DOLININ, K.A., gornyy inzh.; INDENBAUM, N.Ye., gornyy inzh.

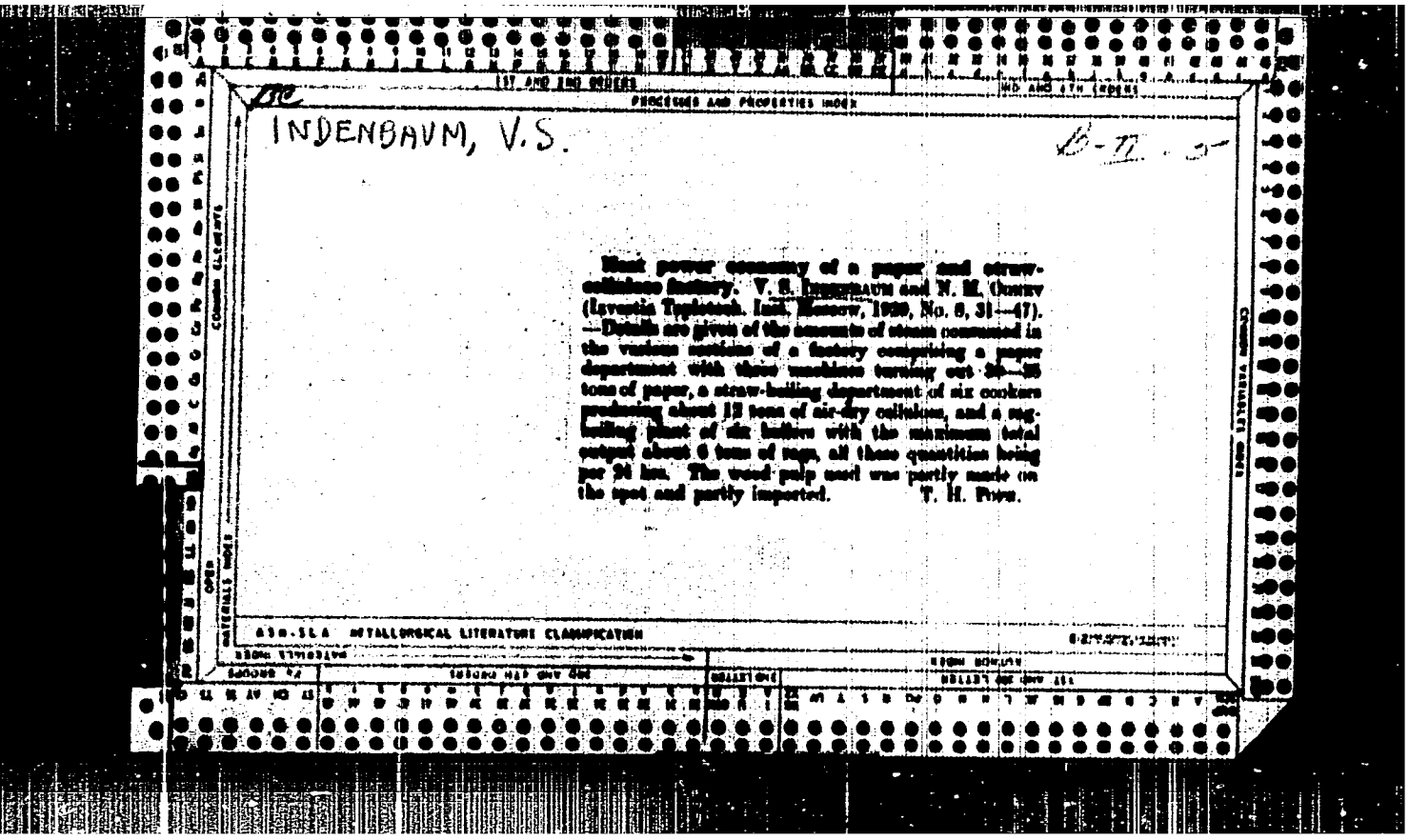
Automatization of industrial processes in nonferrous metal mines of the Sverdlovsk Economic Region. Gor. zhur. no. 1:59-63 Ja '61. (MIRA 14:1)

1. Sverdlovskiy sovnarkhoz (for Dolinin). 2. Degtyarskiy mednyy rudnik (for Indenbaum).
(Sverdlovsk Province--Mining engineering)
(Automatic control)

INDENBAUM, N.Ye.

Automation of compressor stations at the Degtyarka Copper Mine.
Gor.zhur. no.8:39-42 Ag '65. (MIRA 18:10)

1. Degtyarskiy mednyy rudnik.



INDENBAUM, V.S.

Heat power economy of a paper and straw-cellulose factory. V. S. INDENBAUM and N. M. (Inzhr) (Izvestia Teplotekh. Inst. Moscow, 1950, No. 8, 31—47). —Details are given of the amounts of steam consumed in the various sections of a factory comprising a paper department with three machines turning out 30—35 tons of paper, a straw-boiling department of six cookers producing about 12 tons of air-dry cellulose, and a rag-boiling plant of six boilers with the maximum total output about 6 tons of rags, all these quantities being per 24 hrs. The wood pulp used was partly made on the spot and partly imported. T. H. Pim.

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

INDENBAUM, V. S.

AB-II-5

Regenerative soda-oven at straw-cellulose factory. V. S. Indenbaum, G. N. [illegible], and N. V. [illegible] (Izvestia Teplotech. Inst., Moscow, 1930, No. 3, 48—56).—The heat balance of the regeneration of spent soda from a straw-cellulose factory is worked out in detail from experimental results. T. H. Pope.

ASA-SLA METALLURGICAL LITERATURE CLASSIFICATION

INDENBAUM, V.S.; SLUCHAYEV, M.A.; CHULKOV, S.P., redaktor; MINASYAN, Ye., tekhnicheskiy redaktor

[Inspection and maintenance of steam turbines in communal electric power stations] Revizilia i remont parovykh turbin kommunal'nykh elektrostantsii. Moskva, Izd-vo Ministerstva kommunal'nogo khoziaistva RSFSR, 1954. 211 p. [Microfilm] (MLRA 7:10)
(Steam turbines)

PIKULIN, Saveliy Moiseyevich; INDENBAUM, V.S., redaktor; LANOVSKAYA, M.S., redaktor izdatel'stva; KARASEV, A.I., tekhnicheskiy redaktor

[New method of laying foundations for turbine installations] Novyi metod ustanovki na fundamente turboagregatov. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1956. 39 p. (Turbines) (Foundations) (MLRA 9:12)

MIKHALIN, G.I., inzh.; INDELBAUM, V.S., red.; SHNEYEROV, S.A., red.izd-va; VOLKOV, S.V., tekhn.red.

[Mechanization of heavy and time-consuming work in the servicing and repairing of internal combustion engines] Mekhanizatsiia trudoemkikh protsessov pri obsluzhivanii i remontakh dvigatelei vnutrennego sgoraniia. Moskva, Izd-vo M-va kommun. khoz. RSFSR, 1957. 95 p. (MIRA 11:5)

(Gas and oil engines--Maintenance and repair)

25(1);8(0) PHASE I BOOK EXPLOITATION SOV/2029

Indenbaum, V.S., Engineer, G.I. Mikhalin, Engineer, and M.A. Sluchayev, Engineer, Deceased

Montazh energeticheskogo oborudovaniya; kratkoye spravochnoye posobiye (Installation of Power Equipment; a Concise Manual) Moscow, Mashgiz, 1959. 419 p. Errata slip inserted. 13,000 copies printed.

Ed.: V.N. Yakovlev; Ed. of Publishing House: G.A. Molyukov, Engineer; Tech. Ed.: A.Ya. Tikhanov; Managing Ed. for Reference Literature: V.I. Krylov, Engineer; Ed. of Graphs and Charts: V.G. Karganov.

PURPOSE: This book is intended to serve as a manual for engineers and technicians engaged in the installation of pipelines and power equipment.

COVERAGE: This manual is divided into three parts, the first of which deals with the installation of pipelines, the second with

Card 1/13

turbines and generators, and the third with internal combustion engines used in power stations, In Part I Engineer V.S. Indenbaum reviews the existing official regulations and approved methods to be followed in the installation of pipelines for water, steam, and gas in various industrial plants. The proper size, quality, and general characteristics of pipes and tubular stock are listed according to use. Test procedures for pipelines are specified, and a number of illustrations show ways of joining pipes. Engineers V.S. Indenbaum and M.A. Sluchayev (deceased) prepared Part II in which they deal with the installation of Soviet-made and imported power equipment such as steam turbines, turbocompressors, and various pumps. A step-by-step description is given of the proper installation procedures for this equipment, from the inspection of the foundations to the final adjustment of the rotor. Specific instructions are given for the starting and running-in procedures for the new machinery followed by a discussion of possible sources of operational troubles. The last part of the book, written by Engineer G.I. Mikhalin, deals with the installation of stationary internal combustion engines. The author briefly reviews the types of Soviet and imported Diesel engines together with the auxilliary equipment, and proceeds to describe the assembly sequence for stationary Diesels

and generators. The text covers the checking and installation of the crankshaft, cylinders, valves, fuel pumps, and other engine components including the pneumatic starting device. Explicit instructions are given for starting operations after assembly. No personalities are mentioned. There are no references.

PART I. MANUFACTURE AND INSTALLATION OF POWER-STATION PIPING
ENGINEER V.S. Indenbaum

INDENBAUM, Veniamin Solomonovich, inzh.; LEBEDEV, Mikhail Vasil'yevich, inzh. [deceased]; LIBERMAN, Grigoriy Romanovich, inzh.; OL'-SHANSKIY, Ya.A., inzh., red.; POPOV, K.S., inzh., red.; TAYTS, A.A., inzh., red.; SHMYREOV, S.A., red.izd-va; BARANOV, M.V., tekhn.red.

[Operation of small steam turbine electric power plants] Ekspluatatsiia paroturbinnykh elektrostantsii maloi moshchnosti. Pod obshchei red. G.R.Libermana. Moskva, Izd-vo M-va kommun. khoz.RSFSR, 1959. 483 p. (MIRA 13:5)
(Electric power plants)

KOPELIOVICH, Mikhail Mikhaylovich; PUPTSEV, S.A., inzh., retsenzent; INDENBAUM, V.S., inzh., red.; LANOVSKAYA, M.R., red.izd-va; ISLENT'YEVA, P.G., tekhn.red.

[Safety techniques in oxygen sections of metallurgical plants] Tekhnika bezopasnosti v kislorodnykh tsekhakh metallurgicheskikh zavodov. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1960. 44 p. (MIRA 14:1)
(Metallurgical plants--Safety measures)
(Oxygen--Industrial applications)

INDENBAUM, Veniamin Solomonovich; SLUCHAYEV, Mikhail Aleksandrovich [deceased]; VARGANOVA, A.N., red.izd-va; SALAZKOV, N.P., tekhn. red.

[Inspection and repair of small steam turbines] Reviziia i remont parovykh turbin maloi moshchnosti. Izd.2., ispr. i dop. Moskva, Izd-vo M-va kommun.khoz.RSFSR, 1960. 337 p. (MIRA 13:7)

(Steam turbines--Maintenance and repair)

VAKHLER, Boris L'vovich; INDENBAUM, V.S., red.; GOLYATKINA, A.G., red. izd-va; MIKHAYLOVA, V.V., tekhn. red.

[Pumping and compressor plant operator; manual for improving the qualifications of workers] Mashinist nasosnykh i kompressornykh stantsii; uchebnoe posobie dlia povysheniia kvalifikatsii rabochikh. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1961. 224 p. (MIRA 14:9)

(Air compressors) (Pumping machinery)

ALEKSANDROV, Kirill Ivanovich; INDENBAUM, V.S., red.; VAGIN, A.A., red. izd-va; ISLENT'YEVA, P.G., tekhn. red.

[Exhausters; practical manualfor machine operators and attendants of machine sections of by-product coke plants] Gazoduvki; prakticheskoe rukovodstvo dlia mashinistov i obsluzhivaniushchego personala mashinnykh otdelenii koksokhimicheskikh zavodov. Moskva, Gos. nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1962. 224 p. (MIRA 15:2)

(Coke industry—Equipment and supplies)

SHTERN, Leybshi Yankelevich; HEYZEROV, Semen Moiseyevich; PLAVNIK, Valentin Gilyar'yevich; INDENBAUM, V.S., red.; GOLYATKINA, A.G., red. izd-va; VAYNSHTEYN, Ye.B., tekhn. red.

