

BOKSHTEIN, M.

Theorem on universal coefficients for spectral groups of
cohomologies of differential groups. Dokl. AN SSSR 148 no.5:
997-1000 F '63. (MIRA 16:3)

1. Moskovskiy aviatsionnyy tekhnologicheskii institut. Predstavleno
akademikom P.S.Novikovym.
(Abelian groups) (Homology theory)

BOKSHTEYN, M. F.

Teoremy sushchestvovaniya i edinstvennosti resheniy sistem obyknovennykh differentsial'nykh uravneniy. M., Uchen, Zap. Un-ta. 15 (1939), 3-72.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A.G.,
Markushevich, A.I.,
Rashevskiy, P.K.
Moscow-Leningrad, 1948.

0000

Eokštejn, M. On the Alexander-Kolmogorov duality theo-
rem. Doklady Akad. Nauk SSSR. (N.S.) 59, 631-633
(1948). (Russian)

By a modification of a proof due to P. Alexandroff [Trans.
Amer. Math. Soc. 49, 41-105 (1941); these Rev. 2, 323] of
the Alexander-Kolmogorov duality theorem, the author
eliminates the condition that the locally bicomact Haus-
dorff space R of that theorem be a normal space.
L. Zippin (Flushing, N. Y.).

Source: Mathematical Reviews,

Vol

No.

DOKSHTEYN, M.

Dokstein, M. On the dimension of a topological product. Doklady Akad. Nauk SSSR (N.S.) 63, 221-223 (1948). (Russian)

This announces a complete analysis of the dimension of a topological product $A \times B$ of bicompact spaces, based upon a knowledge of the homology-dimensions of A and B over certain designated coefficient groups. These groups, denoted by R, R_p, C_p, Q_p , are not identified in the note; references for this and other points of notation and of fact are to earlier papers by the author [C. R. (Doklady) Acad. Sci. USSR (N.S.) 37, 243-245 (1942); 38, 187-189 (1943); 40, 339-342 (1943); same Doklady (N.S.) 59, 631-633 (1948); these Rev. 5, 48, 104; 6, 97; 9, 523]. The pertinence of these groups lies in the fact (stated as an older result of the author) that they give sufficient knowledge for the problem.

The author introduces new invariants of four types. The first, denoted by $D_0(A)$, is defined to be the largest integer q for which there exists a subset A' of A whose q -dimensional homology group over integral coefficients contains an element of infinite order. The set A' is required to be of the topological type of a set-difference of two open subsets of

a bicompact space. The other invariants, $d_1(A), \Delta_p(A), \delta_p(A)$, p a prime, have analogous but somewhat more intricate definitions depending in part on certain projection spectra not defined in the paper. Formulas are given for calculating these invariants for a topological product, e.g., $D_0(A \times B) = D_0(A) + D_0(B)$. Another one is:

$$\Delta_p(A \times B) = \max \{ \Delta_p(A) + \Delta_p(B), d_p(A) + \Delta_p(B), \Delta_p(A) + d_p(B), \Delta_p(A) + \delta_p(B) + 1 \}.$$

These invariants are related to the homology dimensions of A by formulas of which these two may suffice: $\dim_{\mathbb{Z}} A = D_0(A)$, and $\dim_{\mathbb{Z}} A = \max \{ D_0(A), \Delta_p(A) + 1 \}$.

The principal theorem states that the homology dimension of $A \times B$ for coefficient groups R and C_p is the sum of the corresponding dimensions, and gives formulas for calculating this dimension for the coefficients R_p and Q_p . The formula for the group Q_p reads:

$$\dim_{Q_p}(A \times B) = \max \{ \dim_{C_p} A + \dim_{C_p} B, \dim_{C_p} A + \dim_{C_p} B - 1 \}.$$

The author remarks that one of his earlier papers, the third referred to above, has certain lacunae which the present work will take into account. *L. Zippin.*

Source: Mathematical Reviews,

Vol. 10 No. 11

BOOKSHELF, VI. 1

Math

Bokstein, M. V. Duality theorem for locally bicom-
pact spaces, Moskov. Gos. Univ. Uč. Zap. 145, Mat. 3
(1949), 131-164. (Russian)

1-FW

The author gives a complete, and very detailed, proof of the Alexander-Kolmogorov duality theorem. If R is locally compact Hausdorff, A a closed subset, $H^q(R) = H^{q+1}(R) = 0$, the $H^q(A) \approx H^{q+1}(R-A)$. R is not assumed normal. The cohomology groups H^q are based on finite open coverings in the sense of Aleksandrov [finite set of pairwise different open sets with R as union, closed under intersection]. They are essentially groups with compact carriers: the value of a co-chain on a simplex of the nerve is 0, if one of the vertices is a set whose closure is not compact. The main new auxiliary concept is that of "covering regular with respect to A ", meaning that any set v in the covering with compact closure \bar{v} and with $v \cap A = \emptyset$ has $\bar{v} \cap A = \emptyset$.

H. Samelson.

SM
MT

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ДОКЛАДЫН. М. П.

Bokstein, M. F. On a prime dominant of sets. 1 - T/W
Mat. Sb. N.S. 26(78), 311-334 (1955). (Russian)

Denote by A an arbitrary closed bounded subset of a Euclidean space, and by $\dim A$ its dimension. P. Alexandroff [Math. Ann. 105, 161-238 (1932)] has introduced the dimension $\Delta_m A$ of A modulo m , m an integer ≥ 2 . The author denotes by $\dim_m A$ the dimension of A with respect to the dominant m , and has proved [Fund. Math. 34, 311-315 (1947); MR 10, 56] that $\dim A = \max \dim_m A$. The (prime) dominant of a set A is the set of all (prime) m with $\dim_m A = \dim A$; the (prime) subdominant the set of all (prime) m with $\Delta_m A = \dim A$. Previous results of the author show that the prime dominant determines the dominant, and the prime subdominant the subdominant. In this paper, the structure of these four sets are completely characterized. It is shown that no new relations hold. More precisely, if D is any non-empty set of primes and S an arbitrary subset of D , then there exists an A whose prime dominant is D and whose prime subdominant is S .

E. E. Floyd (Charlottesville, Va.)

Sum

BOKSHEYN, M. F.

Call Nr: AF 1108825

Transactions of the Third All-union Mathematical Congress (Cont.) Moscow,
Jun-Jul '56, Trudy '56, V. 1, Sect. Rpts., Izdatel'stvo AN SSSR, Moscow, 1956, 237 pp.
Section of Topology 133-137

Reports of the following personalities are included:

Bokshteyn, M. F. (Moscow). On Nomologic Dimension of
Topological Spaces.

133

Gordon, I. I. (Gor'kiy). On Continuous Functions
Defined on Spheres.

133-134

Mention is made of Pontryagin, L. S.

There are 3 references, 2 of which are USSR, and 1 is English.

Yefremovich, V. A. (Ivanovo). Proximity Properties in
Manifolds.

134-135

Mention is made of Ramm, N. S., Shvarts, A. S., Khodova, R.,
Tikhomirova, E., Yarutkin, N. and Pontryagin, L.

Card 43/80

Dolbetein, M. F. Homology invariants of topological spaces. Trudy Moskov. Mat. Obsc. 5 (1956), 3-80. (Russian)

Doc. ID: A66012

This paper is concerned with the relations between the cohomology rings (V-rings) of a locally compact Hausdorff space A over various coefficient rings. Aleksandrov's definition of cohomology (essentially commutative with compact carriers) is used. Let Z_k denote the integers ($=Z_0$) reduced mod k . Let m divide m' ($m > 0, m' \geq 0$), the obvious maps of $Z_{m'}$ onto Z_m , resp. of Z_m into $Z_{m'}$, induce maps of the cohomology rings over these groups, denoted by $\pi_m^{m'}$, resp. $\tilde{\omega}_m^{m'}$. The π 's are multiplicative, the $\tilde{\omega}$'s satisfy a somewhat different law. The set of V-rings $H^*(A, Z_k)$ ($k=0, 1, 2, \dots$) together with all the π 's and $\tilde{\omega}$'s is called the modular cohom-spectrum of A . Paragraph 2 discusses two three-manifolds whose cohomology V-rings are isomorphic, but whose V-rings over Z_k are different. Paragraph 3 proves that the modular spectrum determines the V-ring over any coefficient ring R . The ring $H^*(A, R)$ is constructed by an algebraic procedure similar to the tensor product. It begins with the formal sum $\sum r_i \pi_i(m_i)$, where $\pi_i(m_i) \in H^*(A, Z_{m_i})$, $r_i \in R$, and $m_i \geq 0$. Multiplication and certain identifications of these sums are introduced, with the π 's and $\tilde{\omega}$'s intervening. Paragraph 4 gives a criterion for such a formal sum to be equivalent to 0 under the identifications. Paragraph 5

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BOKSTEIN, M. F.

brings a proof of the universality of integral cohomology for the cohomology groups (U-product omitted), essentially Steenrod's theorem. Use is made of the Bokstein-Whitney operator, associated with the exact coefficient sequences $0 \rightarrow Z_n \rightarrow Z_n \rightarrow Z_m \rightarrow 0$ and $0 \rightarrow Z_n \rightarrow Z_m \rightarrow Z_m \rightarrow 0$ and the induced exact cohom. triangles (although not in this language). Ch. II concerns dimension (cohom. dimension) $\text{Dim}_G A$ over a group G , defined as the largest q for which there exists an open set A' with $H^q(A', G) \neq 0$. The main theorem states that $\text{Dim}_G A$ can be computed for arbitrary G , if it is known for the following G 's: The rationals, the p -adic rationals (denominator prime to p), the cyclic groups Z_p , and the groups Z_{p^k} (all roots of unity of order a power of p), p running through all primes. [A set of groups which determines $\text{Dim}_G A$ for arbitrary G is called a full system of coefficient groups for cohomological dimension.] A sharper statement is made: To an arbitrary G one associates a subset S_G of the groups listed above, depending on whether G contains elements of infinite order, elements of order p , etc.; $\text{Dim}_G A$ is simply $\max\{\text{Dim}_H A : H \in S_G\}$. The proof rests on lemmas of the following form: If G and $H^q(A, Z)$ contain elements of infinite order, then $H^q(A, G) \neq 0$. The constructions of paragraphs 3, 4 are used here. — A second part, to appear in the same Trudy will treat product spaces.

