

GARBER, Il'ya Borisovich, ZHILINA, Ol'ga Vladimirovna, ROMANOV, Aleksandr Ivanovich, KOROL'KOV, I. I., red.; ZABRODINA, A.A., tekhn.red.

[Experience in the centralized repair of electrical equipment at electric power stations of the Leningrad Regional Power Authority].
Iz opyta tsentralizovannogo remonta elektrooborudovaniia na elektrostatsiakh Lenenergo. Moskva, Gos. energ.izd-vo, 1956. 70 p.

(MIRA 11:9)

(Electric apparatus and appliances--Maintenance and repair)

SOV/91-59-8-12/28

25(1)

AUTHOR: Garber, I.B., Engineer

TITLE: A Device for Removing Heavy Coupling Flanges

PERIODICAL: Energetik, 1959, Nr 8, pp 17-19 (USSR)

ABSTRACT: Until recently, heavy coupling flanges of large electric motors were removed by means of different screw devices. Three to four men were required because of the considerable weight of these devices. Using the experience of Sverdlovenergo, a hydraulic device for removing heavy coupling flanges was developed by Lenenergo, as shown in fig.1. The device consists of a telescopic U-shaped frame which is mounted on a three-wheel carriage. A small hydraulic press is connected to the frame. Its position may be adjusted according to requirements. Only one worker is required for removing the coupling flange of an electric motor. The device may be used for removing coupling flanges of up to 500 mm diameter, even when the centers of the motor shaft are 1.5 m above the floor. The weight of the entire device is 64 kg. Turbine oil is used in the hydraulic press. The height of the hy-

Card 1/2

SOV/91-59-8-12/28

A Device for Removing Heavy Coupling Flanges

draulic press is set by a winch. The author describes the process of removing a coupling flange in detail. There are 4 diagrams.

Card 2/2

GARBER, I.B., inzh.

Voltage indicator for electrical systems with voltage up to
500 volts using a cold-cathode thyratron. Energetik 11 no.10:
29-31 0 '63. (MIRA 16:11)

GARBER, I.B., inzh.

Improvement of manual lever shears. Energetik 12 no.1:21-22

Ja '64.

(MIRA 17:3)

GARBER, Isaak Semenovich; LYUBIMOVA, T.M., red.

[Magnetic pulse modulators] Magnitnye impul'snye moduliatory. Moskva, Sovetskoe radio, 1964. 158 p.
(MIRA 17:11)

GARBER, K.S., dotsent; NIKITIN, A.I.; LYAUDIS, B.V.; MALINOVSKIY, B.N., kand. tekhn.nauk; BEL'SKIY, O.I.; VOLKOV, L.G.; KUZNETSOV, M.P.; KUTSENKO, A.D., SOROKIN, A.A.; STAKHURSKIY, A.D.; TRUBITSYN, L.M.; TRUSEYEV, A.I.; SHAFRAN, I.K., inzh.; SHESTAK, P.I.; UL'YANOV, D.P.

Automatic control of converter smelting by means of compu' rs.
Stal' 23 no. 7:608-610 J1 '63. (MIRA 16:9)

1. Dneprodzerzhinskiy metallurgiches'iy zavod-vtuz im. M.I. Arsenicheva (for Garger). 2. Institut kibernetiki AN UkrSSR (for Malinovskiy). 3. Zavod im. Dzerzhinskogo (for Shafran).

GARBER, L.A.

Development of an ear for harmony and timbre in preschool
children. Vop. psikhol. no.5:103-112 S-0 '64 (MIRA 18:1)

1. Pedagogicheskiy institut, Taganrog.

GARBER, Mieczyslaw

Selection of leads in vectocardiography. Postepy hig. med, dosw, 11
no.4:461-478 1957.

(VECTOCARDIOGRAPHY,
selection of leads, review (Pol))

POLAND / Human and Animal Physiology (Normal and Pathological).
Blood.