[Regulation and automation of air-blower and compresser plants] Regulirovanie i avtomatizatsiia vozdukhoduvnykh i kompressornykh stantsii. Pod obshchei red. L.IA.Shterna. Moskva, Metallurgizdat, 1963. 378 p. (MIRA 16:8)
(Compressors) (Blowers) (Automatic control)

MIKHALIN, Georgiy Ivanovich; INDENBAUM, V.S., red.

[Adjustment and regulation of stationary diesel engines] Naladka i regulirovka statsionarnykh dizelei. Moskva, Izd-vo M-va kommun.khoz.RSFSR, 1963. 126 p. (MIRA 17:6)

BOLDYREV, G.P.; VOGMAN, D.A.; NOVOKHATSKIY, I.P.; VERK, D.L.; DYUGAYEV, I.V.; KAVUN, V.M.; KURENKO, A.A.; UZBEKOV, M.R.; ARSEN'YEV, S.Ya.; YEGORKIN, A.N.; KORSAKOV, P.F.; KUZ'MIN, V.N.; STRELETS, B.A.; PATKOVSKIY, A.B.; BOLESLAVSKAYA, B.M.; INDENBOM, D.B.; FINKEL'SHTEYN, A.S.; SHAPIRO, I.S.; LAPIN, L.Yu.. Prinimali uchastiye: NEVSKAYA, G.I.; FEDOSEYEV, V.A.; KASPILOVSKIY, Ya.B., ZERNOVA, K.V.. BARDIN, I.P., akademik, otv.red.; SATPAYEV, K.I., akademik, nauchnyy red.; STRUMILIN, akademik, nauchnyy red.; ANTIPOV, M.I., nauchnyy red.; BELYANCHIKOV, K.P., nauchnyy red.; YEROFEYEV, B.N., nauchnyy red.; KALGANOV, M.I., nauchnyy red.; SAMARIN, A.M., nauchnyy red.; SLEDZYUK, P.Ye., nauchnyy red.; KHLEBNIKOV, V.B., nauchnyy red.; STREYS, N.A., nauchnyy red.; BANKVITSER, A.L., red.izd-va; POLYAKOVA, T.V., tekhn.red.

[Iron ore deposits in central Kazakhstan and ways for their utilization] Zhelezorudnye mestorozhdeniia TSentral'nogo Kazakhstana i puti ikh ispol'zovaniia. Otvetstvennyi red. I.P.Bardin. Moskva, 1960. 556 p. (MIRA 13:4)

1. Akademiya nauk SSSR. Mezhduvedomstvennaya postoyannaya komissiya po zhelezu. 2. Gosudarstvennyy institut po proyektirovaniyu gornykh predpriyatiy zhelezorudnoy i margantsevoy promyshlennosti i promyshlennosti nemetallicheskikh iskopayemykh (Giproruda) (for Boldyrev, Vogman, Arsen'yev, Yegorkin, Korsakov, Kuz'min, Strelets.

(Continued on next card)

BOLDYREV, G.P.--(continued). Card 2.

3. Institut geologicheskikh nauk AN Kazakhskoy SSR (for Novokhatskiy). 4. TSentral'no-Kazakhstanskoye geologicheskoye upravleniye Ministerstva geologii i okhrany nedr SSSR (for Verk, Dyugayev, Kavun, Kurenko, Uzbekov). 5. Nauchno-issledovatel'skiy institut mekhanicheskoy obrabotki poleznykh iskopayemykh (Mikhanobr) (for Patkovskiy). 6. Gosudarstvennyy institut proyektirovaniya metallurg.zavodov (Gipromez) (for Boleslavskaya, Indenbom, Finkel'shteyn, Nevskaya, Fedoseyev, Karpilovskiy). 7. Mezhduvedomstvennaya postoyannaya komissiya po zhelezu AN SSSR (for Shapiro, Zernova, Kalganov). 8. Gosplan SSSR (for Lapin).
(Kazakhstan--Iron ores)

USPENSKIY, V.A.; INDENBOM, F.B.; CHERNYSHEVA, A.S.; SENNIKOVA, V.N.

Geochemical study of organic substance in Mesozoic and Cenozoic rocks of the Groznyy oil area. Avtoref. trud. VNIGRI no.17:48-54 '56. (MIRA 11:6)
(Groznyy Province--Petroleum geology) (Organic matter)

USPENSKIY, Vladimir Alekseyevich; INDENBOM, Tanya Beynusovna; GORSKAYA, A.I., red.; RAGINA, G.M., vedushchiy red.; YASHCHURZHINSKAYA, A.B., tekhred.

[Volga-Ural oil-bearing area; geochemical characteristics of petroleums and other bitumens] Volgo-Ural'skaia neftenosnaia oblast'; geokhimicheskaia kharakteristika neftei i drugikh bitumov. Leningrad, Gos.nauchno tekhn. izd-vo neft. i gorno toplivnoi lit-ry, 1957. 302 p. (Vsesoiuznyi neftianoi nauchno-issledovatel'skii geologorozvedochnyi institut. Trudy, no.107) (MIRA 12:7)
(Volga Valley--Petroleum) (Ural Mountain region--Petroleum)
(Ural Mountain region--Bitumen)

USPENSKIY, V.A.; INDENBOM, F.B.; CHERNYSHEVA, A.S.

Chemical investigation of the hydrocarbon fraction of bituminogens. (MIRA 11:9)
VNIGRI no.105:221-227 '57.
(Bitumen)

INDENBOM, F.B.

3(5); 11(4) p.4 PHASE I BOOK EXPLOITATION SOV/1234

Vsesoyuznyy neftyanoy nauchno-issledovatel'skiy geologorazvedochnyy institut

Voprosy obrazovaniya nefti; sbornik statey (Problems on the Origin of Petroleum; Collection of Articles) Leningrad, Gostoptekhizdat, 1958. 389 p. (Series: Its: Trudy, vyp. 128) 2,000 copies printed.

Ed.: Vassoyevich, N.B., Professor; Tech. Ed.: Gennad'yeva, I.M.; Executive Ed.: Barkovskiy, I.V.

PURPOSE: This book is intended for geologists, geophysicists, and petroleum technologists, as well as for students at geological and petroleum-engineering institutes.

COVERAGE: This book, containing four articles written by 11 specialists, reports on the results of studies made on the origin of oil deposits in the Northeastern Caucasus. The program was organized in 1950-55 by the VNIGRI (All Union Petroleum Scientific Research Institute for Geological Survey.) Some of the material presented in the book is of a preliminary nature as the studies are still continuing. Particular attention is devoted to the problem of incipient oil concentration (micro-oil) and to the migration and transformation of bituminous substances into drops and liquid phases (macro-oil). The authors outline two periods in the

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Prob...ms on the Origin (Cont.)

formation of oil in terrigenous sediments: 1) the appearance of dispersed micro-globules in parent clays, and 2) the migration of the globules from their source-beds to reservoir-beds and thence their further migration and accumulation in oil traps as liquid drops (macro-oil). The first article is devoted almost entirely to the formation of micro-oil. The second attempts a genetic classification of the sedimentary organic matter. The third defines the content of organic matter in various types of rocks, and describes the conditions under which it undergoes change. The fourth article describes bituminous substances and bitumens and analyzes their components. In addition to a review of the chemical changes in oil, there is a discussion of the problems of petroleum microbiology. The book contains 67 figures and 180 tables. There are 570 references of which 480 are Soviet.

TABLE OF CONTENTS:

Problems on the Origin (Cont.)

SOV/1234

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Problems on the Origin (Cont.) SOV/1234

Bibliography

AVAILABLE: Library of Congress

Card 6/6

3-9-59

USPENSKIY, V.A.; RADCHENKO, O.A.; GLEBOVSKAYA, Ye.A.; SHISHKOVA, A.P.; MEL'TSANSKAYA, T.N.; INDENBOM, F.B.; Prinimali uchastiye: KOLOTOVA, L.F., khimik; CHAGINA, T.P., tekhnik; BASKINA, T.B., laborant; VIKULINA, M.N., laborant; POLOVNIKOVA, I.A., fizik; PETROV, A.K., tekhnik; PONOMAREV, B.P., laborant; KHYAMYALYAYNIN, L.B., laborant; KLOCHKOV, B.N., laborant; RAGINA, G.M., vedushchiy red.; SAFRONOVA, I.M., tekhn.red.

[Basic processes of the transformation of bitumens in nature and the problems of their classification] Osnovnye puti preobrazovaniia bitumov v prirode i voprosy ikh klassifikatsii. Leningrad, Gos.nauchno-tekhn.izd-vo neft.i gorno-toplivnoi lit-ry Leningr.otd-nie, 1961. 314 p. (Leningrad. Vsesoiuznyi nauchno-issledovatel'skii geologorazvedochnyi institut. Trudy, no.185). (MIRA 15:4)

(Bitumen--Geology)

ACC NR: AP6034261 (N) SOURCE CODE: UR/0390/66/029/005/0582/0588

AUTHOR: Danilov, A. F.; Indenbom, M. L.; Mikhel'son, M. Ya.; Khromov-Borisov, N. V.

ORG: Institute of Experimental Medicine, AMN SSSR (Institut eksperimental'noy meditsiny AMN SSSR); Institute of Evolutionary Physiology and Biochemistry im. I. M. Sechenova, AN SSSR, Leningrad (Institut evolyutsionnoy fiziologii i biokhimii AN SSSR)

TITLE: Curareform activity of some new bis-quaternary compounds

SOURCE: Farmakologiya i toksikologiya, v. 29, no. 5, 1966, 582-588

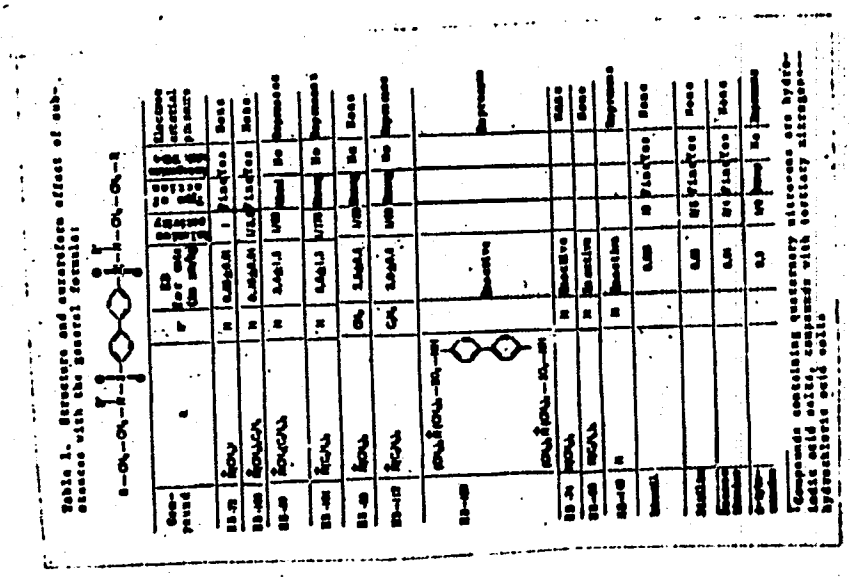
TOPIC TAGS: drug effect, curareform activity, bis quaternary compound, depolarization effect, cholinoreceptor, nervous system drug

ABSTRACT: Highly active curareform compounds may have 10 or 16 atoms between the quaternary nitrogens. In a series of polymethylene-bis-trimethylammonium compounds two peaks of curareform activity were observed: with 9 and 10, and 14—18 methyl groups between the nitrogens. A series of compounds whose structures appear in the table was synthesized and tested for their ability to block neuromuscular conduction. The curareform action of HB-72 is the depolarization type and is reversible by a nucleophilic agent. Successive replacement of methyl with

UDC: 615.785.3

Card 1/3

ACC NR: AP6034261



Card 2/3

ACC NR: AP6034261

ethyl radicals at quaternary nitrogen atoms reduces activity. Changing the position of SO_2 and NH groups results in loss of activity (change of HB-72 to HB 153). Experimental results illustrated the importance of an interquaternary distance of 16 atoms and the presence of the sulfamide groups for the reaction of these substances with cholinoreceptors. Orig. art. has: 2 figures and 1 table. [W.A. 50]