H. Samelson.

SECRET

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BOKSHTEYN, M.F.

New proof of the basic theorem of the homologous dimensionality
theory. Uch. zap. Mosk. un. no.181:13-44 '56. (MLBA 10:4)
(Topology)

ДОКЛАДЫ

PHASE I BOOK EXPLOITATION

156

Moskovskoye matematicheskoye obshchestvo

Trudy, t.6 (Transactions of the Moscow Mathematical Society, v.6)
Moscow, Gostekhizdat, 1957. 485 p 1,550 copies printed.

Editors: Aleksandrov, P.S.; Gel'fand, I.M.; Golovin, O. N.
Ed. of v. 6: Lapko, A.F.; Tech. Ed.: Gavrilov, S.S.;
Corrector: Yedskaya, I.L.

PURPOSE: This book presents original papers submitted to the
Moscow Mathematical Society and is intended for mathematicians
and others with strong mathematical backgrounds.

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Transactions of the Moscow Mathematical Society

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COVERAGE: Volume six contains 9 articles concerning problems in different fields of mathematics and 3 extracts from letters to the editor presenting notes and corrections to articles published in previous volumes. The contributions contained in this book are Soviet. See Table of Contents below for personalities and bibliography and for a brief coverage of each article.

TABLE OF

CONTENTS: Bokshteyn, M.F. Homological Invariants of Topological Spaces, Part II

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Part I of this article was printed in Volume Five of the Transactions of the Moscow Mathematical Society. The basic results given in the article were presented at the December 14, 1954 session of the Moscow Mathematical Society. There are 28 references, of which 16 are Soviet, 6 English, 5 French and 1 German. Soviet personalities mentioned include Aleksandrov, P.S., Boltyanskiy, V., Glezerman, M., Pontryagin, L.S., and Kurosh, A.G., all of whom have published work on topology and the theory of groups.

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Transactions of the Moscow Mathematical Society

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The Table of contents for Part 2, Chapters III and IV is as follows:

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Skornyakov, L.A. Systems of Plane Curves	135

This article was presented at the November 16, 1954 session of the Moscow Mathematical Society. The results of the article were published without proof under the same title in Doklady Akademii Nauk, SSSR, 1954, Vol. 98, Nr. 1. There are 5 references, 3 of which are Soviet (1 translation) and 2 English. The Soviet personality mentioned, Aleksandrov, P.S., is the author of two referenced papers on combinatorial topology and the theory of sets.

Card 4/17

The definition of curves in a Euclidean plane π is given and the terminology used is established. The Σ set of curves under investigation satisfies the following condition: through any two points in a plane only one curve from Σ can be drawn; or, two different curves from Σ intersect at no more than one point. It is proven that any system of curves which satisfies the above condition is an infinite or central system.

Gurevich, G. B. Isomorphism Conditions of Standard Nullalgebras 165

The basic results of this article were presented at the October 5, 1954 session of the Moscow Mathematical Society. There are 4 references, all Soviet. One Soviet personality is mentioned; i.e., Sushkevich, A. K., author of a textbook on higher algebra.

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Transactions of the Moscow Mathematical Society

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The definitions of a standard nullalgebra and its code are given. A duality concept of two standard nullalgebras and their codes is introduced. The necessary and sufficient conditions for the isomorphism of two standard nullalgebras are investigated. It is proven that for $m \geq 3$, where m is the order of a nullalgebra, two standard nullalgebras are isomorphic when their codes either coincide or are dual. For degenerated cases ($m = 1$; $m = 2$) the conditions of isomorphism of two standard nullalgebras are also given.

Lyapunov, A. A. On Operations on Sets With Transfinite Indices 195

The basic conclusions of this article were presented at the September 27, 1955 session of the Moscow Mathematical Society. There are 16 references, of which 12 are Soviet, 3 French and 1 English. Soviet personalities mentioned include Novikov, P.S.; Luzin, N.N.; Arsenin, V.Ya.; Ochan, Yu.S.; Kolmogorov, A.N.; Glivenko, V.I.; Kantorovich, L.V.; and Livenson, Ye.M. The personalities mentioned above have all published work on the set theory.

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Transactions of the Moscow Mathematical Society

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Adyan, S. I. Insolubility of Certain Algorithmic Problems in the Theory of Groups

The basic conclusions of this article were presented at the October 18, 1955 session of the Moscow Mathematical Society. There were 4 references, all Soviet. Soviet personalities mentioned include Kurosh, A. G. and Novikov, P. S., both of whom have published work on the theory of groups.

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Transactions of the Moscow Mathematical Society

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The Table of Contents of this article is as follows:

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Plotkin, B. I. (Sverdlovsk) Radical and Semisimple Groups 299

The basic results of this article were presented at the February 15, 1955 session of the Moscow Mathematical Society. There are 30 references, of which 23 are Soviet, 6 English and 1 German. The following Soviet personalities are mentioned: Gol'berg, P. A.; Kontorovich, P. G.; Kurosh, A. G.; Kutyyev, K. M.; Mal'tsev, A. I.; Mayagkova, N. N.; Pekelis, S. A.; Petrovlovskaya, R. V.; Smirnov, D. M.; Charin, V. S.; Chernikov, S. N.; and Shmidt, O. Yu. These personalities have published work on the theory of groups. The Table of Contents of this article is as follows:

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Rashevskiy, P. K. On Linear Representation of Differential Groups and of Lie Groups With Nilpotent Radical	337

The basic conclusions of this article were presented at the October 5, 1954 session of the Moscow Mathematical Society. There are 8 references, all of which are Soviet including 3 translations. Soviet personalities mentioned are Dynkin, Ye. B. and Berezin, F. A., both of whom have published work on the theory of groups.

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The Table of Contents of this article is as follows:

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Berezin, F. A. Laplace Operators on Semisimple Lie Groups

372-462

The basic conclusions of this article were presented at the Moscow Mathematical Society on September 25, 1956. There are 26 references, of which 15 are Soviet (2 translations), 8 English, 2 French and 1 German. Soviet personalities mentioned are: Gel'fand, I. M.; Raykov, D. A.; Naymark, M. A.; Dynkin, Ye, B. and Onishchik, A. L.

An editorial note observes that the results obtained in this article coincide to a considerable extent with those published by Harich-Chandra in the Transactions of the American Mathematical Society in November 1956.

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Ladyzhenskaya, O. A. (Leningrad). On the Construction of Discontinuous Solutions of Quasilinear Hyperbolic Equations in the Form of Limits of Solutions of Corresponding Parabolic Equations, When the "Coefficient of Viscosity" Converges to Zero 465

The basic conclusions of this article were presented at the December 18, 1956 session of the Moscow Mathematical Society and were in part published in Doklady, Akademi Nauk SSSR, 1956, Vol. III, Nr 2. There are 10 references, 7 of which are Soviet including 1 translation and 3 English. Soviet personalities mentioned include Oleynik, O. A.; Tikhonov, A. N.; Samarskiy, A. A.; Venttsel, T. D.; Petrovskiy, I. G.; and Sobolev, S. L., all of whom have published papers on the theory of partial differential equations.

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From Letters to the Editor:

Levitan, B. M. Correction to the Paper on Asymptotic Behavior
of Spectral Function and the Expansion of the Equation

$\Delta u + \{\lambda - q(x_1, x_2, x_3)\}u = 0$ in Eigen functions
[Trudy Mosk. matem. o-va 4 (1955)] 481

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Transactions of the Moscow Mathematical Society 158

Iokhvidov, I. S. and Kreyn, M. G. Remarks on the Article,
"Spectral Theory of Operators in Spaces With Indefinite
Metric I" [Trudy Mosk. matem. o-va 5 (1956)] 486

Berezin, F. A. Correction to the Article, "Some Remarks on the
Theory of Spherical Functions on Symmetrical Riemannian Manifolds."
(Trudy Mosk. matem. o-va 5 (1956)) 486

AVAILABLE: Library of Congress

Card 17/17

LK/jmr
6-16-58

BOKSHTEYN, M.F.

Homologous invariants of topological spaces. Part 2. Trudy Mosk.mat.
ob-va 6:3-133 '57. (MIRA 10:11)

(Topology)

AUTHOR: Bokshteyn, M.