T-4

Abs Jour : Ref Zhur - Biologiya, No 13, 1958, No. 60325
Author : Askanas, Z.; Garber, M.; Lukasik, E.; Stopczyk, M.;
Wajszczuk, W.
Inst : Not given
Title : The Comparison of the Stereocardiogram with the
Perspective Vectorcardiogram
Orig Pub : Polski tygod. lekar., 1957, 12, No 35, 1341-1344
Abstract : No abstract given

Card 1/1

EXCERPTA MEDICA Sec 18 Vol 3/8 Cardio. Dis. Aug 59

1980. Spatial vectorcardiogram. Influence of altered placement of electrodes in the Grishman's lead system and variations due to respiratory movements Wplyw fazy oddechowej i przemieszczenia elektrod w układzie Grishmana na wektokardiogram przestrzenny. GARBER M. and WAJSZCZUK W. IV. Klin. Chor. Wewn. A.M., Warszawa *Kardiol. pol.* 1958, 7/5 (313—322) Graphs 18 Illus. 12.

Small displacement of electrodes (about 2 cm.) in most cases showed no marked influence either on the VCG or on the interpretation. Deep respiratory movements in some cases caused deformation of the loop. This deformation may be misinterpreted as a sign of myocardial damage or vice versa. It is suggested that in doubtful cases the VCG examination should be repeated on full inspiration and complete expiration.

GARBNER, Mieczyslaw; MICHALOWSKI, Adam

Primary cancer of the liver in connection with the observation of two cases of that disease. Polski tygod. lek. 13 no.9:306-311 3 Mar 58.

1. (Z IV Kliniki Chorob Wewnętrznych A.M. w Warszawie; kierownik; prof. dr Z. Askanas i z Zakładu Anatomii Patologicznej A.M. w Warszawie; kierownik: prof. dr L. Paszkiewicz) Warszawa, Ociski 6, IV Klin. Chor. Wewn. A.M.

(LIVER NEOPLASMS, case reports
primary cancer (Pol))

ASKANAS, Zdzisław, GARBER, Mieczysław, LUKASIK, Elzbieta, WAJSZCZUK, Waldemar,
STOPCZYK, Mariusz

Stereocardiographic changes following commissurotomy. Polski tygod.
lek. 13 no. 15:541-546 14 Apr 58

1. (Z IV Kliniki Chorob Wewnętrznych A.M. w Warszawie; kierownik:
prof. dr med. Zdzisław Askanas). Adres: ul. Ocaki 6, IV Klin. Chor. Wewn.
A.M.

(COMMISSUROTOMY,
postop. spatial vectorcardiography (Pol))
(VECTORCARDIOGRAPHY,
spatial, after commissurotomy (Pol))

GARBER, Mieczyslaw (Warszawa, ul. Oczerki 6, IV Kl. Chorob Wewn. A.M.)

Acute poisoning by isonicotinic acid hydrazide in attempted suicide; case report. Polski tygod. lek. 14 no.18:823-825
4 May 59.

1. (Z IV Kliniki Chorob Wewnętrznych A. M. w Warszawie; kierownik: prof. dr med. Zdzisław Askanas).

(ISONIAZID, pois.

in attempted suicide, case report (Pol))

(SUICIDE

attempted by isoniazid pois., case report (Pol))

GARBER, Mieczyslaw

Synergistic therapy of edema with spiro lactone and chlorothiazide.
Polskie arch. med. wewn. 31 no.12:1641-1648 '61.

1. Z Rhode Island Hospital-Providence, R.I. USA.
(ALDOSTERONE antag) (CHLOROTHIAZIDE ther) (EDEMA ther)

GARBER, M. I.

Dekorativnoe shlifovanie i polirovanie. Moskva, Mashgiz, 1948. 185 p.

Ornamental grinding and polishing.

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

MAKHLEVICH, Lev Yakovlevich. Primalni uchastiye: GARBER, M.I.; TELUKHIN, V.D.; SIDOROV, V.I.. BERLYANT, I.Ya., red.; ZAYTSEVA, L.A., tekhn.red.

[Machine repair shops in clothing factories] Remontno-mekhanicheskie masterskie shveinykh predpriatii. Moskva, Vses.koop. izd-vo, 1959. 254 p. (MIRA 13:5)
(Clothing industry--Equipment and supplies)

GARBAR, M. I.

Special consideration should be given to the quality of plastics.
Plast. massy no. 11:1-2 '60. (MIRA 13:12)
(Plastics)

GARBAR, M.I.