SUB CODE: 06/ SUBM DATE: 12May66/ ORIG REF: 004/ OTH REF: 017

Card 3/3

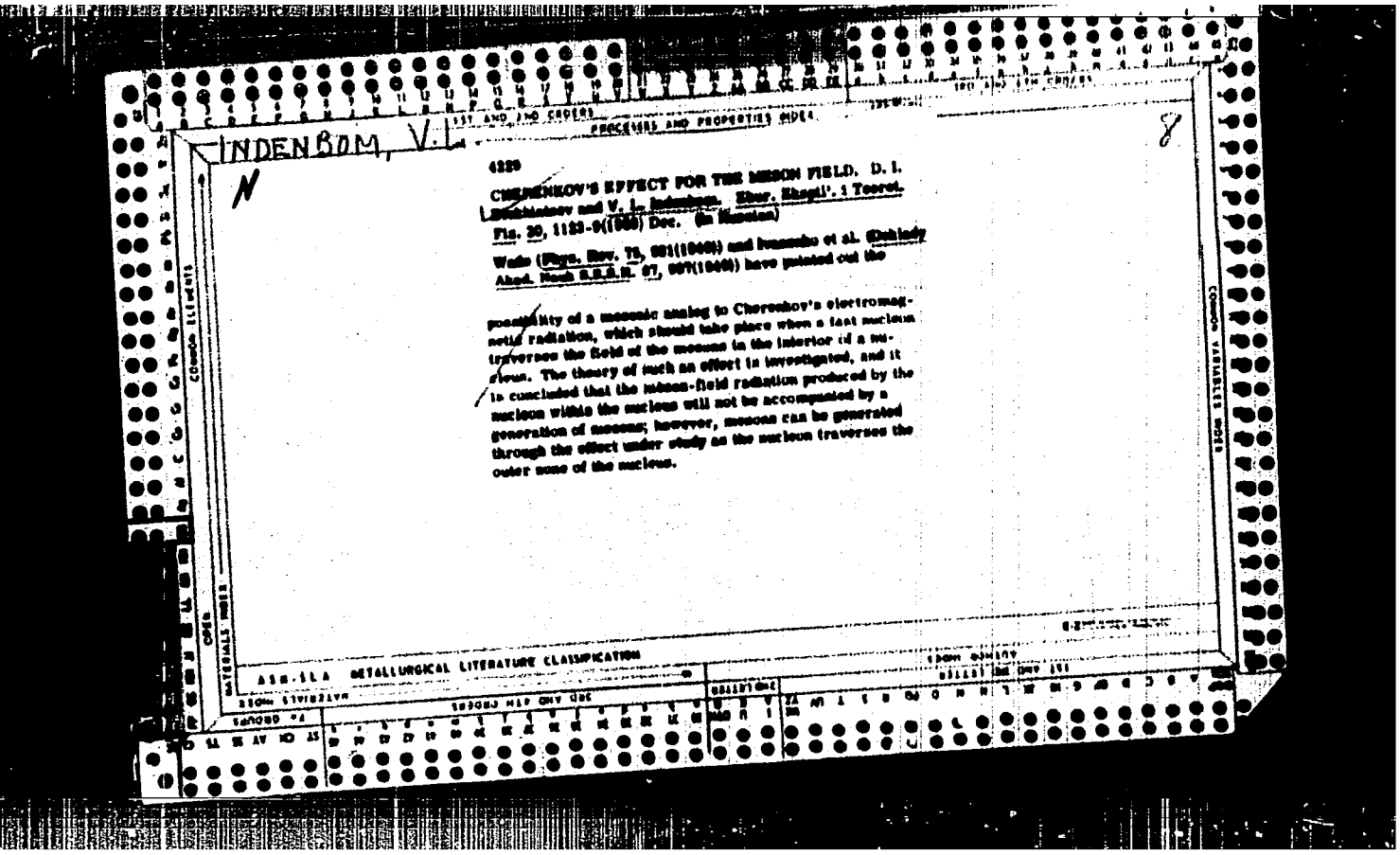
TORF, S.F.; KHROMOV-BORISOV, N.V.; INDENBOM, M.L.

Methyldiazil, methyldiphacil and their quaternary ammonium salts. (MIRA 15:2)
Med. prom. 15 no.12:19-25 D '61.

1. Institut eksperimental'noy meditsiny AMN SSSR.
(ANTISPASMODICS)

RADA, Boris Frantsevich; INDENBOM, Pavel Borisovich; ANGLN, Andrey Nikolayevich; ZOTOVA, A.P., red.

[Carrots and parsley] Morkov' i petrushka. Leningrad, Lenizdat, 1965. 41 p. (MIRA 18:10)



INDENBOM, V. L.

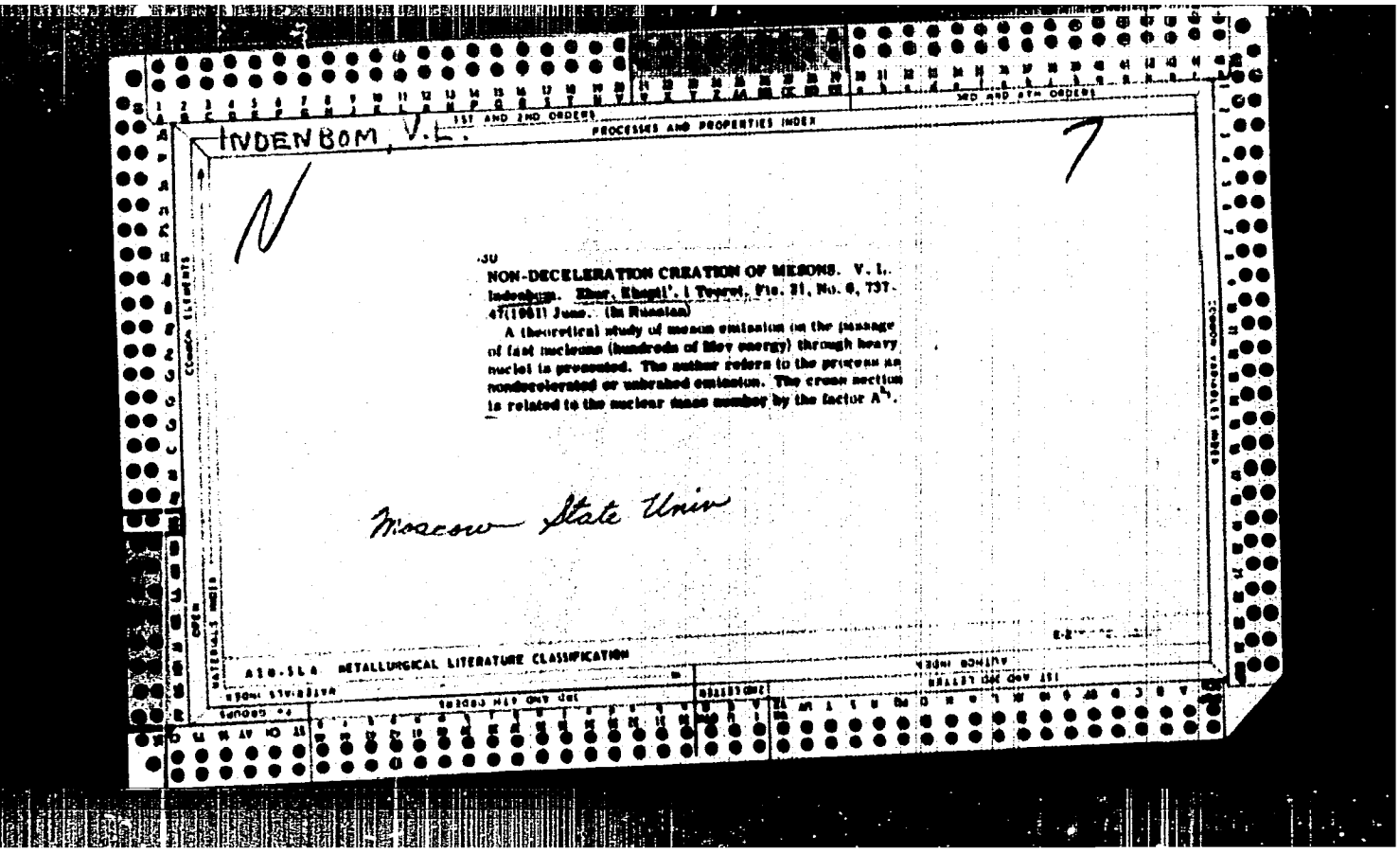
N

4329

CHERENKOV'S EFFECT FOR THE MESON FIELD. D. I. Blokhintsev and V. L. Indenbom. Zhur. Eksptl'. i Teoret. Fiz. 20, 1133-9(1950) Dec. (In Russian)

Wada (Phys. Rev. 75, 901(1949)) and Ivanenko et al. (Doklady Akad. Nauk S.S.S.R. 67, 807(1949)) have pointed out the possibility of a mesonic analog to Cherenkov's electromagnetic radiation, which should take place when a fast nucleon traverses the field of the mesons in the interior of a nucleus. The theory of such an effect is investigated, and it is concluded that the meson-field radiation produced by the nucleon within the nucleus will not be accompanied by a generation of mesons; however, mesons can be generated through the effect under study as the nucleon traverses the outer zone of the nucleus.

ASM-TLA METALLURGICAL LITERATURE CLASSIFICATION



INDENBOM, V. L.

N

7

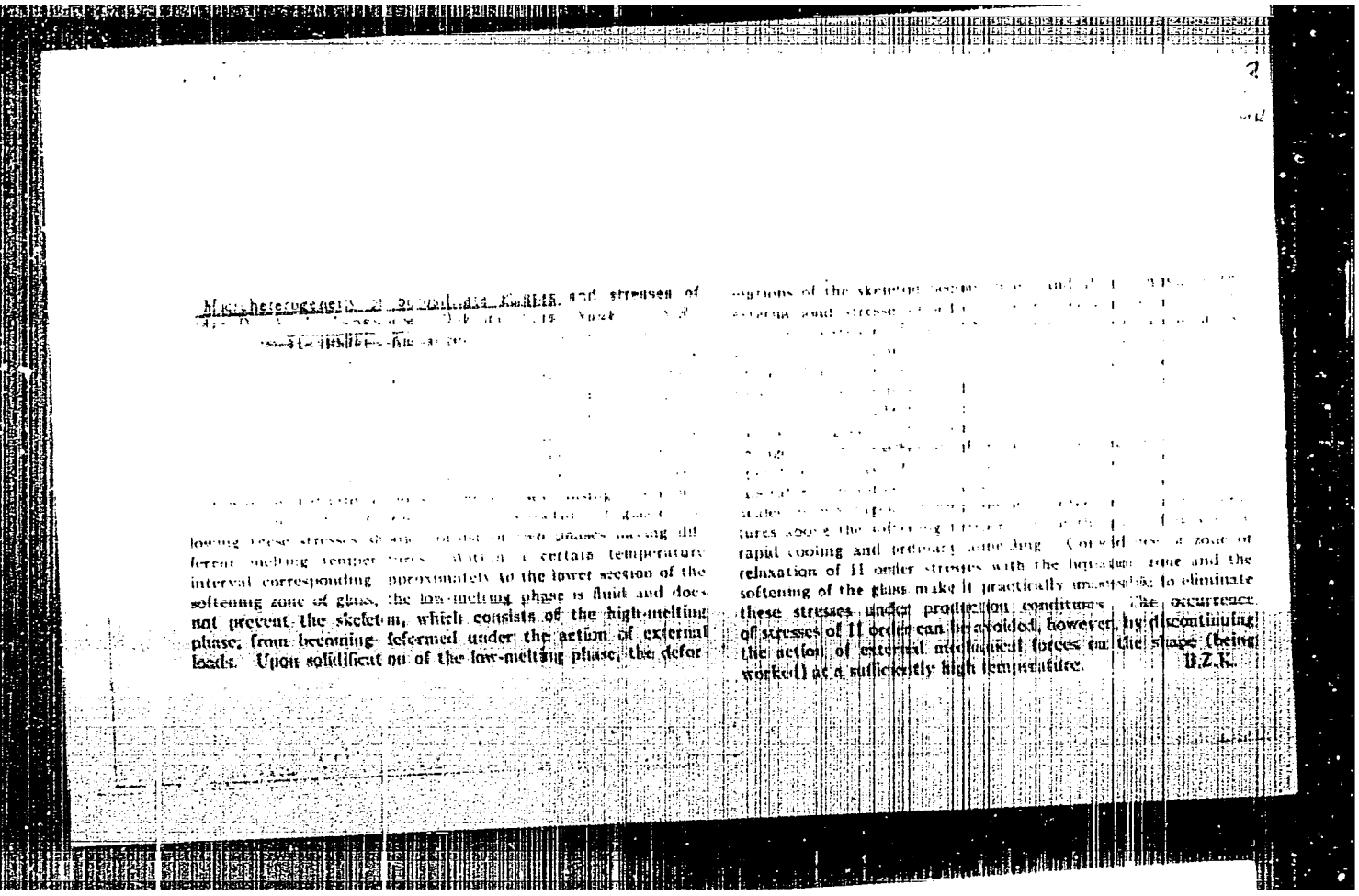
30

NON-DECELERATION CREATION OF MESONS. V. L. Indenbom. Zhur. Eksptl'. i Teoret. Fiz. 21, No. 6, 737-47(1951) June. (In Russian)

A theoretical study of meson emission on the passage of fast nucleons (hundreds of Mev energy) through heavy nuclei is presented. The author refers to the process as nondecelerated or unbraked emission. The cross section is related to the nuclear mass number by the factor $A^{\frac{1}{3}}$.

