.N.

KRATSOV, N.D.

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FRASE I BOBE IZPISANJE 807/1637

Abrazmalna namk SSSR. Komplektnaya antarcticheskiye ekspeditsiya. Opisanie ekspeditsii na dizel'-elektrichode "Ob", 1955-1956 gg. (Description of the Expedition Aboard the Diesel-electric Ship "Ob", 1955-1956) Moscow, Izd-vo AN SSSR, 1958. 237 p. 2,000 copies printed.

Sponsoring Agency: Akademiyu nauk SSSR. Sovet po antarcticheskim issledovaniyam. Chief Ed.: I. P. Mardin, Akademicheskoy Respub. Nauchnoy Ekspeditsii, USSR Academy of Sciences; Chief, 1st trip of the Soviet Antarctic Expedition, USSR Academy of Sciences; Editorial Board: A. A. Artyukhin (Chief, Main Administration of the Northern Sea Route), V. G. Kort (Chief, Main Administration of the Northern Sea Route), V. P. Burbanov (Chief, Main Administration of the Northern Sea Route), A. A. Zolotarev (Chief, Main Administration of the

Card 1/9

Hydro-meteorological Service), V. G. Kort (Professor, Chief, 1st trip of the Marine Antarctic Expedition, USSR Academy of Sciences), N. M. Somov (Chief, Combined Antarctic Expedition, Main Administration of the Northern Sea Route), V. V. Prolov (Director, Arctic Scientific Research Institute, Main Administration of the Northern Sea Route), I. Shchurabov (Chairman, Council for Antarctic Research, USSR Academy of Sciences), Eds.: I. P. Mardin, L. I. Sprygin, and B. S. Shostak, Tech. Ed.: P. S. Mashina.

NOTE: This volume is intended for the general reader.

COVERAGE: The Report of the Combined Antarctic Expedition of the AN SSSR, headed by N. M. Somov, contains an account of the work on the first trip of the Diesel-electric ship "Ob," to the Antarctic and the aims and problems involved, including the establishment of an observatory at Mirnyy. A major part of the book is devoted to scientific research in serology, meteorology and actinometry.

Card 2/9

conducted in cooperation with the IGY program. A large part of the observations and preliminary findings cited are in the field of hydrology and hydrochemistry, marine ecology, serology, hydrography, and hydrobiology. A roster of the members of the expedition together with their specialities is included. There are 72 figures, including maps. Bibliographic references accompany separate chapters.

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VI. Hydrochemical Studies (A. N. Boboyavlenskiy)

Series of work completed  
Methods and equipment  
Preliminary results

Card 4/9

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93

BOGOTAVLENSKIY, A.N., starshiy nauchnyy sotrudnik

Distribution of oxygen, phosphates and silica in Antarctic waters.  
Inform.biul.Sov.antark.eksp. no.3:19-20 '58. (MIRA 12:4)

1. Institut okeanologii AN SSSR.  
(Antarctic regions--Water--Composition)

BOGORYAVLENSKIY, A. N.

PHASE I BOOK EXPLOITATION

SOV/5463

Sovetskaya antarkticheskaya ekspeditsiya

Vtoraya morskaya ekspeditsiya na d/e "Ob'", 1956-1957 gg.; obshcheye opisaniye i nauchnyye rezul'taty (Second Marine Expedition on the Diesel-Electric Ship "Ob'", 1956-57; General Description and Scientific Results) Leningrad, Morskoy transport, 1959. 175 p. (Series: Its: [Materialy] no. 5) Errata slip inserted. 1,200 copies printed.

Sponsoring Agency: Arkticheskiy i antarkticheskiy nauchno-issledovatel'skiy institut.

Ed. (Title page): I. V. Maksimov, Doctor of Geographical Sciences, Professor;  
Ed.: L. G. Kaplinskaya; Tech. Ed.: O. I. Kotlyakova.

PURPOSE: This book is intended for oceanographers, meteorologists, and hydrochemists.

Card 1/6

Second Marine Expedition (Cont.)