Expand the use of plastics in agriculture. Plast. massy no. 1:1-3
'61. (MIRA 14:2)

(Plastics) (Agriculture)

BADALOVA, E.I.; GARBER, M.I.; STRIZHEVSKIY, I.V.

Anticorrosive bitumen insulation with a strenghtening envelope
made of a fiber glass material. Sbor. nauch. rab. AKKH no.2:94-97
'60. (MIRA 15:5)

(Pipelines)

GARDER, M.I.; SHELUGER, M.A., doktor tekhn.nauk, retsenent;
GLEYZER, L.A., doktor tekhn.nauk, prof., red.

[Decorative grinding and polishing] Dekorativnoe shlifovanie i polirovanie. Izd.2., dop. i perer. Moskva, Mashinostroenie, 1964. 190 p. (MIRA 17:11)

Справка, дата: 02.08.1971 г.

Изучив материалы по делу № 10/9-12, сообщая
администрации полиграфического завода № 10/9-12, сообщая
no.10/9-12, сообщая.

1. Сведения о работе завода № 10/9-12, сообщая.

SHAKHNAZAROV, A.B., prof., GARBER, M.M. (Simferopol').

Side effects of ACTH. Vrach.delo no.11:1201 N'58 (MIRA 12:1)

1. Klinika diagnostiki vnutrennykh bolezney (zav. - prof. A.B. Shakhnazarov) Krymskogo meditsinskogo instituta.
(ACTH)

25(1)

SOV/117-59-4-16/36

AUTHORS: Morozov, V.T. and Garber, M.M., Engineers

TITLE: Cementation with a Special Paste

PERIODICAL: Mashinostroitel', 1959, Nr 4, p 32 (USSR)

ABSTRACT: The use of cementation paste is recommended for cementing machine parts, instead of the conventional solid carburizer. The article gives detailed recommendations on the preparation of a paste consisting of 85 weight parts of gas soot, 10 parts of soda ash, 5 parts of potassium ferricyanide, and 200 parts of waste spindle oil. The paste is put on the work in a 3-4 mm layer, and the work surface that is not to be treated is covered with a paste made of 60% fireclay and 40% chamot with a quantity of water glass needed to form the paste. The boxes with parts will be placed into a chamber furnace heated to 920-930°C. After cementation, the parts will be cooled in air together with

Card 1/2

SOV/117-59-4-16/36

Cementation with a Special Paste

the box, or hardened in the conventional way. The obtained surface hardness is $R_c = 56 \div 60$.

Card 2/2

SHAKHNAZAROV, M. N.; LAKISOVA, O. V.; GARBER, M. M. (Simferopol')

Results of the clinical study of the new Soviet preparation,
etafen, for the prevention and treatment of stenocardia. Vrach.
delo no.3:143-145 Mr '62. (MIRA 15:7)

1. Kafedra diagnostiki vnutrennikh bolezney (zav. - prof. A. B.
Shakhnazarov) i gospital'noy terapii (zav. - prof. P. A.
Tepper) lechebnogo fakul'teta Krymskogo meditsinskogo instituta.

(VASODILATORS) (ANGINA PECTORIS)

SHAKHNAZAROV, A.G., prof.; ~~GARBEE~~, M.M.

Case of a typical grave course of eosinophile pneumonia. Vrach.
delo no.8:108-109 Ag '60. (MIRA 13:9)

1. Kafedra diagnostiki vnutrennikh bolezney A.B. Shakhnazarov)
Krymskogo meditsinskogo instituta.
(PNEUMONIA)

GARBER, M. R.

DALIN, Aleksandr Dmitriyevich, doktor tekhnicheskikh nauk, professor;
INCHETOV, G.P., inzhener, retsenzent; ~~GARBER, M.R.~~, inzhener,
redaktor; MATVYEVVA, Ye.N., tekhnicheskly redaktor

[Mechanization of operations in improving meadows and pastures]
Mekhanizatsiia rabot po ulushcheniiu lugov i pastbishch. Moskva,
Gos.nauchno-tekhn.izd-vo mashinostroit. lit-ry, 1957. 327 p.
(Pastures and meadows) (MLRA 10:9)

BOKOLYAR, Isaak Moiseyevich; GARBBER, M.R., inzh., retsenzent; DOBRITSYNA,
R.I., tekhn. red.