Moscow State Univ

A10-5L6 METALLURGICAL LITERATURE CLASSIFICATION



lowing these stresses [illegible] different melting temperatures. Within a certain temperature interval corresponding approximately to the lower section of the softening zone of glass, the low-melting phase is fluid and does not prevent the skeleton, which consists of the high-melting phase, from becoming deformed under the action of external loads. Upon solidification of the low-melting phase, the defor-

[illegible] regions of the skeleton [illegible] external and stress [illegible]

tures above the softening [illegible] rapid cooling and primary annealing. Considered as a zone of relaxation of II order stresses with the liquidus zone and the softening of the glass make it practically impossible to eliminate these stresses under production conditions. The occurrence of stresses of II order can be avoided, however, by discontinuing the action of external mechanical forces on the stage (being worked) at a sufficiently high temperature. B.Z.K.

INDENBOM, V. L. FD-583

USSR/Physics - Glass heating

Card 1/1 Pub. 153-23/28

Author : Indenbom, V. L.

Title : Theory of the heating of glass

Periodical : Zhur. Tekh. fiz. 24, 925-928, May 1954

Abstract : Studies the case of large temperature drops in glass when part is in the plastic state and part in the elastic state, as occurs during the heat treatment of glass. Finds the dependence of residual stress upon rate of cooling at various temperatures. Thanks Prof. G. M. Bartenev. Refer to related works of G. M. Bartenev, in Steklo i Keramika [Glass and Ceramics], and I. I. Kitaygorodskiy's book Steklo i Steklovareniye, 1950, Moscow.

Institution :

Submitted : December 2, 1953

INDENBOM, V. L.

INDENBOM. V. L.: "Polarisation-optical investigation of the internal strains on glass objects". Moscow, 1955. Min Higher Education USSR. Moscow Order of Lenin Chemicotechnological Inst imeni Mendeleyev. (Dissertations for the degree of Candidate of Technical Science.)

SO: Knishnaya Letopis' No. 50 10 December 1955. Moscow.

INDENBOM, V. L.

USSR/Chemical Technology - Chemical Products and Their Application. Silicates. Glass. Ceramics. Binders, I-9

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 62263

Author: Indenbom, V. L.

Institution: None

Title: Quantitative Control of Quality of the Annealing of Glass Articles by Means of Polariscope Utilizing a Standard of Path-Difference

Original Periodical: Inform.-tekhn. Sb. Tsentr. n.-i. labor. elektrotekhn. stekla, 1955, No 3, 59-69

Abstract: None

Card 1/1

Indenbom, V. L.

MT ✓Determination of coefficient of expansion of glass by the double thread method. V. L. Indenbom. *Steklo i Keram.*, 12 [4] 9-14 (1955).—The method is based on the phenomenon of the bending of a double thread during heating or cooling owing to the expansion (contraction) of glasses which form the double thread. Standard glass of the same grade as test glass with an average coefficient of expansion (according to specifications) is cut into 100 to 300-mm. rods 4 to 6 mm. in diameter. Ends of the rods are soldered over each other, and one double end is drawn into a double thread in the form of an arc. Calculations are made from $\alpha = \alpha_0 \pm \Delta\alpha$, where α_0 is coefficient of the standard and $\Delta\alpha$ is calculated from thickness d and deflection of arc h.

B.P.K.

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INDENBOM, V. L.

FD-3041

USSR/Physics - Stresses in shells

Card 1/2 Pub. 153 - 10/23

Author : Indenbom, V. L.

Title : Application of the polarization-optic method to the analysis of stresses in shells of revolution

Periodical : Zhur. tekh. fiz., 25, February 1955, 256-260

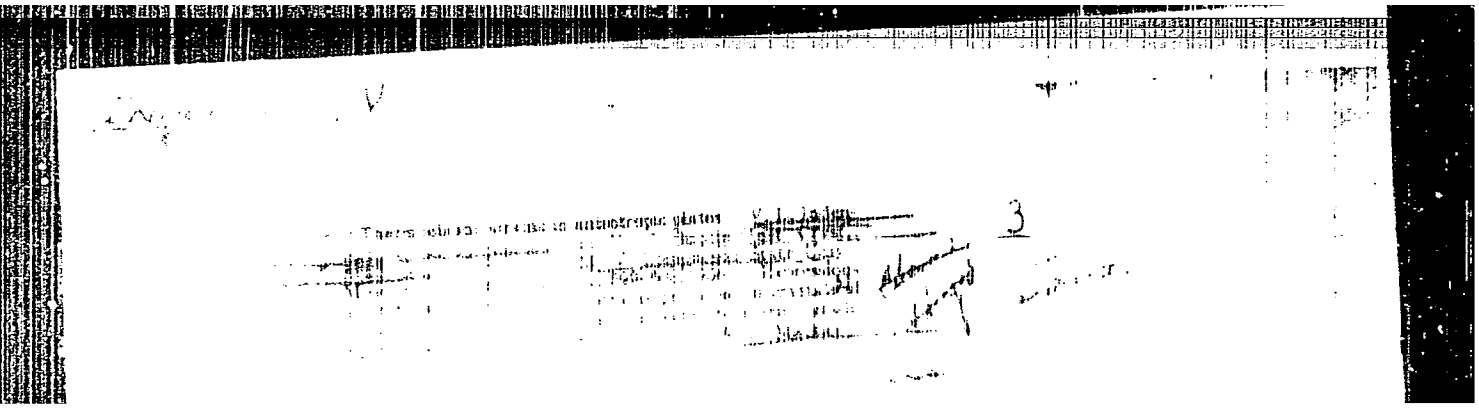
Abstract : With the help of the theory of thin shells the author establishes the basic relations between the stress distribution and the polarization-optic method observed in an axisymmetrically stressed shell of revolution under normal translucence (radioscopy); namely, the author's aim is to map out a course for directly applying the optical method to investigations of axisymmetrically stressed state of transparent shells of revolution and to indicate any possibilities of separating peripheral and meridional stresses and of evaluating the magnitude of bending stresses. He concludes that the developed ideas can be utilized for employing the optical method to measure residual stresses in glass shells and vessels and also to measure stresses caused by external or internal pressures in

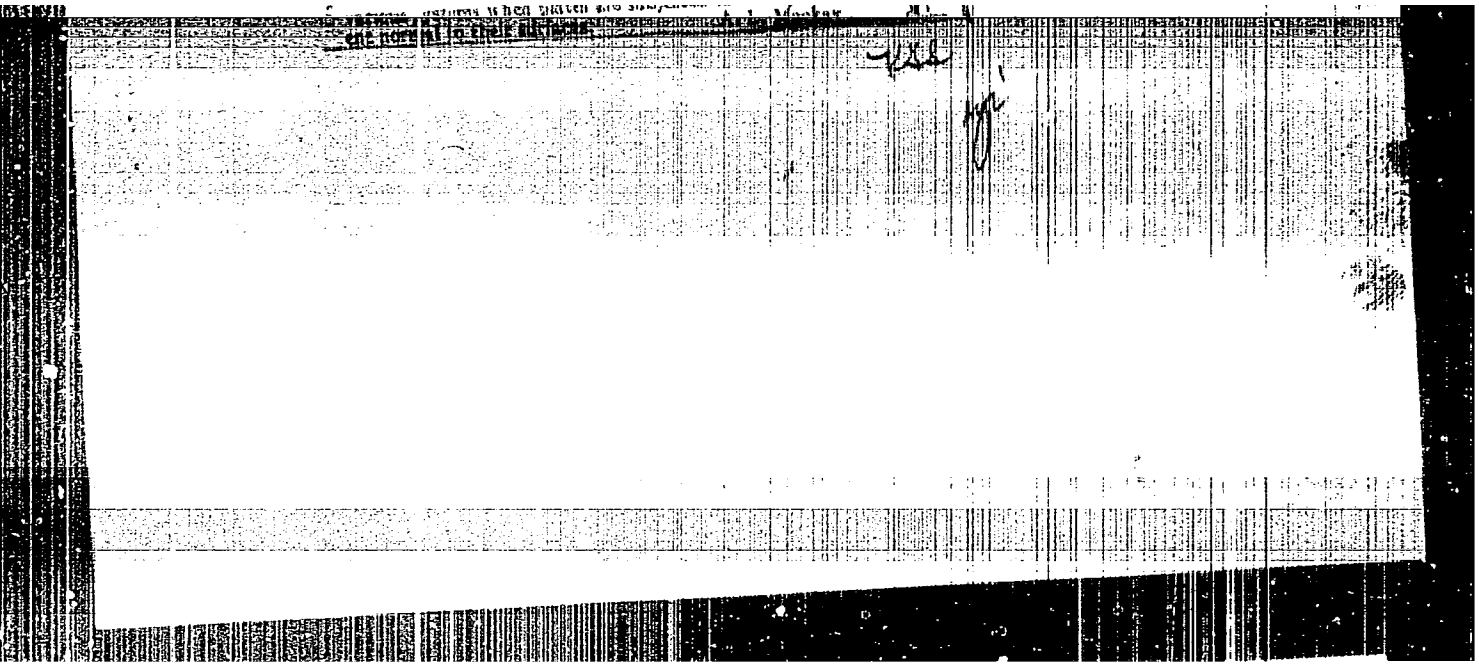
Card 2/2

Abstract : glass parts of various devices. He thanks V. L. Ginzburg, Corresponding Member of Academy of Sciences USSR, for his comments. Ten references: e.g. V. L. Ginzburg, ibid., 14, 181, 1944.

Institution : -

Submitted : September 8, 1954





... control test of annealed glass ware by the ray-differenc... Vol 1, 4, 1956). In

INDENBOM, V.L.

Chemical Technology. Chemical Products and their Application
Glass. Ceramics. Building Materials.

s Jour: Referat Zh.-Kh., No 8, 1957, 27632.

uthor : V.L. Indenbom.
Inst :
Title : Stresses in Sheet Glass and Methods of Their Measurement.

Orig Pub: Steklo i keramika, 1956, No 9, 18-23.

Abstract: According to the existing methods of checking sheet glass fritting, the tests with visible light for the determination of stresses in it are carried out with rays passing parallelly to the glass surface and the tensile and compressior strains in layers parallel to the glass surface are revealed by these methods. These strains equal to 20-50 m/cm cannot be the cause of the decrease of thermal or mechanical strength of glass. The irregularities of the distribution of strains in the plane of a glass sheet residual after the fritting and which cannot be detected by such a method

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USSR/ Analytical Chemistry. Analysis of Inorganic Substances. G-2

Abs Jour: Referat. Zhur.-Khimiya, No. 8, 1957, 27142.

is from 0.1 to 0.15%. If the content of K_2O was known, the digression of the expansion ratio of glass from the given ratio allows for the determination also of the content of Na_2O. The complete determination is carried out in about 1 hour.

Card 2/2

IEDEEBOM, V.L.