20-119-6-2/56

TITLE: Tensorial Products of Systems of Groups and Theorems on Universal Coefficients for Homologies and Cohomologies (Tensor-nyye proizvedeniya sistem grupp i teoremy ob universal'nykh koeffitsiyentakh dlya gomologiy i kogomologiy)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 119, Nr 6, pp 1066-1069 (USSR)

ABSTRACT: Let $H^q(X, G)$ be the q -dimensional spectral group of the cohomologies of the space X with respect to the coefficient group G ; $H_0^q(X) = H^q(X, I)$, where I is the additive group of the integers. Let \otimes denote the tensor product and \star the torsion product. Eilenberg and MacLane [Ref 2] showed for metric compacts that

$$(1) \quad H^q(X, G) \approx H_0^q(X) \otimes G + H_0^{q+1}(X) \star G .$$

Already two years ago the author [Ref 3] proved the universality of the group I in the general case. In the present paper the proof of [Ref 3] is shortened essentially and besides (1) is proved in the general case.

There are 9 references, 5 of which are Soviet, and 4 American.

PRESENTED: December 18, 1957, by P.S. Aleksandrov, Academician

Card 1/2

Tensorial Products of Systems of Groups and Theorems on
Universal Coefficients for Homologies and Cohomologies

20-119-6-2/56

SUBMITTED: December 17, 1957

Card 2/2

16(1)

AUTHOR: Bokshteyn, M.F. SOV/38-23-4-4/8

TITLE: Theorem on Universal Coefficients for Homology Groups of Torsionless Complexes of Groups

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya matematicheskaya, 1959, Vol 23, Nr 4, pp 529-564 (USSR)

ABSTRACT: The paper contains the proofs for the theorems announced by the author in [Ref 10, 11] in the Comptes Rendus. The author thanks M.M. Postnikov and A.S. Shvarts for valuable remarks. He mentions P.S. Aleksandrov. There are 12 references, 6 of which are Soviet, 3 American, 2 French, and 1 Dutch.

PRESENTED: by A.I. Mal'tsev, Academician

SUBMITTED: June 18, 1958

Card 1/1

16(1)

AUTHOR: Bokshteyn, M.

SOV/20-124-6-2/55

TITLE: On the Formula of Künneth in Homological Algebra (0 formule Kyunneta v gomologicheskoy algebre)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 6, pp 1187-1190 (USSR)

ABSTRACT: The author uses his former paper [Ref 4] and the results announced in the C.R.Acad.Sci.Paris [Ref 2, 3], especially the expression for the torsion product of two groups:

$$G * H = \left\{ \begin{matrix} G \\ m \end{matrix}; \begin{matrix} i^m \\ m' \\ m \end{matrix}, \begin{matrix} j^{m'} \\ m \end{matrix} \right\} \otimes \left\{ \begin{matrix} H \\ m \end{matrix}; \begin{matrix} j^{m'} \\ m \end{matrix}, \begin{matrix} i^m \\ m' \end{matrix} \right\}, \text{ in order to obtain}$$

the well-known formula $H(K \otimes L) / [H(K) \otimes H(L)] = H(K) * H(L)$
in the form

$$H(K \otimes L) \approx H(K) \otimes H(L) + H(K) * H(L).$$

There are 6 references, 3 of which are Soviet, 2 French, and 1 American.

ASSOCIATION: Moskovskiy aviatsionnyy tekhnologicheskii institut (Moscow Technological Aviation Institute)

PRESENTED: November 12, 1958, by P.S. Aleksandrov, Academician

SUBMITTED: November 11, 1958

Card 1/1

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S/140/60/000/003/003/011
C111/C222

16-5500

AUTHOR: Bokshateyn, M.F.

TITLE: Equivalence of Some Homological Definitions in the Topology 16

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika, 1960,
Nr.3, pp.62-80

TEXT: The author gives a direct proof of the theorem of A.N.Kolmogorov on the equivalence of inner cohomology groups of the locally bicomact Hausdorff space open imbedded in the bicomactum, with the relative cohomology groups of this bicomactum (cf.(Ref.1)). For the proof the author uses only the homological definitions of P.S. Aleksandrov (Ref.2) instead of the notions used by Kolmogorov in (Ref.1). Furthermore, the equivalence of the definition of the cohomology groups with the aid of the ordinary and multiplicative coverings, respectively, is proved in a more detailed way and in a greater number of cases than in (Ref.2). X

There are 11 references: 10 Soviet and 1 French.

[Abstracter's note: The understanding of the paper is aggravated, since

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C111/C222

Equivalence of Some Homological Definitions in the Topology

since the author uses not generally usual, somewhat changed notations of (Ref.2). (Ref.1) is a paper of A.Kolmogorov, C.r.Acad. sci. Paris, 1936, Vol.202, pp.1641-1642; (Ref.2) is a paper of P.S.Aleksandrov in Uch. zap. Mosk. un-ta, 1940, No.45, pp.3-60] X

ASSOCIATION: Moskovskiy aviatsionnyy tekhnologicheskii institut (Moscow Technological Aviation Institute)

SUBMITTED: May 11, 1959

Card 2/2

BOKSHEYN, M.F.

Second All-Union Conference on Topology. Usp.mat.nauk 15 no.3:
203-224 My-Je '60. (MIRA 13:10)

(Topology--Congresses)

BOKSHTEYN, M.F. (Moskva)

Complete modular spectrum of cohomology rings of the Tikhonov
product. Mat. sbor. 51 no.1:73-98 My '60. (MIRA 13:8)
(Topology)

BOKSHTEYN, M.F. (Moskva)

Correction to the article "Complete modular spectrum of cohomology
rings of the (tikhonov) product." Mat.sbor. 53 no.2:260-263 F '61.
(MIRA 14:5)

(Topology) (Homology theory)

BOKSHTEYN, M.

Splitting in Cunnet's formula. Dokl. AN SSSR 146 no.2:270-273
S '62. (MIRA 15:9)

1. Moskovskiy aviatsionnyy tekhnologicheskiy institut. Predstavleno
akademikom P.S. Aleksandrovym.
(Complexes)

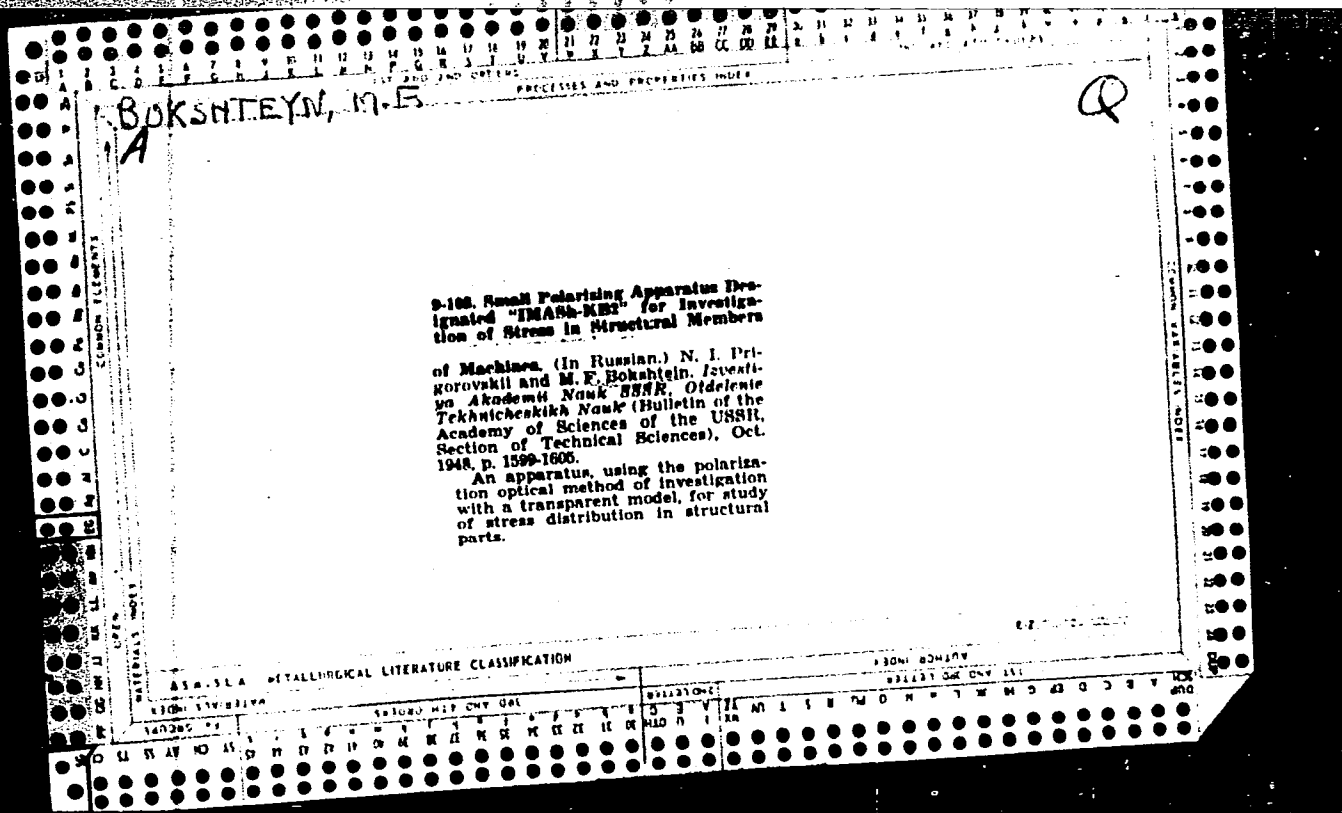
BOKSHTEYN, M.F.