SOV/5463

COVERAGE: The present volume, the fifth in a series of seven, is a collection of articles (except for two) devoted specifically to the oceanographic, meteorological, and hydrochemical findings of the Second Soviet Marine Expedition conducted on the diesel ship "Ob'" (I. A. Man, Captain) during 1956-57. The first two articles outline the Expedition's organization and program, and provide a general account of its activities during the 223-day voyage, which covered more than 40,000 miles of the Atlantic, Antarctic, and Indian Oceans. The expedition was sponsored by the Arctic and Antarctic Scientific Research Institute of the Glavsevmorput' Ministerstva morskogo flota SSSR (Main Administration of the Northern Sea Route of the Ministry of the Merchant Marine of the USSR) as part of the International Geophysical Year program. Its purpose was to investigate 1) atmospheric processes in the Antarctic region and their effect on the earth's general circulation, 2) basic regularities in the distribution of waters in the southern oceanic zone, 3) exchange of the waters of the southern seas with the waters of the world ocean, 4) geological structure of the sea bottom in the Antarctic region, and 5) the plankton, benthos,

Card 2/6



Second Marine Expedition (Cont.)

SOV/5463

ichthyofauna, and microorganisms of the Antarctic waters. Observations of the magnetic field of the earth were also made. The expedition, headed by Professor Igor' Vladislavovich Maksimov, Doctor of Geographical Sciences and Professor at the Leningradskoye vyssheye inzhenernoye morskoye uchilishche imeni S. O. Makarova (Leningrad Higher Marine Engineering School imeni S. O. Makarov), consisted of the following 8 scientific task forces: aerometeorological (headed by Leonid Gennadiyevich Sebolev); hydrological (Kirill Vladimirovich Moroshkin); geological (Aleksandr Petrovich Lisitsyn); hydrochemical (Aleksey Nikolayevich Bogoyavlenskiy); hydrobiological (Viktor Aleksandrovich Arsen'yev); geophysical (Nikolay Panteleymonovich Grushinskiy); geographic (Gravvila Dmitriyevich Rikhter); and hydrographic (Yuriy Aleksandrovich Gordeyev). A complete list of the names and affiliations of the 65 scientific and administrative members of the Expedition is contained in the first article. The articles were written by members of the Institut okeanologii Akademii nauk SSSR (Institute of Oceanology, Academy of Sciences USSR), Gosudarstvennyy okeanograficheskiy institut Gidrometsluzhby SSSR (State Oceanographic Institute of the Hydro-

Card 3/6

Second Marine Expedition (Cont.)

SOV/5463

8

meteorological Service of the USSR), Vsesoyuznyy nauchno-issledovatel'skiy institut rybnogo khozyaystva i okeanografii (All-Union Scientific Research Institute of Fisheries and Oceanography), and the Arctic and Antarctic Scientific Research Institute. There are no references.

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NAZAROV, V.S.; MAKSIMOV, B.A.; ZHIVAGO, A.V.; BRÓDSKIY, K.A.;  
KOLTUN, V.M.; ANDRIYASHEV, A.P.; PAKHAREVA, M.M., red.; KOTLYAKOVA,  
O.I., tekhn. red.

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transport." Vol.22. [Third Sea Expedition of the diesel-electric ship  
Ob', 1957-1958; observational data] Tret'ia morskaiia ekspeditsiia na  
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report submitted for the 13th General Assembly IUGG, (Oceanography) Berkeley,  
California, 19-31 Aug 63

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Some problems concerning the erosive and accumulative activity  
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Growth of the Selenga Delta. Krat. soob. BKNII no.1:39-41 '59.  
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(MIRA 11:11)

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BOGOYAVLENSKIY, D.N.

Forming the methods of students' mental activity as the way to  
develop thinking and stimulate learning. Vop. psikhol. 8 no.4:  
74-82 J1-Ag '62. (MIRA 16:1)

1. Institut psikhologii Akademii pedagogicheskikh nauk RSFSR, Moskva.  
(Educational psychology)

ACC NR: AR6027516

SOURCE CODE: UR/0137/66/000/004/I084/I084

AUTHOR: Bogoyavlenskiy, D. S.