Comparative evaluation of different methods for testing heat resistance of glass. Zav.lab.22 no.11:1388-1390 '56. (MLRA 10:2)

1. Institut kristallografii Akademii nauk SSSR.
(Glass--Testing)

SUBJECT USSR / PHYSICS
AUTHOR KITAJGORODSKIJ, I.I., INDENBOM, V.L.
TITLE The Solidification of Glass by Quenching.
PERIODICAL Dokl.Akad.Nauk, 108, fasc.5, 843-845 (1956)
Issued: 8 / 1956 reviewed: 10 / 1956

After the progress made in prewar years development within this field was only slow. The degree of hardening characterized by tensions in the central plane of a glass plate could not be increased beyond 0,2 and 0,3 with a glass thickness of 6 and 20 mm respectively in spite of complicated blowing devices. According to V.L.INDENBOM, Žurn.techn.fis, 24, 925 (1954) there is no difference between the theoretical and the technical boundary value of the degree of hardening. An exact computation for the dependence of the degree of hardening φ on the intensity of heat transfer characterized by the criterion of Biot (Bi = ha; h = relative coefficient of the emission of heat on the surface, a = half thickness of the plate) is possible by a formula $\varphi(\delta)$. Here δ denotes the first root on the equation $\delta \operatorname{tg} \delta = Bi$. Accordingly, the limit value of hardening at Bi = ∞ is 0,617 and it is true that $\varphi_{max} = 1 - 2/\pi \sim 0,3634$. The above formula is illustrated by a diagram with dimensionless coordinates $\varphi = \varphi(Bi)$ and is compared with more recent experimental data. The degrees of hardening attained at present correspond to the value Bi ~ 5,3, and for a further increase of the degree of hardening by 15% the intensity of the heat transfer must be doubled. However, the possibilities for the solidification of glass need herewith not yet

be exhausted. The above data refer to tensions in the central plane of the plate, whereas the solidity of the hardened glass is determined by tensions on its surface. Unfortunately the authors only quite recently succeeded in developing a method for the direct determination of the surface tension of hardened glass from the modification of the degree of hardening on the occasion of a successive grinding of the surface layers. According to various experimental data the ratio $\mathcal{H}$ = (tension on the surface of the plate / tension in its central plane) may change within very wide limits (about from $\mathcal{H}$ =-1 to $\mathcal{H}$ =-3). The surface tension of hardened glass can be determined indirectly from its solidification with respect to annealed glass. By means of INDENBOM'S theory of hardening it is possible to determine the theoretical dependence between the tensions on the surface and in the middle layers of regularly heated glass. The corresponding formula is given, and the curve obtained agrees satisfactorily with experimental data.

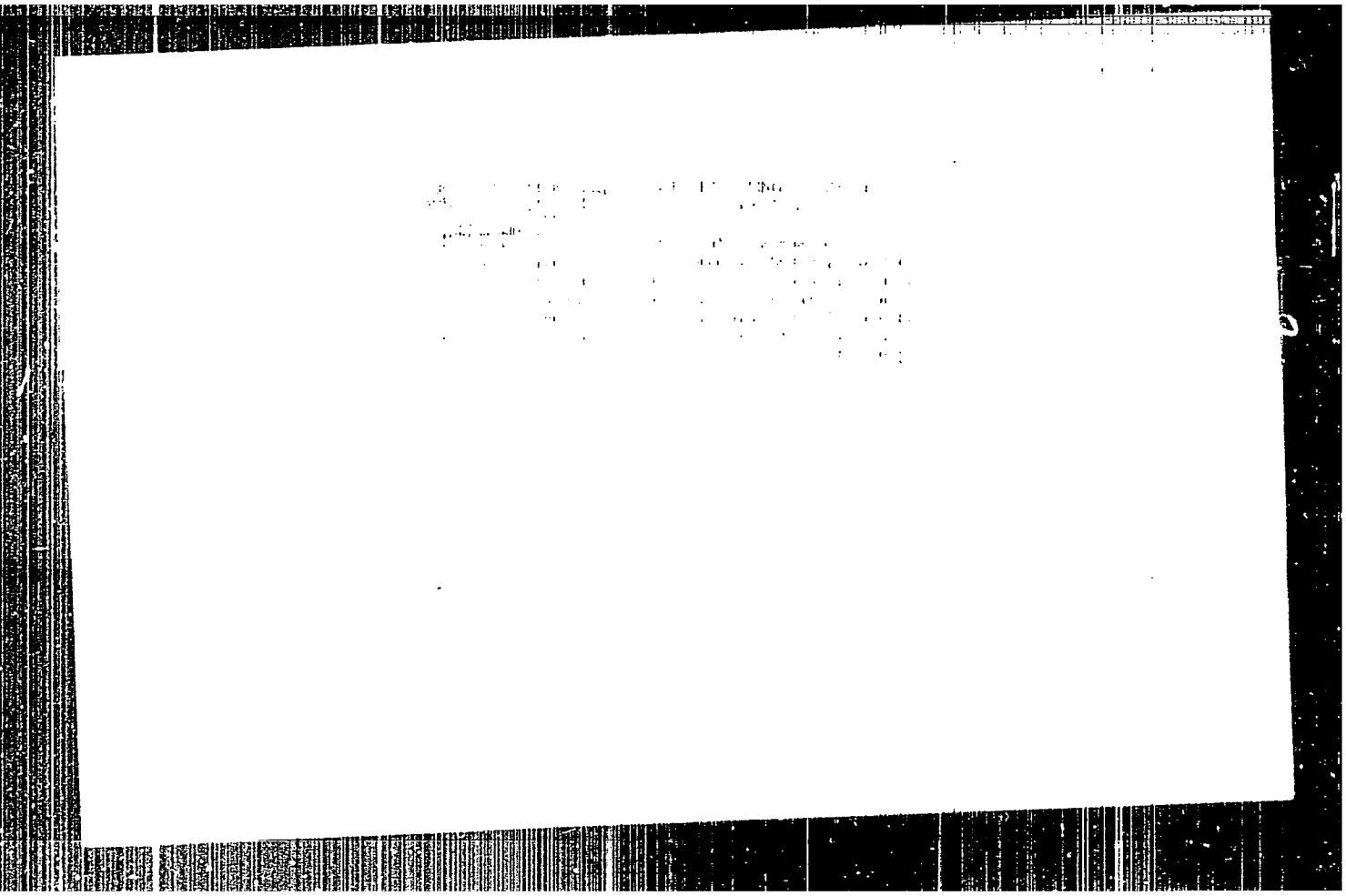
Thus, the present experimental data confirm V.L.INDENBOM'S theory, according to which the possibilities for the solidification of glass are by no means exhausted, in a convincing manner.

INSTITUTION: Moscow Chemical-Technological Institute "D.I.MENDELEEV"

INDENBOM, V.L.; CHERNYSHEVA, M.A.

Edge dislocation loop in Rochelle salt cyrstals. Dokl. AN SSSR 111 no.3:596-598 N '56. (MLRA 10:2)

1. Institut kristallografii Akademii nauk SSSR. Predstavleno akademikom A.V. Shubnikovym.
(Potassium sodium tartrate) (Dislocation in crystals)



APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618610011-7"

INDENBOM, V.L.; TOMILOVSKIY, G.Ye.

Macroscopic boundary dislocations in corundum crystals. Kristallografiia 2 no.1:190-192 '57. (MLRA 10:7)

1. Institut kristallografii Akademii nauk SSSR.
(Corundum crystals) (Dislocations in crystals)

70-4-13/16

AUTHORS: Indenbom, V.L. and Chernysheva, M.A.

TITLE: The Significance of the Optical Investigation of the Domains of Rochelle Salt for the Theory of Ferroelectricity. (Znacheniye opticheskogo issledovaniya domenov segnetovoy soli dlya teorii segnetoelektrichestva).

PERIODICAL: Kristallografiya, 1957, Vol.2, Nr 4, pp.526-535 (USSR)

ABSTRACT: The birefringence of Rochelle salt allows the domain structure to be observed directly because adjacent domains (with different polarisation directions) have different extinction directions when viewed with a polarising microscope. Changes in the domain structure with temperature or field can thus be followed. A quantitative measurement of the rotation of the extinction direction from the symmetrical position serves as a parameter of the "monoclinicity" of the crystal or the departure from the orthorhomic pseudosymmetry. This parameter can be used in thermodynamic calculations in the theory of ferroelectricity. The thermodynamic potential is expanded about the Curie temperature $T = \Theta$ as a series in η^2 where η is the parameter of asymmetry. The coefficients of the series can be derived from C_p and the variations of η with T. As a measure of η either the polarisation P_x

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70-4-13/16

The Significance of the Optical Investigation of the Domains of Rochelle Salt for the Theory of Ferroelectricity.

(along the axis of ferroelectricity X), the shear deformation y_z or the rotation α of the optical indicatrix about the X-axis can be used. Any two of these quantities can be expressed in terms of the third and the applied field. The optical measurements are the most convenient; η varies from 0 to 1.2° over the temperature range 24 to 0 C. A model (illustrated) of the thermodynamic potential function $\Phi(T,\eta)$ in the neighbourhood of the Curie point has been constructed. Data from Cady as well as indicatrix measurements were employed. There are 10 figures and 16 references, 10 of which are Slavic.

ASSOCIATION: Institute of Crystallography, Ac.Sc., USSR. (Institut Kristallografii, AN SSSR).

SUBMITTED: February 23, 1957.

AVAILABLE: Library of Congress.

Card 2/2

70-5-4/31

AUTHOR: Indenbom, V.L.

TITLE: The Macroscopic Theory of the Formation of Dislocations in the Growth of Crystals (Makroskopicheskaya teoriya obrazovaniya dislokatsiy pri roste kristallov)

PERIODICAL: Kristallografiya, 1957, Vol.2, No.5, pp. 594 - 603 (USSR)

ABSTRACT: The formation of dislocations in the process of growth of a crystal is regarded, not as a chance happening associated with this or that error in the growth, but as an essential consequence of the non-equilibrium distribution of temperature in the growing crystal. It is only thanks to the formation of dislocations that incompatible temperature distributions do not lead to the production of thermoelastic strains. The macroscopic density of dislocations, due to a temperature field $T = T(\underline{r})$ is characterised by the tensor $\hat{\beta} = -\operatorname{grad} T \times \hat{\alpha}$, where $\hat{\alpha}$ is the tensor of the temperature coefficients of thermal expansion of the crystal. In a simple cubic lattice the diagonal terms of $\hat{\beta}$ correspond to the density of screw dislocations and the off-diagonal terms to the density of edge dislocations. The theory developed is applied not only to dislocations formed in the growth of a crystal but to those formed in zone refining,

Cardl/2

70-5-4/31

The Macroscopic Theory of the Formation of Dislocations in the Growth of Crystals.

hardening and to the process of cooling a crystal after annealing. In the latter two cases the dislocations are formed not from the breaking of growing atomic planes but as a consequence of incompatible plastic deformations.
There are 7 figures and 17 references, 11 of which are Slavic.

ASSOCIATION: Institute of Crystallography Ac.Sc. USSR. (Institut Kristallografii AN SSSR)

SUBMITTED: February 7, 1957.

AVAILABLE: Library of Congress

Card 2/2

INDENBOM, V.L.; YURKOV, L.F.

Modernizing the LM-18Kh1000 annealing lehr. Stek. i ker. 14 no.5: 22-24 My '57. (MLRA 10:6)
(Glass furnaces)

56-4-9/52

AUTHOR: INDENBOM, V.L., CHERNYSHEVA, M.A.

TITLE: Construction of the Thermodynamic Potential of a Seignette Salt From the Results of the Optical Investigation of the Domains. (Postroyeniye termodinamicheskogo potentsiala segnetovoy soli po rezultatam opticheskogo issledovaniya domenov - Russian)

PERIODICAL: Zhurnal Eksperim.i Teoret.Fiziki,1957,Vol 32,Nr 4,pp 697-701(U.S.S.R.)