[Machinery and equipment for asphalt-concrete work] Mashiny i ob-
rudovanie dlia asfal'tobetonykh robot. Moskva, Gos. nauchno-
tekhn. izd-vo mashinostroit. lit-ry, 1961. 155 p. (MIRA 14:11)
(Road machinery) (Pavements, Concrete)

ГРИГАК, А.М.; ГАМБИН, М.Я.

Improved method of cast iron purification by magnesium in special tilting ladles. T kh. no. 3:3-4 '59. (T A 14:2)

1. Vsesoyuznyy nauchno-issledovatel'skiy i proyektno-tekhnologicheskii institut upolnomocheniya SSSR (Odesk'skiy metallogorudnyy)

GAPBER, M.Ye.; TSYPIN, I.Z.

Wear resistant alloys. Biul. tekhn.-ekon. inform. Gos. nauch.-
issl. inst. nauch. i tekhn. inform. 17 no.4:86-87 Ap '64.
(MIRA 17:6)

GUTERMAN, V.M.; GARBER, N.Ye.; GANOL'SKAYA, Z.I.; Prinsipali uchastiye: ZELIKMAN, I.D.; TSYPIN, I.I.; KUL'MANSON, V.I.; KISELEVA, V.S.; NIKHAYLOVSKAYA, S.S.; GRINBERG, A.Ya.; MARKIN, I.S.

Raising the wear resistance of equipment parts operating in a hydraulic abrasive medium. Ugol' 39 no.9:61-63 S '64. (MIRA 17:10)

1. Vsesoyuznyy nauchno-issledovatel'skiy i proyektno-tekhnologicheskii institut ugol'nogo mashinostroyeniya.

GARNER, N. I. (Dnepropetrovsk)

"Primary Excision of Freshly Infected Wounds in the Light of Experiment"

SO: Nov. Khir., Arkh. 1937, Vol.38, Pages 298-300, Unclassified

GARBAR, N. I.

GARBAR, N. I.

Reparativnye protsessy v kostnoi tkani pri lechenii gematogenogo osteomielita penitsillinom. /Healing processes in the bone tissue during penicillin therapy of hematogenous osteomyelitis/ Khirurgiia, Moskva No. 6 June 51 p. 24-9.

1. Of the Surgical Clinic (Director—Prof. N. I. Garbar), Children's Clinical Hospital of Dnepropetrovsk Medical Institute.

ACCESSION NR: AT4016316

S/0000/62/000/000/0338/0341

AUTHOR: Panova, A. N.; Dobrovinskaya, Ye. R.; Garber, P. R.

TITLE: Scintillation and luminescence properties of NaI(Tl, Cu) and NaI(Cu) crystallophosphors

SOURCE: Vses. soveshch. po fiz. shchelochnogaloidn. kristallov. 2d, Riga, 1961. Trudy*. Fiz. shchelochnogaloidn. kristallov (Physics of alkali halide crystals). Riga, 1962, 338-341

TOPIC TAGS: luminescence, phosphor, crystallophosphor, scintillation, alkali halide, alkali halide crystal, sodium iodide, copper, copper luminescence activator, scintillation counter

ABSTRACT: The effect of Cu-admixtures on the scintillant properties was studied in NaI(Tl) crystals in an effort to perfect nuclear radiation counters in which the crystals are essential. The study included the distribution and assimilation of Cu in the crystals, the dependence of the scintillant effectiveness on the Cu-concentration and the resolution and spectral characteristics of the crystals. The chemical analysis of specimens, grown by a liquid-phase convective mixing process, showed that the admixtures readily

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ACCESSION NR: AT4016316

assimilate and are distributed according to the Pfann equation, the distribution factors being 0.03 and 0.13 for Cu_2O and Cu_2I_2 , respectively. The luminous efficiency of the crystals grown from NaI with Cu_2I_2 admixtures of $1 \cdot 10^{-4}$ to $5 \cdot 10^{-4}$ weight % Cu showed a drop to 40-50% of its initial value for concentrations of Cu as high as $5 \cdot 10^{-2}\%$. In contrast, the crystals activated with Cu_2O showed an equal drop for $2.5 \cdot 10^{-4}\%$ Cu. The luminescence of NaI crystals with $\approx 1 \cdot 10^{-4}\%$ Cu was found to produce a narrow intensive 375 m μ band and a broad, less intensive 465 m μ band. Cu-admixtures were found to reduce the resolution of a scintillation counter with a NaI crystal. "In conclusion, the authors express thanks to A. B. Blank for his constant interest in the work and to Z. B. Baturicheva for help in making the measurements." Orig. art. has: 3 figures and 1 table.