CA

Optical methods for studying hydrocarbons. III. The combined scattering spectrum of paraffins P. A. Bazhulin, M. F. Bokshtein, A. L. Liberman, M. Yu.

Lukina, E. I. Margolis, O. P. Solovova and B. A. Kazanski. Bull. acad. sci. U. R. S. S., Classe sci. chim. 1963, 198-205 (English summary); cf. C. A. 37, 5315. Spectra are reported for 2,2-dimethylbutane, 2,3-dimethylbutane, 2,3-dimethylpentane, 2,4-dimethylpentane (I), 3,3-dimethylpentane, 2,2,3-trimethylbutane (II), 2,2-dimethylhexane, 2,3-dimethylhexane, 3,4-dimethylhexane, 2,2,3-trimethylpentane, 2,3,4-trimethylpentane, 2-methyl-3-ethylpentane, 3-methyl-3-ethylpentane, 2,2,3,3-tetramethylbutane and 2,2,3,3-trimethylpentane. The method used for the detns. is more accurate than that used in the previous work, but by applying a correction factor the results for the 2 series can be compared, giving data for all the paraffins with 5-8 C atoms. The results for the detns. agree in general with those of Rosenbaum, et al (C. A. 33, 8110), except in the case of I and II, whose spectra agree better with those detd. by Bonino and Manzoni-Analdi (C. A. 33, 4874). H. M. Leicester. The study of crystals with infrared rays. Andrea Leviardi. Inst. Anigraf. y geol., Univ. nac. Austral (Rosario, Arg.) Pub. No. 15, 15 pp. (1943) —A review. Cyrus Feldman

Sebedev Phys. Inst. AS USSR



ROKSHEYN M. F.

OCT. 48

USSR/Engineering
Stress Analysis
Machinery - Design

"Small-Size Polarization Equipment Type DMASH-KB2 for Studying the Tensions in Machine Parts,"
N. I. Prigorovskiy, M. F. Rokshteyn, Inst Mach Studies, Acad Sci USSR, 6 $\frac{1}{2}$ pp

"Iz Ak Nauk SSSR, Otdel Tekh Nauk" No 10

Equipment is designed for studying stress distributions in machine parts by optical polarization method using transparent models. Describes construction of apparatus, and investigates errors resulting therefrom, with three photographs, and three diagrams. Submitted 8 July 48

PA 21/49T34

1ST AND 2ND ORDERS PROCESSES AND PROPERTIES INDEX 3RD AND 4TH ORDERS

535.535

SA

AS-3

1882. Graphical calculation of polarization transformations. BOGOMOLY, M. E. *J. Tech. Phys., USSR*, 18 (No. 5) 673-8 (May, 1948) in Russian.—A graphical method is presented for calculating the transformations representing the polarized states of light, resulting from its passage through birefringent plates. The method is based on that of Poinsot and uses Wulf's net. The application of the method to obtaining circular polarization by combination of plates is considered as an example. B. P. K.

COMMON ELEMENTS

MATERIALS INDEX

ASS-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS 3RD AND 4TH ORDERS

BOKSHEYN, M. F.

USSR/Engineering - Testing Equipment - Stress Analysis

Mar 49

"The IMASH-KB2 Polarization Unit for the Study of Stresses," N. I. Prigorovskiy, M. F. Bokshteyn, Inst of Mach Sci, Acad Sci USSR, 9 pp

"Zavod Lab" Vol IV, No 3

Subject unit makes it possible to perform measurements on flat models as well as on cross sections of three-dimensional models, utilizing the "freezing" method. Complete description of IMASH-KB2 unit, with illustrations and diagrams.

pa 48/49T39

BOKSHEYN, M. F.

TA 151T101

USSR/Physics - Stress Analysis
Plastic Models

Oct 49

"Resolving Power of a Polarization Apparatus for the Study of Stresses," M. F. Bokshteyn, Inst of Mach Studies, Acad Sci USSR, 4 pp

"Zhur Tekh Fiz" Vol XIX, No 10

Showed reason for nonresolution of interference bands created by a model under tension is deflection of light in the model for high stress gradients. Established analogy between this phenomenon and diffraction of light in a fine structure. Submitted 17 Jul 48.

151T101

FROGHT, M.M.; BOKSHTEYN, M.F. [translator]; KRASONTOVICH, Yu.F., [translator];
PREYSS, A.K. [translator]; PRIGOROVSKIY, N.I., professor, redaktor;
SNITKO, I.K., redaktor; TUMARKINA, N.A., tekhnicheskiiy redaktor.

[Photoelasticity; polarisation-optical method of stress analysis]
Fotouprugost'; poliarizatsionno-opticheskiy metod issledovaniia
napriazhenii. Perevod s angliiskogo M.F.Bokshtein, IU.F.Krasonto-
vicha, A.K.Preiss. Pod red. N.I.Prigorovskogo. Moskva, Gos. izd-vo
tekhniko-teoret. lit-ry. Vol. 1. 1948. 432 p. Vol. 2. 1950. 488 p.
[Microfilm] (MLRA 8:2)
(Photoelasticity) (Strains and stresses)

BOKSHTELYN, N. F.

BOKSHTELYN, N. F. -- "INVESTIGATION OF THE TENSIONS ON VOLUMETRIC MODELS IN THE SCATTERING EFFECT OF LIGHT." SUB 5 OCT 52, INST OF MACHINE SCIENCE, ACAD SCI USSR (DISSERTATION FOR THE DEGREE OF CANDIDATE IN TECHNICAL SCIENCES)

SO: VECHERNAYA MOSKVA, JANUARY-DECEMBER 1952

BOKSHTEYN, M.F.

Dissertation by M.F.Bokshtein "Method of examining tension in volumetric transparent models in diffused light." Izv. AN SSSR Otd.tekh.nauk no.8:1211-1212 Ag '53.
(MLR 6:8)
(Optics, Physical)

9349

NEW MATERIAL, "GLIFTAMAL," FOR TESTING STRESS OF
FLAT MODELS BY USING POLARIZATION-OPTICAL
METHOD

M. P. Dokshina, N. I. Prigorovskii, S. I. Sokolov, and N. A. Shebegolevskaya. *Izvest. Akad. Nauk S.S.S.R. Otdel. Tekh. Nauk* No. 2, 139-41(1956) Feb. (in Russian)

A new type material "gliftamal" was developed for testing flat models at room temperature with reduced polymerization. "Gliftamal" is the product of pentaerythrite, glycerin, and diethylene glycol condensation with maleic and phthalate anhydrides. The material has a solidification time of 2 months. Disk-shaped samples were tested in polariscope under diameter compression. The relations of m layers to the stresses and to the length of time under stress were determined. Selected samples showed optic proportionality of 30 bands calculated for 7 mm thickness. Tabular results are given. (R.V.J.)

Handwritten: 1/27/56

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BOKSHTEYN, M.F.; FREYSS, A.E.

Doubling of light rays in large IMASH-KB2 polarization machines.
Zav. lab. 23 no.5:636-638 '57. (MLRA 10:8)

1. Institut mashinovedeniya Akademii nauk SSSR.
(Polarisation (Light))

BOKSHEYN, M.F.; kand. tekhn. nauk; ZABUGINA, N.A., inzh; PRIGOROVSKIY, N.I.,
prof.; doktor tekhn. nauk; KHURSHUDOV, G.Kh., inzh.

Using models made of plastics in investigating stresses in
large-size presses. Vest. mash. 39 no.1:69-74 Ja '59.

(Power presses--Models) (Strains and stresses)

(MIRA 12:1)

BOKSHEYN, M.F.

Geometrical analysis of polarization of light during the trans-
lucense of optically sensitive materials. Probl.proch.v mashinostr.
no.8:73-117 '62. (MIRA 16:1)

(Polarisation (Light))

BOKSHTEYN, M.F.

Multiple Künneth formulas. Izv. AN SSSR. Ser. mat. 27 no.2:467-482
Mr-Apr '63. (MIRA 16:4)
(Homology theory) (Groups, Theory of)

ACC NR AR0020077

SOURCE CODE: UR/0124/66/000/001/V088/V089

AUTHOR: Bokshteyn, M. F.; Prigorovskiy, N. I. 24

TITLE: Development of a wide-field polariscope

SOURCE: Ref zh. Mekhanika, Abs. 1V718

REF SOURCE: Sb. Polyarizats.-optich. metod issled. napryazheniy, M., Nauka, 1965, 5-13

TOPIC TAGS: polarimeter, stress analysis, polarizing filter, model

ABSTRACT: Data are given on a new polariscope for studying stresses on the basis of two- and three-dimensional transparent models. The instrument has a field diameter of 250 mm and interchangeable light sources (a mercury tube, motion picture projection lamp and spectral tube). The light sources are mounted on a rotating turret and provision is made for independent adjustment of the individual lamps in three mutually perpendicular directions. The optical system of the polariscope projects a 1.8x image on the screen of the instrument, and a 4x image on a wall screen. The load unit may be used for both vertical and horizontal loading of the model to 2 tons. The polariscope is equipped with a 24x30 cm camera with a mirror unit. The system contains light splitters for multiple passage of a beam through the model or for producing a band pattern of higher contrast using the multiple-interference method, an attachment for

xCard 1/2

ACC NR: AR6020077

doubling interference orders in studying thin sections and models made from low-modulus materials, and a compensator tube for measuring path difference at points in the model or sections by the compensation method. The tube of a polarization microscope is used in this capacity to permit utilization of the compensator, drawing equipment and a photomicrographic adapter. The compensator tube may be rotated about its optical axis by the control shaft of a selsyn with readout of the angles of turn on a dial with an accuracy of 0.1° . The polaroids in the polarizer and analyzer may be rotated from a remote control panel. One or both polaroids in the analyzer and polarizer are rotated by receiver selsyns through rotation of a control selsyn on the panel. Rotation of the polaroid in the polarizer is synchronized by selsyns with rotation of the compensator tube. V. D. Kopytov. [Translation of abstract]

SUB CODE: 11, 20

Card 2/2 *lrm*

ACC NR: AT6000917 IJP(c) WW/EM/GS/RM SOURCE CODE: UR/0000/65/000/000/0094/0106

AUTHOR: Bokshteyn, M. F.