ABSTRACT: The paper under review determines from the experimental temperature dependence of the monoclinic parameter η and from the heat capacity c_p the thermodynamic potential of the Seignette salt with an accuracy up to the terms of the order of magnitude η^4. In the paper under review, its authors do not use certain simplifying presuppositions and simply set $\Phi = \bar{\Phi}(T,\eta^2)$. In this context, Φ denotes the thermodynamic potential and T stands for the temperature. The temperature dependence of the parameter of asymmetry is determined from the conditions $\partial\Phi/\partial\eta = 0$, $\partial^2\Phi/\partial\eta^2 = 0$, yielding two solutions: $\eta = 0$ at $(\partial\Phi/\partial\eta^2)_{\eta=0} > 0$ (outside of the Seignette-electrical interval) and $\eta = \eta_0$ within the Seignette-electrical interval. In this context, $\eta_0(T)$ satisfies the equation $(\partial\Phi/\partial\eta^2)_{\eta=\eta_0} = 0$, $(\partial^2\Phi/\partial(\eta^2)^2)_{\eta=\eta_0} > 0$. For the heat capacity the following expression is found: $c_p = -T\left[\frac{\partial^2}{\partial T^2} - \left(\frac{\partial\eta^2}{dT}\right)^2 \frac{\partial^2}{\partial(\eta^2)^2}\right]\Phi$. The exact construction of the surface $\Phi = \Phi(T,\eta)$ is put aside for the time being. Then the paper under review proceeds to determine the temperature dependence of the parameter of asymmetry. In this context, the

Card 1/2

Construction of the Thermodynamic Potential fo a Seignette Salt From the Results of the Optical Investigation of the Domains. 56-4-9/52

optical method seems to be most promising;with its aid it is possible to obtain an individual characteristic of the domains; It will be of advantage to use here as parameter of asymmetry the angle of rotation of the optical indicatrix around the x-axis.This angel is proportional to the spontaneous deformation of the domain,and it can be easily determined from the angle 2α between the extinction positions of the neighbouring domains.The results of the measurements are represented in a diagram.The monoclinic parameter of the Seignette salt varies continuously in the interval between the Curie points and reaches its maximum halfway between both Curie points (~3degrees centigrade).Then the paper discusses different details.From what was said above there arises the possibility of an exact construction of the surface of the thermodynamic potential directly from the optical characteristics of the domains.(3 reproductions).

ASSOCIATION Institute for Crystallography,Academy of Science of the U.S.S.R.
PRESENTED BY
SUBMITTED 22.11.1956
AVAILABLE Library of Congress.
Card 2/2

Indenbom, V.L.

53-3-9/10

AUTHOR: INDENBOM, V. L.

TITLE: V.T.RID: "Dislocation in Crystals", Publishing House for Metallurgy, 1957, pp 279, price 13,20 roubles, 4000 copies). (V.T.Rid: "Dislokatsii v kristallakh", Russian)

PERIODICAL: Uspekhi Fiz. Nauk, 1957, Vol 62, Nr 3, pp 377-379 (U.S.S.R.)

ABSTRACT: A translation of this book by V.N.GEMINOV and V.S.IVANOV was published under the editorship of the corresponding member of the Academy J.A.ODING. By the fact that the translators independently introduced abbreviations, the book is somewhat difficult to understand. As, besides, unorthodox terms were introduced, intelligibility suffers in various cases. The reviewer points out a number of inexact and nearly garbling translations and recommends publishing a second revised edition. The first edition was sold out within 2 days.

ASSOCIATION: Not given

PRESENTED BY:

SUBMITTED:

AVAILABLE: Library of Congress

Card 1/1

20-2-17/60

AUTHORS: Kitaygorodskiy, I. I., Indenbom, V. L.

TITLE: The Internal Stresses in Hard and Glasses (Vnutrenniye napryazheniya v zakalennykh steklakh)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 114, Nr 2, pp. 297-300 (USSR)

ABSTRACT: In recent times the authors expanded the practical possibilities for the employment of the optical method in the quantitative analysis of the stresses in glass products of various forms, immediately from the results of the transillumination. Analogous to the plane photoelasticity the investigation of the stresses in the bodies of various forms is based on the corresponding equations for the equilibrium of the internal stresses. In transilluminations of massive bodies the beam of light successively goes through layers with stresses of various strength and direction and the interference-figure resulting from this is very complicated. The most simple relations are obtained for workpieces with symmetry of axis or symmetry of revolution. Formulae for the pertinent phase-difference are given. An alleged mistake made by J. H. Adams

Card 1/3

The Internal Stresses in Hard . . Glasses

and E. D. Williams is shown. The results found here for the cylinder and for the sphere are compared in two diagrams with the corresponding experimental results and are found to be in satisfactory agreement. In the cylinder the distance between the neutral zones is equal to the radius; the absolute amount of the phase difference in the domains with compression and expansion is equal. By investigations of the stresses in samples of different glasses which were quenched in oil-baths the authors determined the following: Internal expansion--stresses up to 30 - 32 kg/mm^2 do not yet cause a destruction of the glass. This value is about 4 times as high as the limit of stability of the glass in the case of extension. Further the amount of stresses on the surface of the glass can be determined from the average double refraction which was observed along the beam with maximum phase difference. This simple method permits a direct evaluation of the amount of stresses which either strengthen or weaken the surface of glass in any of its complex domains. The polarization-optical method also opens up interesting possibilities for the investigation of the distribution of stress in hardened vessels and bowls. There are 4 figures, and 7 references, 6 of which are Soviet.

The Internal Stresses in Hard Glasses

ASSOCIATION: Moscow Chemical and Technological Institute imeni D. I. Mendeleyev (Moskovskiy khimiko-tekhnologicheskiy institut im. D. I. Mendeleyeva)

PRESENTED: August 2, 1956, by P. A. Rebinder, Academician

SUBMITTED: July 4, 1956

AVAILABLE: Library of Congress

Card 3/3

INDENBOM, V.L.

20-4-25/60

AUTHORS: Indenbom, V. L., Tomilovskiy, G. Ye.

TITLE: Internal Stresses Around Unit Dislocations (Vnutrenniye napryazheniya vokrug yedinichnykh dislokatsiy).

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 115, Nr 4, pp. 723-726 (USSR)

ABSTRACT: According to the dislocation theory the atomic planes in the real crystals are only approximately parallel with each other. They may end within the crystal (boundary dislocations) or they may be connected with each other and form a single spiral surface (helicoidal dislocation). Every dislocation causes a local curvature of the lattice and is a source of internal stresses. According to many reliable experimental data the macroscopic curvature of a lattice in fact consists of the local curvatures of the lattice around individual dislocations. When the boundary dislocations are arranged in form of a so-called vertical series, the stresses caused by them compensate each other and the curvatures are arranged in a manner that the series as a whole is equivalent to a symmetric boundary of blocks. In this connection these blocks are mutually twisted round the angle = b/D; b signifies the Byurger (reote Buerger) vector of the dislocations and D - the distance between them. The investigation of a horizontal series of boundary dislocations makes it possible to check

Card 1/2

Internal Stresses Around Unit Dislocations.

the predictions of the theory on the dislocations as sources of internal stresses. By the way, such a checking of the theory was hitherto not successful. In the plane of a horizontal series of boundary dislocations the normal stresses acting along the Buerger vector of the dislocation line undergo a jump. The development of horizontal series of boundary dislocations may most probably be expected in the planes of the creeping. NaCl-crystals are not suitable for the quantitative investigation of the lines of creepind. Special mention deserves the development of local dislocations in places where thelines of creeping intersect each other. The theoretical data and the data experimentally found by the optical method are in satisfactory agreement. The usual elasticity theory is apparently quite suitable for the calculation of internal stresses in the interior of unit dislocations, at least in distances of some microns from the dislocation lines. There are 3 figures, 1 table and 14 references, 6 of which are Slavic.

ASSOCIATION: Institute for Crystallography AN USSR(Institut kristallografii AN (SSR)

PRESENTED: May 22, 1957, by A. V. Shubnikov, Academician

SUBMITTED: May 15, 1957

AVAILABLE: Library of Congress

Card 2/2

Indenbom V. L.

KLASSEN-NEKLUDOVA, M. V., INDENBOM, V. L., URUSOVSKAYA, A. A. and TOMILOVSKIY, G. E.

"Comparison of Deformed Crystals with Etch-Pattern Distribution,"

paper presented at the Conf. on Mechanical Properties of Non-Metallic Solids, Leningrad, USSR, 19-26 May 58.

Institute fo Crystallography of the Acad. Sci., USSR, Moscow.

SOV/70-3-1-12/26

AUTHORS: Indenbom, V.L. and Metelkin, I.I.

TITLE: Application of Artificial Anisotropy to Directed Fracture of Materials (Ispol'zovaniye iskusstvennoy anizotropii dlya napravlennogo razrusheniya materiala) (The Artificial "Cleavage" Effect) (Yavleniye iskusstvennoy "spaynosti")

PERIODICAL: Kristallografiya, 1958, Vol 3, Nr 1, pp 80 - 82 + 1 plate (USSR)

ABSTRACT: Synthetic anisotropic materials have been found useful in applications where a high mechanical strength was required in a particular direction. For example, combination of glass fibre and plastics resulted in sheet material with a tensile strength of 100 kg/mm^2. Artifical anisotropy can be produced either by a combination of two or more materials or by establishment of a certain distribution of internal stresses in an initially isotropic material. The present paper deals with an application of artificial anisotropy to production of fracture in a predetermined direction, i,e. formation of an artificial cleavage plane along which binding between atoms or ions is weakened. An example of directed fracture is a glass tube which snaps easily at the point where it was earlier heated locally. Such a tube is shown in polarised light in Figure 1; colour photographs in polarized light are reproduced in a plate (Figures 2, 3).

Cardl/2

Application of Artificial Anisotropy to Directed Fracture of Materials

Figure 4 shows the plot of elastic energy liberated on fracture of the glass tube of Figures 1-3 at distances from 0 to 7 mm on both sides of the cross-section which was preheated. The optimum fracture occurs in a narrow region which can be regarded as a cleavage plane. It was found also that if a crack starts outside the artificial cleavage plane, it tends to grow in the direction of that plane. This "self-focusing" property is very useful in practice since it helps to achieve fracture at a pre-determined cross-section. Figure 5 shows that directed fracture can be achieved in tubes of varied shapes: from very wide tubes with thin walls to thick-walled tubes with a narrow bore. There are 5 figures and 8 references, 6 of which are Soviet and 2 English.

ASSOCIATIONS: Institut kristallografii AN SSSR (Institute of Crystallography of the Ac.Sc.USSR)
Soyuznyy nauchno-issledovatel'skiy institut radiotekhnicheskoy promyshlennosti (Scientific Research Institute of the Radio-technical Industry)

SUBMITTED: January 12, 1957

Card 2/2

SOV/70-3-1-26/26

AUTHOR: Indenbom, V.L.

TITLE: Review. Dislocations in Crystals (Obzor. Dislokatsii v kristallakh)

PERIODICAL: Kristallografiya, 1958, Vol 3, Nr 1, pp 113-132 (USSR)

ABSTRACT: This is a lengthy review of the significant new developments in the dislocation field in the last 2-3 years (since the publication of A.J. Forty's review (Adv. in physics, 1954, Vol 3, pp 1-25). The sections are: What is a dislocation. Dislocations in the theory of elasticity. The macroscopic description of a dislocation. The relief on a crystal face and screw dislocations. The discovery of dislocations by the methods of etching and decoration. The macroscopic curvature of the lattice and dislocations. The dislocation structure of the faces of grains. Strains round dislocations. Plastic deformation as a result of the movement of a dislocation. Experimental confirmations of the mobility of a dislocation. Dislocations and other lattice defects. Conclusions.
It is concluded that only a few difficulties remain

Card1/3

Review . Dislocations in Crystals SOV/70-3-1-26/26

unresolved in the theory of dislocations. In particular, questions of the generation and multiplication of dislocations are still not clear. It is considered that the existence of Frank-Read sources has not been conclusively demonstrated experimentally. In any case "spontaneous" generation has also to be explained. The works of Stepanov and Rebinder show that the role of the actual structure of the surface layer has been underestimated. The application of dislocation theory to structure-sensitive physical properties is still embryonic. Monographs must be consulted for detailed information on topics only mentioned. Further work in the direction of understanding the behaviour of real crystal during plastic deformation must be undertaken.
There are 18 figures and 111 references, 28 of which are Soviet, 1 Czechoslovakian, 2 French, 4 German and 76 English.

Card 2/3

Review. Dislocations in Crystals SOV/70-3-1-26/26

ASSOCIATION: Institut kristallografii AN SSSR
(Institute of Crystallography of the Ac.Sc.USSR)

SUBMITTED: July 12, 1957

Card 3/3

USCOMM-DC-61,062

70-3-2-10/26

AUTHOR: Indenbom, V.L.