TITLE: Investigation of tensile creep ( $t = 18^{\circ}\text{C}$ ) in aluminum-magnesium alloys

SOURCE: Ref. zh. Metallurgiya, Abs. 41571

REF SOURCE: Nauchn. tr. Voronezhsk. inzh.-stroit. in-t, sb. 11, vyp. 2, 1965, 53-61

TOPIC TAGS: creep mechanism, magnesium containing alloy, metal deformation

TRANSLATION: Creep tests were conducted in a lever type apparatus on 10 samples of an AMg alloy at stresses of 840-1690 kg/cm<sup>2</sup> and 14 samples of an AMg6 alloy at stresses of 1825-3600 kg/cm<sup>2</sup>. The AMg alloy was tested over a period of 100 days, and AMg6 over a period of 150 days. It was established that in structures made from Al-Mg alloys, operating for long times at stresses close to  $\sigma_g$ , the creep deformation may be considerable and must be taken into account in the design. The fracture stress in the case of tension under a constant load is decreased significantly with time, although for actual service periods it remains above  $\sigma_g$ . I. Tulupova.

SUB CODE: 11,13

UDC: 669.715'721:620.17

Card 1/1

L 11321-67 EWP(k)/EWT(m)/EWP(w)/EWP(t)/ETI LJP(c) JD/HW  
ACC NR: AR6022169 SOURCE CODE: UR/0137/66/000/003/1047/1047

AUTHOR: Bogoyavlenskiy, D. S. 27

TITLE: Investigation of creep in AMg6 alloy under compression and bending

SOURCE: Ref. zh. Metallurgiya, Abs. 3I312

REF SOURCE: Nauchn. tr. Voronezhsk. inzh.-stroit. in-t, sb. 11, vyp. 2, 1965, 62-74

TOPIC TAGS: creep, aluminum manganese alloy, metal deformation

ABSTRACT: Specimens of AMg6 aluminum alloy (Mg--5.7%, Mn--0.54%, Si--0.25%, Fe--0.19%, Ti--0.03% and Cu--0.01%) were tested for creep under various types of stress (compression, tension and bending) amounting to 10-24 kg/mm<sup>2</sup> at a temperature of 18±2° for 150 days. A formula is derived for calculating stresses in the stationary creep stage for any cross section of a beam subjected to pure bending. It is shown that creep deformations in the alloy under compression and bending are rather high (15-20% of the instantaneous deformations under compression and 5-10% under bending for 150 days) which should be taken into account in designing structures for operation over protracted periods under loads approaching the yield stress. Deformation below the yield stress in elements subjected to compression is several times greater than in specimens subjected to tension. Elements subjected to bending should be designed with regard to the difference in creep indices under compression and tension. L. Gordiyenko. [Translation of abstract]

SUB CODE: 11,20

Card 1/1 bab

UDC: 539.376:669.715

TIKHOMIROV, V.N.; BOGOYAVLENSKIY, G.; SHTIL'MARK, R.

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Mr-Ap '62. (MIRA 15:2)  
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BOGOYAVLENSKIY, G.

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by M.A.Solomovich. Reviewed by G.Bogoiavlenskii. Geog. v shkole  
26 no.1:87-88 Ja-F '63. (MIRA 16:5)  
(Geography--Study and teaching) (Solomovich, M.A.)



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2. USSR (600)
4. Geology and Geography
7. News of the All-Union Geographical Society, (Vol. 79, Moscow-Leningrad, Press of Acad Sci USSR, 1947)  
Reviewed by G. P. Bogoyavlenskly, Sov. Kulga, No. 2, 1948.

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DLC: Unclass.

SO: LC, Soviet Geography, Part I, 1951, Uncl.



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BOGOYVALENSKIY, G.Ġ,

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Reviewed by G.P. Bogoyavlenskiy  
Geog. v shkole no. 3, 1952

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Reviewed by G.P. Bogoyavlanskiy  
G<sup>E</sup>og. v shkole, no. 4, 1952



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(*Renewals - ?*)

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7. Problems of Geography, a journal. (Scientific Symposia of Moscow Affiliate of Geographic Society of USSR Symposium 18: Higher Geographical Education, 1950). (Moscow, Geographical Press). Reviewed by P. G. Kochergin and G. P. Bogoyavlenskiy, Sov. Kniga, No. 10, 1952:

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School work of a geography teacher on local lore. Reviewed by G. Bogoyavlenskiy. Geog. v shkole no.3:77-78 My-Je '53. (MLRA 6:6)  
(Kalinin, F.P.) (Geography--Study and teaching)