ORG: none

TITLE: Polarization-optical investigations of stresses near openings in a shell loaded by an internal pressure

SOURCE: AN SSSR. Institut mashinovedeniya. Polyarizatsionno-opticheskiy metod issledovaniya napryazheniy; problemy prochnosti v mashinostroyenii (Polarizing-optical method of investigating stresses; problems of durability in machinery manufacture). Moscow, Izd-vo "Nauka", 1965, 94-106

TOPIC TAGS: ~~nozzle geometry, orifice outflow, stress measurement~~, stress analysis, photoelasticity, pressure vessel, ellipsoidal shell structure

ABSTRACT: Photoelastic stress studies were made on a model of a pressure vessel with orifices. The model (see Fig. 1) is a shell segment with an internal surface in the form of half of a compressed ellipsoid of rotation with semi-major axis a_1 and semi-minor axis $b_1 = 0.5 a_1$, and with z being the shell's axis of symmetry. The shell is of a constant thickness $d = 0.2 a_1$ and it contains nineteen cylindrical orifices each of radius $\rho = 0.12 a_1$. The model is constructed of material ED6-M. It was "frozen" in

Card 1/3

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44
42
B+1

24

2

ACC NR: AT6000917

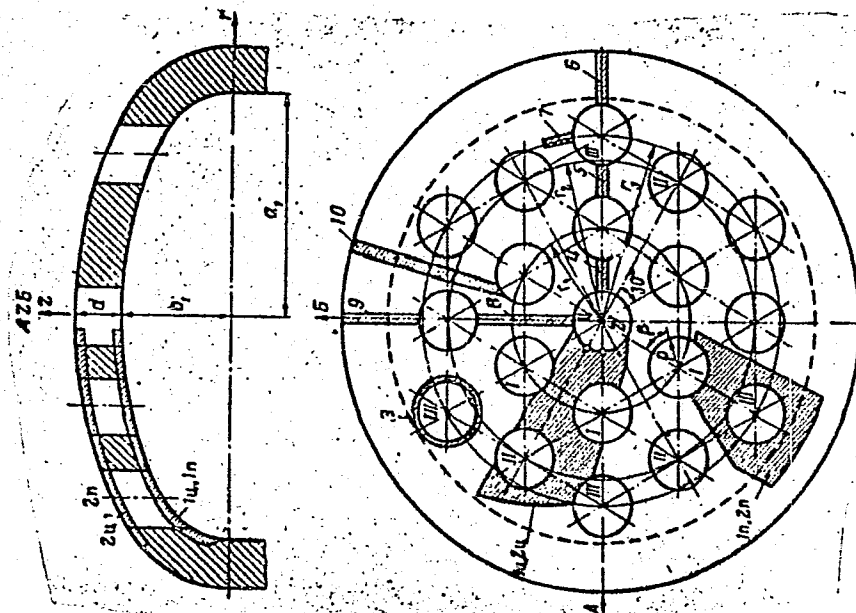


Fig. 1. Form of the shell: $b_1 = 0.5a_1$; $d = 0.2a_1$; $\rho = 0.12a_1$; $r_1 = 0.39a_1$; $r_2 = 0.67a_1$; $r_3 = 0.78a_1$. For this model $2a_1 = 137$ mm; 1 - 10 are sections.

glycerin under an internal pressure load of 0.250 kg/cm^2 (see N. I. Prigorovskiy (Ed) *Napryazheniya i deformatsii v detalyakh i uzlakh mashin*. Mashgiz, 1961). Shell

Card 2/3

L 13478-66

ACC NR: AT6000917

9M 2

sections were immersed in a bromonaphtalene- α and petroleum jelly bath, and stresses were measured on a polarization microscope with a KPK compensator. Trajectories of semi-principal stresses were measured for several sections of the model. Use is made of the formula

$$\bar{\delta}_s = (\sigma_{s1} - \sigma_{s2}) = \sigma_0 \frac{m_s}{s}$$

where $\bar{\delta}_s$ is the mean difference of semi-principal stresses σ_{s1} and σ_{s2} , m_s is the order of the interference band, and s is the light path. Variations of the formula are developed for various conditions of stress and for various geometrical configurations of sections. Mean stress coefficients are computed with the aid of supporting stress-strain curves obtained from the photoelastic measurements. Several cases are defined in correspondence with the sections observed in the experiments. Orig. art. has: 9 figures and 19 equations.

SUB CODE: 20,13/ SUBM DATE: 03Apr65/ ORIG REF: 008

Card 3/3 *AK*

BOKSHTEYN, M.YE.

"

Roentgenologic examination of the pelvis in pregnancy and labor
Akush 1 gin. no. 2, 1952
Kandidat Medishinskikh Nauk

LEYKINA, Ye. S.; GAYKO, B.A.; CHELYSHEVA, K.M.; BOKSHEYN, M.Ye.

Early immunodiagnosis of ascariasis in man and its clinical and epidemiologic significance. Klin. med., Moskva 30 no. 11:49-53
Nov 1952. (CML 23:5)

1. Of the Helminthological Sector of the Institute of Malaria, Medical Parasitology and Helminthology of the Ministry of Public Health USSR (Director of Institute -- Prof. P. G. Sergiyev, Active Member of the Academy of Medical Sciences USSR; Head of Sector -- Prof. V. P. Pod'yapol'skaya), Moscow.

BOKSHEYN, M. Ye., kand. med. nauk.; LEYKINA, M.S. (Solnechnogorsk, Moskovskoy obl.)

Contrast study of the knee joint in meniscal injuries. Ortop. travm. protez., Moskva 19 no.6:30-33 N-D '58. (MIRA 12:1)

(KNEE, wds. & inj.

meniscus. diag. value of contrast arthrography (Rus))

KOROLEV, M.F., polkovnik meditsinskoy sluzhby; BOKSHTEYN, M.Ye., podpolkovnik meditsinskoy sluzhby, kand.med.nauk; GAL'PERIN, Yu.B., podpolkovnik meditsinskoy sluzhby

Some problems in the differential diagnosis of chronic highmoritis.
Voen.-med.zhur. no.12:54-57 '59. (MIRA 14:1)
(SINUSITIS)

BOKSHTEYN, M.Ye., podpolkovnik meditsinskoy sluzhby, kand.med.nauk; KVITASH,
V.A., podpolkovnik meditsinskoy sluzhby, kand.med.nauk

Clinical importance of the early stages of degenerative diseases
of the spine. Voen.-med.zhur. no.12:72-75 '59. (MIRA 14:1)
(SPINE--DISEASES)

LIUBUSHIN, A.A.; BOKSHEIN, M.Ye.

Case of malignant synovioma of the diaphragm. Klin. med. 38
no. 4:136-140 Ap '60. (MIRA 14:1)
(DIAPHRAGM—CANCER)

LOGINOV, A.S., kand. med. nauk; BOESHTEYN, M.Ye., kand. med. nauk

Comparison of laparoscopy and roentgenologic findings in
diseases of the liver and bile ducts. Sov. med. 27 no.10:
91-97 0 '63. (MIRA 17:6)

1. Iz Instituta terapii (dir.-deystvitel'nyy chlen AN SSSR prof.
A.I. Myasnikov) AN SSSR.

ACCESSION NR: AP4013291

S/0135/64/000/002/0011/0011

AUTHORS: Katler, S. M. (Candidate of technical sciences); Bekshteyn, R. L.
(Engineer)

TITLE: Welding of pipes to pipe boards with a cylindrical arc regulated by a magnetic field

SOURCE: Svarochnoye proizvodstvo, no. 2, 1964, 11-14

TOPIC TAGS: welding, pipe welding, arc welding, cylindrical arc, magnetic welding regulation, steel welding, 1Kh18N9T steel, argon arc welding, ring electrode

ABSTRACT: The article presents the results obtained in the experimental welding of pipes to pipe-boards by the procedure developed at the VNIIESO. This method involved using an annular arc under argon, with the anode and cathode points rotating in a magnetic field. The arc was activated between the welded object and an infusible electrode shaped to fit the object being welded (in this case a ring). The electrode was cooled by running water. The pipes were 6, 15, 28 and 29 mm in diameter and varied from 1 to 2 mm in thickness. They were welded to the boards

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ACCESSION NR: AP4013291

10 mm thick made of steel 1Kh18N9T. It was established that: 1) best results were obtained when current was delivered in pulses and the arc was reversed during each pulse; 2) the optimal length of the pipe-end projecting above the board was 0.2-0.5 mm for pipe diameter 6 mm, 0.5-1 mm for 15 and 28 mm diameters, and 0.5-1.5 mm for 29 mm diameter; 3) the optimal clearance between the pipe (29 mm in diameter) and the opening in the pipe-board was 1 mm; 4) the optimal electrode diameter for welding with an annular groove was 28-29 mm (for 29 mm pipes) and 31 mm for welding without encircling grooves. "Engineer A. I. Zakrzhevskiy participated in the experimental work." Orig. art. has: 5 tables and 6 figures.