TITLE: The Mobility of Dislocations in the Model of Frenkel' and Kontorova (Podvizhnost' dislokatskiy v modeli Frenkelya - Kontorovoy)

PERIODICAL: Kristallografiya, 1958, Vol 3, Nr 2, pp 197 - 205 (USSR)

ABSTRACT: Static dislocations, as represented in the model used by Frenkel' and Kontorova (Zh.Eks.Teor.Fiz., 1938, Vol 8, Nr 19, p 1340) are examined. The dependence of the total energy of the displacements from the position of the centre of the dislocation relative to the atoms of the layer below determines the resistance to slipping, which decreases exponentially on increasing the widths of the dislocation and can be estimated from the lattice parameters. The result agrees with the law for the crystallographic choice of the glide elements known empirically. From this the calculation is carried out for a sinusoidal periodic field and estimations are made for an arbitrary periodic field due to the substrate. The magnitude of the strain necessary for the movement of the dislocations turns out to be roughly equal to the value of the critical shear strain observed in single crystals of metals. Acknowledgements to Prof. M.V. Klassen-Neklyudova and T.S. Kontorova.

SOV/70-3-5-10/24

AUTHORS: Indenbom, V.L. and Tomilovskiy, G.Ye.

TITLE: Measurements of Internal Strains in Crystals of Synthetic Corundum (Izmereniye vnutrennikh napryazheniy v kristallakh sinteticheskogo korunda)

PERIODICAL: Kristallografiya, 1958, Vol 3, Nr 5, pp 593-599 (USSR)

ABSTRACT: A tendency to split or crack, either spontaneously or under a light blow, has often been observed in corundum boules when half-boules, rods or other parts are worked. Here, the examinations of strains in such boules by polarised light is described. In orthoscopic illumination, when observing along the unique axis, the refractive index ellipse will coincide with the strain ellipse. The birefringence can be described by two piezo-optical coefficients. The difference in refractive indices can also be estimated conoscopically from observations of the optic axial angle and again only the photo-elastic constants are required. The latter were measured by a separate experiment by loading a corundum cube. The constant was 2.1×10^{-7} cm^2/kg with a deviation of 0.1 to 0.2 for various specimens. From the refractive indices $n_o = 1.770$ and $n_e = 1.762$, the difference in

Card1/2

Measurements of Internal Strains in Crystals of Synthetic Corundum

strains $s_1 - s_2 = 1.9 \times 10^4 (1 - \cos 2\Omega)$ kg/cm^2, where 2Ω is the optic axial angle. If $2E$ is the angle measured in air, then $\sin \Omega = 1/n_o \sin E$. Hence, $s_1 - s_2 = 0.6 \times 10^4 (1 - \cos 2E)$ kg/cm^2. The strains in a boule were plotted out and it was shown that there is considerable compressive strain in the central regions and tensile strain in the outer parts, the neutral layer being about 30% of the distance from the centre. This system would cause a marked tendency to splitting down the axis of symmetry. Strains in rods were also examined showing the same effect. In the two cases, the same maximum stress of 7.6 to 8.0 kg/mm^2 was found.

Acknowledgements are made to Professor M.V. Klassen-Neklyudova and N. Yu. Ikornikova.

There are 6 figures and 16 references, 15 of which are Soviet and 1 English.

Card 2/2

AUTHORS: Indenbom, V.L., Ananich, N.I. 72-58-6-5/19

TITLE: A Simple Method of Calculating the Regime of Annealing by Taking the Shape of the Product and the Properties of the Glass Into Account (Prostoy metod rascheta rezhima otzhiga s uchetom formy izdeliya i svoystv stekla)

PERIODICAL: Steklo i Keramika, 1958, [illegible], Nr 6, pp. 11-16 (USSR)

ABSTRACT: The authors say that at present there are no reliable methods of calculating the annealing regime of glass products, which may e.g. be gathered from the book by V.A.Kuzyak, which contains many mistakes. This article describes a new method of calculation, which is based upon the latest theoretical and experimental research work carried out by TsNILES for the elaboration and introduction of accelerated regimes of annealing as well as of controlling and modernizing continuous production annealing furnaces (1952-1955). Calculation is suited for the selection of the annealing regime for glass of any composition, without it being necessary to know its chemical composition and its physical properties with the exception of resistance to heat and the zone limits of annealing.

Card 1/4

A Simple Method of Calculating the Regime of Annealing by Taking the Shape of the Product and the Properties of the Glass Into Account

72-58-6-5/19

1.) Determination of initial data is carried out by a method which is contained in GOST 7328-55, as worked out by TsNILES and in the standards VN MPSS 937-52. In order to ascertain the zone limits of annealing the polarimeter (fig. 1) is used. From the temperature curves shown (fig. 2) the zone limits may be ascertained. Standards VN MPSS 938-52 give a detailed description of this method, which is based upon that used by S.G.Lioznyanskaya and S.I.Iofe (Ref 1). The average values of resistance to heat and of the zone limits for the most-known types of industrial glass are mentioned in table 1.

2.) The purpose of annealing and permissible limits (tolerances). Optical and thermal glass is annealed in order to stabilize its structure; in the case of all other types of glass this is done merely in order to reduce residual stress to an amount that exercises practically no influence on the strength of the glass any longer.

3.) Selection of the basic parameters of the regime. The cycle of annealing consists of the following 4 stages: Heating up to annealing temperature, critical interval, slow cooling down in

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the zone of annealing, and complete cooling down. Fig. 3 shows a scheme for the selection of the most important parameters of the regime of annealing, which depend on the permissible temperature drop δT in the product. This value is expressed in table 2 as part of the resistance to heat.

4.) The drop in temperature in the glass walls. A formula (3) is given which makes it possible to convert the values given in table 2.

5.) Taking account of the shape of products. The authors refer to the work by V.L.Indenbom and B.A.Reznikov (Ref 1). When annealing products of complicated shape, also the parasitic temperature drops in the product itself must be taken into account, which are caused by differences in the dimensions of the glass. Formulae (4) and (5) are given for the calculation of these temperature drops.

6.) Approximative calculation of the coefficients of temperature conductivity and heat transfer. The coefficient of temperature conductivity can be assumed to amount to 0.25 cm/minute. The

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coefficient of the relative surface heat transfer depends on the temperature of the product and of the furnace. Furthermore, 2 formulae and an example are given for its calculation. Reference is also made to the work by N.I.Ananich. There are 3 figures, 2 tables, and 5 references, 5 of which are Soviet.

ASSOCIATION: Tsentral'naya nauchno-issledovatel'skaya laboratoriya elektrotekhnicheskogo stekla (Central Scientific Research Laboratory for Electrotechnical Glass)

1. Glass--Heat treatment 2. Glass--Heat transfer
3. Mathematics

Card 4/4

AUTHOR: Indenbom, V. L.

[illegible]72-58-8-17/17

TITLE: A Textbook on the Burning of Glass (Posobiye po otzhigu stekla)

PERIODICAL: Steklo i keramika, 1958, Nr 8, pp. 48 - 48 (USSR)

ABSTRACT: The Czechoslovakian State Publishing House for Technical Literature published a monography of František Schill "The Burning of Glass" (1955). The book is written mainly for technical schools and colleges of the glass industry. A critical review of the book is given. There is 1 reference.

1. Glass--Processing 2. Literature

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24(2), 24(3)

AUTHORS: Indenbom, V. L., Chernysheva, M. A. SOV/48-22-12-15/33

TITLE: Individual Characteristics of Domains of Seignette Salt (Individual'nyye kharakteristiki domenov segnetovoy soli)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1958, Vol 22, Nr 12, pp 1469-1471 (USSR)

ABSTRACT: As is known, the polarization process in piezoelectrics is very complicated. It is not only accompanied by the growth of single domains at the expense of other ones, but also by a variation in polarization of every single domain. The spontaneous polarization and deformation of Seignette salt crystals are apparently connected with the genetic history of the samples and decrease in continuous measurement. Attempts were made to carry out direct measurements of the spontaneous deformation of the Seignette salt domains. Vitovskiy showed (Ref 7) that the Seignette salt crystals have grooves in the c plane. The expected profile was actually discovered on the surface of the cleavage crystals in the c plane (Fig 2). Interferometric investigations of the cleavage plane show, as expected, that the "roofs" have a slight slope. It can be seen from figure 3 that the interference bands proceed in a

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straight line on the entire length of the domain. On exceeding the domain boundary they suddenly change direction. The quantitative elaboration of interferometric data, however, showed an unexpected result which requires further experimental investigations to be explained. It was observed that when the groove exceeds the block boundary consisting of a dislocation nucleus (or net) a number of steps originate, which assemble into macroscopic steps. As a consequence, characteristical "tree-shaped" phenomena of the cleavage steps must be formed. Examples of such tree-shaped phenomena are shown in figure 5. It can be assumed that the microstructure of the domains is dependent on individual dislocations. Since a connection between the diagrams of the domains and the arrangement of the dislocations could be determined on investigating the microstructure of the cleavage plane, such investigations can be very useful when studying any structure-sensitive properties

of piezoelectrics. There are 5 figures and 10 references, 6 of which are Soviet.

ASSOCIATION: Institut kristallografii Akademii nauk SSSR (Institute of Crystallography, Academy of Sciences, USSR)

SOV/20-125-4-27/53

24(2)

AUTHORS: Indenbom, V. L., Tomilovskiy, G. Ye.

TITLE: The Microstructure of the Stresses in Slip Lines and Dislocations (Mikrostruktura napryazheniy v liniyakh skol'zheniya i dislokatsii)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 125, Nr 4, pp 673-676 (USSR)

ABSTRACT: Measurement of macrostresses gave the following result: To each etched figure (which, according to assumptions, corresponds to the end of an atomic dislocation line) there actually corresponds on the average a displacement which is approximately equal to the lattice parameter in the direction of slipping. For the final solution of the problem of slip line dislocation structure it is, however, necessary to resolve the fine structure of the field of stresses and to disclose the effects produced by individual dislocations. Besides, it must be shown that this structure corresponds to the suggested order of dislocations. The calculation is outlined in short, and the expression found for the summated function of stresses is written down. A further expression characterizes the density field, which determines, among other things, the dispersion

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of light by the active slipping surface. Such an effect can occasionally be observed in polished transparent crystals. Further expressions given here determine the field of the double refraction caused by the slip line. A diagram shows the calculated polarization-optical diagram in the case of crossed Nicols. In NaCl-crystals a double refraction of the order of 1 μ/cm is attained only if the distance between the dislocations is of the order of the resolving power of an optical microscope. The second figure shows a total view of one of the samples under investigation. The etching of such a sample in a potassium bisulfate or in a boiling orthophosphoric acid furnishes a drawing of the slip lines and twin boundaries which is in good agreement with the optical image. As a result of repeated etching and grinding only the position of the etched figures changes which are connected with chance scratches on the surface of the sample. The third picture illustrates the image of the microstresses in the slip lines which was observed after the double refraction stripes corresponding to the macroscopic stresses had been extinguished. The same figure shows photographs

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of the distribution of the etch patterns on the same parts of the sample. The most distinct image obtained herefrom is by far more complicated than the calculated one. It may be hoped that the microstresses observed are the same that occur also in the dislocation scheme of the slip line and which correspond to the conception of atomic discreteness of the translation displacement. The authors observed a microstructure of stresses practically in all slip lines and slip bands found in the investigated samples of synthetic corundum. The here discussed optical method of investigating dislocations is also suited for the solution of other problems requiring an investigation of the mechanism of the collective displacement of atoms in crystals. There are 3 figures, 1 table, and 12 references, 9 of which are Soviet.

ASSOCIATION: Institut kristallografii Akademii nauk SSSR
(Institute of Crystallography of the Academy of Sciences, USSR)

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INDENBOM)
INDEBOM, Vladimir L'vovich

"Phase Transitions without Altering the Number of Atoms in the Unit Cell"

a report presented at Symposium of the International Union of Crystallography Leningrad, 21-27 May 1959

INDENBOM, V.L.

24(6) PHASE I BOOK EXPLOITATION SOV/2385

Akademiya nauk SSSR

Nekotoryye problemy prochnosti tverdogo tela; sbornik statey (Some Problems in the Strength of Solids; Collection of Articles) Moscow, Izd-vo AN SSSR, 1959. 386 p. Errata slip inserted. 2,000 copies printed.