ASSOCIATION: VNIIESO

SUBMITTED: 00

DATE ACQ: 26Feb64

ENCL: 00

SUB CODE: ML

NO REF SOV: 001

OTHER: 001

Card 2/2

BOKSHTEYN, S.Ya.

Circulating air separators for cement grinding. TSement 26
no.2:26-28 ~~Ms-Ap~~ '60. (MIRA 13:6)
(Cement) (Milling machinery)

ACCESSION NR: AP4034900

S/0181/64/006/005/1261/1266

AUTHORS: Bokshayn, S. Z.; Kishkin, S. T.; Nazarova, M. P.; Svetlov, I. L.; Umantsev, E. L.

TITLE: Growth of sapphire whisker

SOURCE: Fizika tverdogo tela, v. 6, no. 5, 1964, 1261-1266

TOPIC TAGS: whisker crystal, crystal growth, sapphire, sapphire whisker

ABSTRACT: Whisker crystals of Al_2O_3 were grown by high-temperature oxidation of powdered metallic Al in an atmosphere of moist hydrogen. The reaction temperature was 1350-1400C. The authors describe a special apparatus used for growing these crystals, which consists of three essential parts: a tubular furnace, a hydrogen source, and a system for purification and control of hydrogen feed. The whisker crystals ranged from 1 to 30 μ in diameter and from 3 to 15 mm in length. Microcrystals ranged from 30 to 350 μ in diameter, and 0.5 to 3 mm in length. Capillaries were observed along the growth axes of some crystals.

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ACCESSION NR: AP4034900

Growth of the whisker crystals is explained on the basis of Frank's theory of crystal growth by screw dislocations. Hexagonal crystal nuclei form in sites where the screw axes emerge with Burgers vector $[0001]$. Since the dislocations are at right angles to the basal planes, all the whiskers grow parallel to each other in the $[0001]$ direction.

Because of a high modulus of elasticity ($52,000 \text{ kg/mm}^2$) and a large Burgers vector of dislocations along the $[0001]$ direction, the elastic energy of the dislocation nuclei exceeds the bonding energy of atoms in the crystal lattice. This fact leads to rupture of the lattice, which is then manifested in capillaries along the growth axes of the crystals. Laue patterns and immersion studies show the crystals to belong to the alpha modification of Al_2O_3 (sapphire). "In conclusion, we thank Ye. V. Kolontsov and I. V. Telegin for their aid in the interpretation of the x-ray patterns." Orig. art. has 5 figures, 1 table, and 3 formulas.

ASSOCIATION: none

SUBMITTED: 08Feb63

ATD PRESS: 3048

ENCL: 00

SUB CODE: SS

NO REF SOV: 001

OTHER: 006

Card: 2/2

BOKSHTEYN, S.A.; BRONFIN, M.B.; KISHKIN, S.T.; MARICHEV, V.A.

Internal friction of deformed molybdenum and its alloys with
zirconium and rhenium. Fiz. tver. tela 5 no.11:3075-3080 N
'63. (MIRA 16:12)

BOKSHTEYN, S.Z., doktor tekhn. nauk, prof.; KUNYAVSKAYA, T.M.,
red.

[Diffusion processes, structure and properties of metal;
collected articles] Protsessy diffuzii, struktura i svoistva
metallov; sbornik statei. Moskva, Mashinostroenie, 1964.
188 p. (MIRA 17:4)

BOKSHTEYN, S.Z.; SVETLOV, I.L.

Effect of alloying on the strength characteristics of
copper whiskers. Fiz. tver. tela 5 no.6:1749-1750 Je '63.
(MIRA 16:7)

ACCESSION NR: AP4009380

S/0126/63/016/006/0872/0876

AUTHOR: Balalayev, Yu. F.; Bokshteyn, S. Z.

TITLE: Ultrasonic high-temperature heating and its use for thermal treatment in studies of metals and alloys

SOURCE: Fizika metallov i metallovedeniye, v. 16, no. 6, 1963, 872-876

TOPIC TAGS: ultrasound, ultrasonic heating, ultrasonic high temperature heating, metal heat treatment, alloy heat treatment, steel, martensite, 30KhGSA steel, heat conduction, aluminum, iron

ABSTRACT: The authors used a new ultrasonic heating technique for the thermal treatment of metallic rods in order to study the condition and behavior of the granules, the processes of recrystallization, and the martensitic and other transformations in the solid phase. Longitudinal waves with a frequency of 18-27 kilocycles/sec and a stress amplitude somewhat lower than the fatigue limit of the material were produced by a compound resonance system with a magnetostrictive stimulator and energy concentrator as described in a previous paper (Balalayev, Yu. F. Zavodskaya laboratoriya, 1960, No. 5). As shown by the example of a steel specimen heated to the burning stage by internal friction with elastic vibrations having a frequency of about 20 kilocycles/sec and a stress amplitude of 3-15

Card 1/3

ACCESSION NR: AP4009380

kg/mm², only the central part of the sample attains a high temperature since the stress along its axis changes according to the sinusoidal law. In the established method of heating to temperatures above the critical point for phase transformations, the thermal losses from the surface of the sample are equal to its internal potential. As the result of the sinusoidal distribution of stresses and the cooling effect at the extremities of the sample, a temperature gradient appears resulting in a gradation of structures corresponding to different heating temperatures in the same sample. At a definite stage, one observes a rapid local increase in temperature and the destruction of the sample, the rapid development of fissures being accompanied locally by a bright luminescence along the path of propagation. Studies have shown that samples made of technical iron and steels, as well as technical grades of aluminum, heat rapidly in the annealed state. Weak hardening increases the tendency of samples to heat rapidly and to form fissures. Strongly hardened samples do not heat easily; for their heating internal friction is preferred, temperatures above 1000C being attained by ultrasound. A mathematical treatment is given for the active potential of loss at the expense of the viscosity component of the internal friction, as well as for the overheating temperature, using A. G. Spektor's formulae. Such an analysis is made possible by the fact that the statistical model of a double-component system with resilient limits and elastic granules coincides with the model of a heterogeneous conductor. In both cases, the statistical model can be represent-

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ACCESSION NR: AP4009380

ed by a plate whose two opposite surfaces emanate heat. In this particular case, the distance between the two parallel surfaces is considered to be equal to the average size of the granules. Studies using the ultrasonic technique showed that the main characteristic of this method is the phenomenon of microfocal superheating of the viscous regions, resulting in a specific effect on the microstructure of the steel. Intensive relaxation with a high frequency and amplitude of vibrations sometimes provokes such rapid heat loss that the recrystallization becomes insignificant; in some other cases, the local overheating of viscous components provokes local recrystallization. An investigation of samples of 30 KhGSA steel, hardened in water after ultrasonic heating, showed a different martensitic pickling at the boundaries of the granules than in the body proper, which can be explained by overheating at the boundaries. Orig. art. has: 3 figures and 3 formulas.

ASSOCIATION: Voronezhskiy politekhnicheskiy institut (Voronezh Polytechnical Institute)

SUBMITTED: 26Feb63

DATE ACQ: 03Feb64

ENCL: 00

SUB CODE: ML

NO REF SOV: 008

OTHER: 001

Card 3/3

BOKSHTEIN, S. Z.

USSR/Metals

Nov 1947

Charges, Electrostatic
Alloys - Properties

IA 38185

"Nature of Sensitivity to Concentrations of Charges by
Highly Tensile Alloys," S. Z. Bokshstein, S. T. Kishkin,
3 1/2 pp

SSR
"Dokl Ak Nauk" Vol LVIII, No 4

Extreme sensitivity of highly tensile alloys to con-
centrations of charges has for many years prevented
use of such alloys in industries. It appeared that
highly stable materials could in no way be adapted to
use in machinery. Author explains this phenomenon,
which is particularly noticeable in open-hearth steel,

USSR/Metals (Contd)

38185
Nov 1947

and discusses results of experiments. Submitted by
Academician A. A. Bochvar, 17 May 1947.