Ed. of Publishing House: V. I. Aver'yanov; Tech. Ed.: R. S. Pevzner; Editorial Board: A.F. Ioffe, Academician; G. V. Kurdyumov, Academician; B. P. S. N. Zhurkov, Corresponding Member, USSR Academy of Sciences; F. F. Vitman, Konstantinov, Corresponding Member, USSR Academy of Sciences; F. F. Vitman, Doctor of Physical and Mathematical Sciences, Professor (Resp. Ed.); L. A. Glikman, Doctor of Technical Sciences, Professor; N. A. Zlatin, Doctor of Physical and Mathematical Sciences; V. A. Stepanov, Doctor of Technical Sciences; Ya.B. Fridman, Doctor of Technical Sciences, Professor; B. B. Ioffe, Candidate of Technical Sciences (Deputy Resp. Ed.).

PURPOSE: This book is intended for construction engineers, technologists, physicists and other persons interested in the strength of materials.

COVERAGE: This collection of articles was compiled by the Otdeleniye fiziko-matematicheskikh nauk AN SSSR (Department of Physical and Mathematical Sciences) and the Fiziko-tekhnicheskiy institut AN SSSR (Institute of Applied Physics, Academy of Sciences, USSR) in commemoration of the 80th birthday of Nikolay Nikolayevich Davidenkov, Member of the Ukranian Academy of Sciences, founder and head of the Otdel prochnosti materialov (Department of the Strength of Materials) at the Institute of Applied Physics, Academy of Sciences, USSR, founder of the Fakul'tet fizicheskogo metallovedeniya (Department of Physical Metallurgy) at the Leningradskiy politekhnicheskiy institut (Leningrad Polytechnic Institute), recipient of the Stalin Prize (1943), the Order of the Red Banner of Labor (1945) and the Order of Lenin (1953). The articles deal with the strength of materials, phenomena of imperfect elasticity, temper brittleness, hydrogen embrittlement, cold brittleness, influence of deformation speed on the mechanical properties of materials, fatigue of metals, and general problems of the strength, plasticity, and mechanical properties of nonmetals. Numerous personalities are mentioned in the introductory profile of Professor Davidenkov. References are given at the end of each article.

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SOV/70-4-1-16/26

AUTHORS: Indenbom, V.L. and Urusovskaya, A.A.

TITLE: What are "Irrational Twins"? (Chto takoye "irratsional'nyye dvoyniki"?)

PERIODICAL: Kristallografiya, 1959, Vol 4, Nr 1, pp 90 - 98 (USSR)

ABSTRACT: Theoretical and experimental investigations are presented of the type of plastic deformation of NaCl crystals discovered by Brilliantov and Obreimov (Ref 4) and connected with the formation of "irrational twins". The representations of the translation mechanism of the re-orientation of the lattice as "twins" are confirmed by results of selective etching and also by optical, X-ray and interferometric studies on crystals of NaCl and LiF. It is demonstrated that in the deformation of crystals of the NaCl type any difference in the selection of favoured elements of gliding in different parts of the specimen must lead to the formation of differently oriented regions possessing all the basic properties of "irrational twins". Taking a cubic crystal bounded by the cube faces {100} - suppose that slip can occur on the {110} planes in (for 110) the [1$\bar{1}$0] direction. If the crystal is considered in two parts, divided by the 110 plane, then, if

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one part slips on the 011, 01$\bar{1}$ planes it will become longer in the [0$\bar{1}$0] direction. If the other part slips on the 101 and 10$\bar{1}$ planes it will be elongated in the [100] direction. The two parts suffering extensions in different directions and still having a plane in common will, therefore, be rotated about [001] through a small angle with respect to each other. The two parts will then be in an irrational twin relationship to each other. The production of such twins depends on external conditions which favour gliding in different directions in different parts of the crystal block. Crystals of LiF which had undergone such treatment showed, after selective etching in 3% H_2O_2 to show surface dislocations, the expected sort of patterns. Because of the anisotropic mechanical strain near the twin boundary birefringence may arise there. The strain is calculated in terms of the elastic constants and agrees in order of magnitude with that observed. It is suggested that it would be more accurate to replace the term "irrational twins" by the term "Brilliantov-Obreimov bands".

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Acknowledgments are made to Academician I.V. Obreimov, Professor N.A. Brilliantov and Professor M.V. Klassen-Neklyudova for their advice.
Presented at the International Conference on Mechanical Properties of Non-metallic Substances, May, 1958.
There are 6 figures and 10 references, 7 of which are Soviet and 3 English.

ASSOCIATION: Institut kristallografii AN SSSR (Institute of Crystallography of the Ac.Sc., USSR)

SUBMITTED: August 14, 1958

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SOV/70-4-1-17/26

AUTHORS: Indenbom, V.L. and Urusovskaya, A.A.

TITLE: Strains and Rotations of the Lattice During the Surface Distribution of Dislocations, Arising in the Process of Plastic Deformation (Appendix) (Napryazheniya i povoroty reshetki pri poverkhnostnom raspredelenii dislokatsiy, voznikshem v protsesse plasticheskoy deformatsii) (Prilozheniye)

PERIODICAL: Kristallografiya, 1959, Vol 4, Nr 1, pp 98 - 100 (USSR)

ABSTRACT: A mathematical analysis of the question "What are "Irrational Twins"?" (pp 90-98 of this journal) is given.
There are 4 references, 1 of which is Soviet, 1 English, 1 German and 1 international.

ASSOCIATION: Institut kristallografii AN SSSR (Institute of Crystallography of the Ac.Sc., USSR)

SUBMITTED: August 14, 1958

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SOV/70-4-4-27/34

AUTHOR: Indenbom, V.L.

TITLE: The Connection of the Groups of Antisymmetry and Colour Symmetry with One-dimensional Representations of the Usual Symmetry Groups. The Isomorphism of the Shubnikov and Fedorov Groups

PERIODICAL: Kristallografiya, 1959, Vol 4, Nr 4, pp 619-621 (USSR)

ABSTRACT: Shubnikov obtained the antisymmetry groups by examining the anti-identity operation R as well as the identity operation E . The usual groups $G = \{g_i\}$, if multiplied by R give the grey groups $\{E, g_i\}$ and if combined with R , the black and white groups. If R is the reversal of current direction and G the charge distribution, then their combination gives the magnetic groups. It is shown that all pure groups of anti-symmetry, which can be obtained from a given symmetry group, are determined by the one-dimensional real representations of this group and are isomorphous with it. That is, they have identical properties to those groups in spite of

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containing other operations. Each real (non-unitary) one-dimensional representation τ of the group G gives an isomorphous reflexion of this group in the antisymmetry group $\bar{G}$. The character $\chi_R(g)$ of τ is ± 1. We combine with the operation R those elements g_i of the Group G, the characters of which are -1, having left unchanged the remaining elements of g_j. It is easy to see that the choice of the elements $\{Rg_i, g_j\}$ forms a group of antisymmetry $\bar{G}$ isomorphous with G, in as much as R commutes with all elements of G, $R^2 = E$ and the character of the product of two elements in the one-dimensional representation is equal to the product of the characters. Thence, it follows that substitution of R for E in the pure groups of antisymmetry does not give homomorphs but isomorphous reflexions

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of these groups in the usual symmetry groups. On the other hand, if the group $\bar{G}$ is a group of pure antisymmetry with respect to G, then these groups have a one-dimensional real product τ. In this $\chi(g) = 1$, if g is a common element of G and $\bar{G}$, and $\chi(g) = -1$ if to the element g of G there corresponds an element Rg of $\bar{G}$. Thus, the problem of finding the one-dimensional real representations of a given group and the problem of finding the antisymmetry groups are equivalent. A table of the connections between the magnetic classes and the one-dimensional real representations of the crystal classes is given. Acknowledgments are made to A.V. Shubnikov. There are 1 table and 7 Soviet references.

ASSOCIATION: Institut kristallografii AN SSSR (Institute of Crystallography of the Ac.Sc., USSR)

SUBMITTED: April 27, 1959

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SOV/20-128-5-11/67

~~16 (1)~~ 24.4100

AUTHOR: Indenbom, V. L.

TITLE: Reciprocity Theorems and Influence Functions for the Tensors of Dislocation Density and Dislocation Incompatibility

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 5, pp 906-909 (USSR)

ABSTRACT: M. V. Mayzel' (Ref 1) gives a generalization of the theorems of reciprocity by Maxwell-Betty for the case of remanent deformation. Supposing the first of two similar bodies I and II (generally under the influence of different stress) to have the remanent deformations e^{o}_{ij}; the elastic deformations e_{ij}, and the strains σ_{ij} in these bodies are then connected by the relation $e^{I}_{ij}\sigma^{II}_{ij} = e^{II}_{ij}\sigma^{I}_{ij}$, according to Hooke's law. Summation is to be carried out over repeated indices. Since the total deformation $1/2\ (u_{i,j} + u_{j,i})$, corresponding to the dislocation vector u_i, coincides with the elastic deformation in the second body, and is composed of elastic and remanent deformation in the first body, the relation

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$(u^{I}_{i,j} - e^{o}_{ij})\sigma^{II}_{ij} = u^{II}_{i,j}\sigma^{I}_{ij}$ is obtained. Thus, the generalized reciprocity theorem is obtained by integration over the volume of the body in consideration of the equations for equilibrium of strains. Strains produced by a concentrated force have the effect of the influence functions for remanent deformations. Theorems similar to those by Betty—Maxwell may be defined for bodies whose state of stress is produced by a certain distribution of dislocations β = curl ε^{o} or by the incompatibility of the deformations η = curl (curl e)* = = - curl (curl e_o)*. The asterisk denotes the transposed tensor. The author then introduces the stress functions ψ_{ij} and ψ_{ij}, which correspond to the conditions σ = curl ψ = curl (curl ψ)*. In the second equation given in the present paper those derivatives are separated which yield the surface terms on integrating over the volume. After some further operations, the author arrives at the desired relations of reciprocity, which may be written down for various combinations of the type $\sigma\varepsilon$, $\psi\beta$, and $\psi\eta^{*}$. Thereafter formulas are given for the case

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in which body I is free of external stress, but contains (internal) dislocations, and is under the influence of one concentrated force only. In other words, the stress functions for the concentrated force have the effect of influence functions for the dislocations and for the incompatibility of deformations. All formulas given hitherto in this paper hold for any anisotropic medium. If the stress functions for arbitrary 3 noncoplanar directions of the action of a concentrated force in such a medium have been found, the problem of calculating the field of dislocations for any distribution of dislocations or incompatibility of deformations can be reduced to a simple integration. In discussing examples of application of this method, the author restricts himself to some problems concerning elastic isotropic media. These examples raise the hope that the method of reciprocity relations and influence functions will help to solve various problems of the theory of elasticity for bodies possessing dislocations or incompatible deformations. There are 5 references, 3 of which are Soviet.

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Reciprocity Theorems and Influence Functions for the Tensors of Dislocation Density and Dislocation Incompatibility

ASSOCIATION: Institut kristallografii Akademii nauk SSSR (Institute of Crystallography of the Academy of Sciences, USSR)

PRESENTED: May 14, 1959, by A. V. Shubnikov, Academician

SUBMITTED: May 12, 1959

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INDENBOM, V.L.

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PHASE I BOOK EXPLOITATION SOV/4609

Akademiya nauk SSSR. Institut nauchnoy informatsii

Nekotoryye voprosy fiziki plastichnosti kristallov (Some Problems in the Physics of the Plasticity of Crystals) Moscow, 1960. 209 p. (Series: Itogi nauki: Fiziko-matematicheskiye nauki, 3) 2,700 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Vsesoyuznyy institut nauchno-tekhnicheskoy informatsii.

Resp. Ed.: M. V. Klassen-Neklyudova; Ed. of Publishing House: Ye. B. Kuznetsova; Tech. Ed.: S. G. Tikhomirova.

PURPOSE: This book is intended for physicists, metallurgists, and persons interested in crystallography and solid state physics.

COVERAGE: These 6 articles were compiled by personnel of the Laboratoriya mekhanicheskikh svoystv kristallov Instituta kristallografii AN SSSR (Laboratory of Mechanical Properties of Crystals of the Institute for

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