38185

CA

2

The carbide phase in the tempering of alloy steel. S. Z. Hukhstein, *Zhur. Tekh. Fiz.* 19, 532-41 (1949).—The gradual passage of Cr into the carbide phase in a 3.6% Cr steel (C 0.41, Mn 0.45, Si 0.35, Ni 0.16%) on isothermal tempering at 530° of the alloy initially quenched from 1050°, was demonstrated by analyses of the carbide residue obtained by electrolytic soln. of the metal in 1 N KCl with 0.5% citric acid, c.d. 0.02-0.03 amp./sq. cm., temp. not over 4-5°. After 1, 30, 60, 360, 1800, and 3000 min., the Cr bound in the carbide phase was 0.4, 0.90, 1.05, 1.19, 2.03, and 2.08%; the Cr left in the ferrite 3.3, 2.71, 2.55, 2.41, 1.57, and 1.52%; the Fe bound in the carbide phase 4.8, 4.01, 4.12, 4.11, 3.05, and 2.52%, i.e. practically unchanged up to 6 hrs., then falling rapidly. Debyeograms show, as early as after 1 min. at 530°, an orthorhombic cementite-type carbide instead of the normal trigonal carbide. The diffraction pattern changes sharply

after 25 hrs., with the appearance of lines of the trigonal carbide Cr_7C_3 ; only that carbide seems to be left after 30 hrs. The concn. of Cr in the carbide phase increases linearly with the log of time τ up to 6 hrs.; at this stage, the carbide phase consists of the Cr-alloyed cementite $[Fe,Cr]_3C$. At 6 hrs., the curve of the Cr content in the carbide as a function of log τ shows a sharp break in the sense of a sharply increased rate of passage of Cr into the carbide; at the same time, the Fe content in the carbide phase begins to fall. The concn. of Cr in the carbide attained after 6 hrs., 22.5%, is very close to the max. Cr content in $[Fe,Cr]_3C$, 25%; a higher concn. of Cr evidently causes transformation of the cementite into $[Cr,Fe]_3C$. The Cr concn. attained after 30 hrs., 45.2%, coincides very exactly with Westgren's (C.A. 22, 2913) min. Cr content in the trigonal $[Cr,Fe]_3C$. Between 6 and 25 hrs., both carbides coexist, even though x-ray patterns reveal the Cr carbide only after 25 hrs. By rough calcn., after 25 hrs., 80% of the carbide is Cr_7C_3 and 20% Fe_3C ; after 60 hrs., it is all Cr_7C_3 . The fall of the amt. of bound Fe that begins after 6 hrs. is obviously due to displacement of Fe by Cr atoms. The calcd. no. of metal atoms (Fe + Cr) bound in the carbide phase remains const., 5.7, up to 6 hrs., and falls to 4.3 after 30 hrs. The latter value checks fairly well with the 4.6 calcd. for complete conversion of the orthorhombic Fe_3C into the trigonal Cr_7C_3 .

N. Tbon

BOKSHEYN, S. Z.

PH 3/50T73

DESR/Metals - Steel
Tempering
1 Aug 49

"Laws Governing the Variation in Resistance to Fracture During Steel Tempering," S. Z. Bokshteyn, 4 pp

"Dok Ak Nauk SSSR" Vol LXVII, No 4, 67, 4

Used samples containing 0.46% C, 0.36% Mn and 2.71% Si. Hardened specimens at 980° in oil and tempered at various temperatures for one hour. Results show that with an increase in tempering temperature, resistance to fracture increases first, reaches a maximum at 300-400°, and decreases with a further increase. Prolonged tempering (25 hours) at 650° reduced resistance to breaking considerably in comparison with the usual tempering (one hour). Submitted by Acad N. T. Gudtsov 3 Jun 49.

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Mechanism of the change of resistance to rupture during tempering of steel. S. Z. Bokshtein. *Doklady Akad. Nauk S.S.S.R.* 67, 651-4 (1949).—Tension impact tests at -196° were made on 4-mm. diam. by 28-mm. specimens of a 0.46% C, 0.30% Mn, 2.71% Si steel that were tempered for 1 hr. after oil quenching from 980° . The rupture strengths in kg./sq. mm. and the Rockwell C hardnesses were: no tempering, 130, 59; 200° , 215, 55; 300° , 258, 51; 400° , 253, 47; 500° , 178, 41.5; 650° , 142, 28; 650° (25 hrs.), 102, 19.5. The specimens fractured with practically no deformation. For a similar steel (0.41% C, 2.75% Si) the following C contents in the ferrite had been found after tempering: 200° , 0.35%; 300° , 0.31%; 400° , 0.26%; 500° , 0.03%. The increase in rupture strength up to 400° was due to decompn. of the martensite and its decreasing C content. The decrease

above 400° was due to structural changes after decompn. of the martensite. Ferrite formed from martensite is greatly distorted. This distortion is relieved above 400° . Ferrite grain size increases above 400° and decreases rupture strength. The carbides change to a rounded shape and increase in size from 10^{-4} - 10^{-3} at 300 - 400° to 10^{-4} - 10^{-3} at 650° . The low value after 25 hrs. tempering at 650° was due to the formation of graphite. A. G. G.

BOKSHTEYN, S. Z.

The influence of nickel on the quantitative characteristics of carbide coagulation in isothermal tempering. S. Z. Bokshtein. *Zhur. Tekh. Fiz.* 20, 327-331 (1950). *Chem. Zentr.* 1951, 1, 3257. —The coagulation of carbide during isothermal tempering was investigated in 3 Ni steels (contg. 0.4% C, with Ni contents of 0.3, 3.0, and 5.6%) in the same manner it had previously been studied in unalloyed steels (cf. C.A. 44, 7208c). The results of isothermal transformation at 630° for periods varying from 10 min. to 25 hrs. indicated that the coagulation of carbide in Ni steels proceeded qualitatively in the same manner as in unalloyed steels. Quantitatively, the Ni accelerated the carbide coagulation. The increase in tenacity (in the annealed condition) was yield. by the hardening effect of the Ni on the ferrite groundmass. In contrast to unalloyed steel, there was no linear relation between the degree of dispersion of the carbide and the strength of the steel except within certain limits. In case of extensive coagulation and coarsening of the carbide, higher Ni contents were necessary to produce an increase in strength.

M. G. Moore

BOKSHTEYN, S. Z.

PA 164745

USSR/Metal - Steel
Tempering

Jul 50

"Law Governing the Variation of Resistance to Breaking in Tempered Steel," S. Z. Bokshteyn, VIAM

"Zhur Tekh Fiz" Vol XX, No 7, pp 866-871

Considers brittle and plastic state of solids vs temperature of deformation (shear and break vs T), as studied by A. F. Ioffe; stress vs Si content; influence of temperature of tempering (0-700°C) upon resistance to break in chilled steel (0.46% C, 2.71% Si). Concludes graphitization and decay of carbide-phase particles decreases subject

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USSR/Metal - Steel
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resistance. Increased C concentration lowers resistance after low tempering and chilling and increases it after high tempering. Submitted 14 May 49.

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Coagulation and decomposition of carbides (graphitization)

in tempering silicon steel. S. Z. Bokshstein. *Doklady Akad. Nauk S.S.S.R.* 71, 311-14(1950); cf. *C.A.* 44, 7238C, 8100h. - An expl. study was made of the behavior of carbide particles in 0.4% C steels contg. 0.25, 1.75, and 2.75% Si during tempering at about 650°. The third steel was quenched from 980° and the others from 930°. The process of carbide coagulation was the same as that previously reported for C and Ni steels. Si delayed coagulation and decreased particle size, but these effects were small. After long tempering times, graphitization affected coagulation behavior. Graphitization occurring in the range 550-700° was studied in several ways. Metallographic detn. of the decrease in no. of carbide particles showed that from an initial value of 66×10^4 particles per cu. mm., final values in the 3 steels first showed a significant difference after 8 hrs. tempering at 700°; namely 0.25 Si, 45; 1.75 Si, 27; 2.75 Si, 10×10^4 . Analyses for combined C showed no change in the 0.25 Si steel after 25 hrs. tempering at 650°;

a drop to 0.31 C after 5 hrs. and to 0.07 C after 25 hrs. in the 1.75 Si steel; and a drop to 0.31 C after 1 hr. and to 0.05 C after both 5 and 25 hrs. in the 2.75 Si steel. Tempering for 25 hrs. at 550° caused a decrease to 0.17 C in the 2.75 Si steel. The x-ray diffraction lines of Fe₃C faded out in the 2.75 Si steel after 25 hrs. tempering at 650°, and an intense (002) line of graphite appeared. No other lines appeared because of the weak crystal tendency of graphite. The anomalous effect on coagulation produced by graphitization is the result of the graphitization of the small, less-stable carbide particles initially. Later, the larger particles graphitize and cause the no. of such particles to decrease. Carbide decompn. is affected by the initial structure in a 2.55 Si alloy, and neither supercooled austenite at 680° nor coarse pearlite produced by isothermal reaction at 300° graphitizes. The product of austenite decompn. at 300° graphitizes as readily as martensite on tempering for 6 hrs. at 650°; 0.15 C remained in combined form in both cases. Graphitization can occur only when diffusion makes possible the formation of local regions high in C. A. G. Guy

1951

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9

Influence of alloying elements on the decomposition of martensite in the tempering of steel. S. Z. Bokshitch. *Doklady Akad. Nauk S.S.S.R.* 73, 49:-(1950).--An expl. study was made of 0.4% C steels contg. varying amts. of Ni, Mn, Si, Cr, V, and Mo. The course of tempering during 1 min. to 25 hrs. at 200 to 650° was followed by detg. the C content of the ferrite. Ni and Mn have little effect on tempering or may speed it; the remaining elements retard tempering, through their influence on carbide coagulation and on the rate of diffusion of C in ferrite. Exptl. data support this view except for Si, which may act by impeding carbide nucleation. A. G. Guy

1951

BOKSHTEYN, S. Z.

BOKSHTEYN, S. Z. --"Coagulation, Phase Conversion, and Mechanical Properties of Alloyed Steel During Tempering." Sub 18 Jun 52, Inst of Metallurgy imeni A. A. Baykov (Dissertation for the Degree of Doctor in Technical Sciences)

SO: Vechernaya Moskva January-December 1952

BOKSHTEYN, S. Z.

PHASE I TREASURE ISLAND BIBLIOGRAPHICAL REPORT AID 481 - I

BOOK Call No.: AF641149

Author: BOKSHTEYN, S. Z.
Full Title: STRUCTURE AND MECHANICAL PROPERTIES OF ALLOY STEEL
Transliterated Title: Struktura i mekhanicheskiye svoystva legirovannoy stali

PUBLISHING DATA

Originating Agency: None
Publishing House: State Scientific and Technical Publishing House of Literature on Ferrous and Nonferrous Metallurgy (Metallurgizdat)
Date: 1954 No. pp.: 279 No. of copies: 5,500

Editorial Staff

Gudkova, T. I., Eng., Sinel'shchikov, G. S., Eng., Kishkin, S. T., Prof., Blanter, M. Ye., Prof.

PURPOSE: This book is intended for engineers-metallurgists working in the field of the alloying and heat treatment of steel as well as in the theory of phase transformations. The book can be also used by teachers of metallography and metalphysics in schools of higher learning.

TEXT DATA

Coverage: This is a survey of the effect of tempering conditions, as well as of carbon content and alloying elements on the structure and mechanical properties of steel. On the basis of investigations the

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author establishes the qualitative and quantitative relation between the structure and the mechanical properties of alloy steel after heat treatment, and explains the physical nature of the effect of alloying elements on the mechanical properties of steel in different phases. The author hopes that the experimental data and general deductions contained in this book will help scientists to work out new kinds of steels and to develop further the theory of phase transformations and of the mechanical properties of alloy steel. The book is provided with roentgenograms and photographs of the microstructure of steel, tables and diagrams.

No. of References: Total 158, Russian 140 (1908-1952)

Facilities: N. M. Popova, Kand. of Tech. Sci., and her staff;

Ye I. Onishchik, Dotsent.

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BOKSHTEYN, S. Z. Prof.

"Tagged Atom Techniques in Metallography, paper presented at the 4th Conference of Workers in Plant and Industrial Laboratories in Kazakh SSR and Central Asia, Alma-Ata, 1955

SO: TI 170982

All-Union Inst. of Aviation Materials

KISHKIN, S.T.; BOKSHTEYN, S.Z.

[Investigating the distribution and diffusion of components in metal alloys by the method of autoradiography] Issledovanie raspredeleniia i diffuzii komponentov v metallicheskih splavakh metodom avtoradiografii. Moskva, 1955. 20 p.

(MIRA 12:11)

(Alloys--Metallography)
(X rays--Industrial applications)

BOKSHTEYN, S. Z.

14305 Distribution and Diffusion of Components in Metal Alloys Studied by the Autoradiographic Method. S. Z. Bokstein and S. Z. Bokstein, International Conference on the Peaceful Uses of Atomic Energy, A/CONF.8/P/703, July 1955, 28 p. (QC770 In8a)

① (Translated from the Russian.) Autoradiographic techniques permit direct and local study of structure and properties of real bodies, furnish qualitative and quantitative picture of distribution mode of elements in alloy, assist in quantitative solution of the diffusion problem along grain boundaries and within the crystal, and serve as a means of understanding mechanism of influence of minor impurities. Table, graphs, micrographs, photographs, diagrams. 18 ref.

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BOKSHTEYN, S.Z.

Category : USSR/Solid State Physics - Phase transformation of solid bodies

E-5

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1226

Author : Bokshteyn, S.Z., Kishkin, S.T., Platonova, A.F., Popova, N.M

Title : Carbide Formation in Tempering of Chrome-Nickel Steels and Chrome-Nickel-Tungsten Steels

Orig Pub : Fiz. metallov i metallovedeniye, 1955, 1, No 3, 459-466

Abstract : An investigation was made of the carbide-formation in Cr -- Ni steel (C -- 0.4, Cr -- 1.96 and Ni -- 2.75%) and in Cr -- Ni -- W (C -- 0.38, Cr -- 1.71, Ni -- 2.09, and W -- 1.51%) steel after hardening from 960° and tempering, as a function of the temperature (200 -- 650°) and of the length of soaking (up to 300 hours), using the differential carbide analysis method. A procedure for such a test is given. It is shown that the decomposition of martensite terminates in the above steels at 400 -- 500°. In this case the carbide portion of the steel, depending on the tempering condition, consists either of a single iron carbide or simultaneously of cementite and chromium carbide. Carbide of the cementite type is formed at a tempering temperature of 400° and less or in the beginning instants of deep tempering. No trigonal chromium carbide is formed 300 hours at 400°, but it appears

Card : 1/2

Category : USSR/Solid State Physics - Phase transformation of solid bodies

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Abs Jour : Ref Zhur - Fizika, No 1, 1957 No 1226

after 50 hours at 500°, after one hour at 500°, and after five minutes at 560°. The amount of cementite increases at the start of the tempering, and diminishes upon the appearance of the chromium carbide (500 -- 550°). The maximum solubility of chromium in cementite reaches 20%, and that of tungsten reaches 2 -- 2.5%. Introducing tungsten into chrome-nickel steel reduces the amount of the special chromium carbide and reduces the solubility of the chromium in the cementite. A double carbide of iron and tungsten is formed by tempering at 600° (300 hours) and at 650° (50 hours).

Card : 2/2

BOKSHTEYN, S. Z.

A Study of the Influence of High-melting Elements on
 Self-diffusion of Iron using Radioactive Isotopes S. Z.
 Bokshtein, A. R. Kozlov, S. R. Kharin, and L. M. Mirskii
 (Institute of Atomic Energy, U.S.S.R., Moscow, U.S.S.R.)
 (In Russian). The dependence of the coefficient of self-diffusion
 of iron in iron-nickel alloys on temperature and the
 contents of nickel, molybdenum, niobium, titanium, and
 vanadium was investigated. Specimens of alloys in the form
 of plates were electroplated on one side with a thin layer of
 iron ^{59}Fe and heated in vacuum. The diffusion coefficient was
 followed by measuring the integrated radioactivity of the iron
 removed from the specimen investigated.

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Бокштейн, С.З.

Notes

✓ Study of the Homogeneity of Alloys and Mobility Along Grain Boundaries with the Aid of Radioactive Isotopes. S. Z. Bokshstein, P. I. Gudkova, S. T. Kishkin and L. M. Abram. (Zavodskaya Laboratoriya, 1955, 21, (4), 423-432). [in Russian]. The theory of the autoradiographic method as applied to the study of the distribution of elements in alloys is discussed, and suitable methods are described.

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Results obtained for carbon in cast steel (0.33% C), for tin in iron and for various elements in nickel are illustrated and examined. During the study of the kinetics of element redistribution, the possibility was noted of increased heterogeneity as a result of diffusional annealing. The mobility of components was found to be considerably greater in deformed than in cast alloys. Diffusion inside a crystal and along grain boundaries can be studied photometrically. --S. X.

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BOKSHEYN, S. Z.

USSR/Engineering - Radiographic analysis

Card 1/1 Pub. 22 - 22/52

Authors : Kishkin, S. T.; Bokshteyn, S. Z.; Moroz, L. M.; and Gudkova, T. I.

Title : Quantitative analysis of the distribution of elements in alloys

Periodical : Dok. AN SSSR 101/4, 667-670, Apr 1, 1955

Abstract : The quantitative radiographic method for quantitative analysis of elements in alloys is described. The application of this method in determining the nonuniform distribution of tungsten in nickel-tungsten alloy is discussed. Results are given. Five references: 1 Swiss and 4 USSR (1947-1954). Graphs; illustrations.

Institution : Scientific Research Institute of Aviation Materials

Presented by: Academician G. V. Kurdyumov, July 15, 1954

BOKSHEIN, S. Z.

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An investigation by autoradiography methods of diffusion through the body of a metal and along the crystal boundaries. S. Z. Bokshstein, S. T. Kishkin, L. M. Moroz, and T. I. Gudkova. *Doklady Akad. Nauk S.S.S.R.* 102, 73-5 (1955).—The diffusion was studied by applying electrolytically an extremely thin coating of radioactive Sn to a polished surface of Fe or Ni. A 2nd section, polished but uncoated, was clamped on the 1st, and the samples were annealed. The surface activities of both sections were the same after ignition. The annealed samples were cut at a slant and placed in contact with a photoactive surface, and the prints obtained were examd. photometrically. The radiograms of Fe and Ni were different, revealing the Sn to have diffused evenly through the Fe cross section, whereas in Ni the diffusion proceeded evenly at first and then only along the crystal boundaries. W. M. Sternberg

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[Physical metallurgy and the heat treatment of steel and iron; a reference book] Metallovedenie i termicheskaya obrabotka stali i chuguna; spravochnik. Pod red. N.T.Dudtsova, M.L.Bernshteina, A.G. Rakhshadta. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1956. 1204 p. (MLRA 9:9)

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