ASSOCIATION: VNI Monokristallov (All-Union Scientific Research Institute for Monocrystals)

SUBMITTED: 00

DATE ACQ: 06Mar64

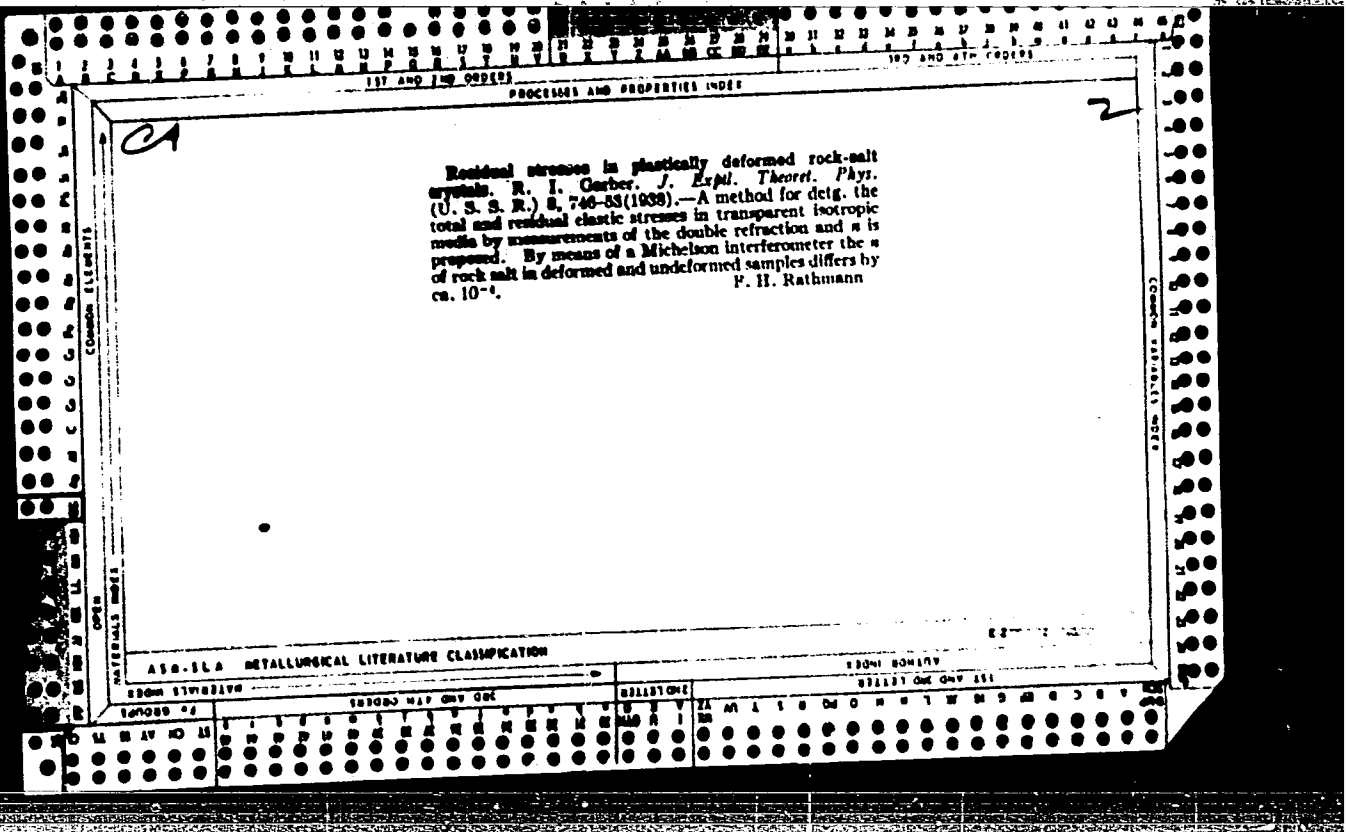
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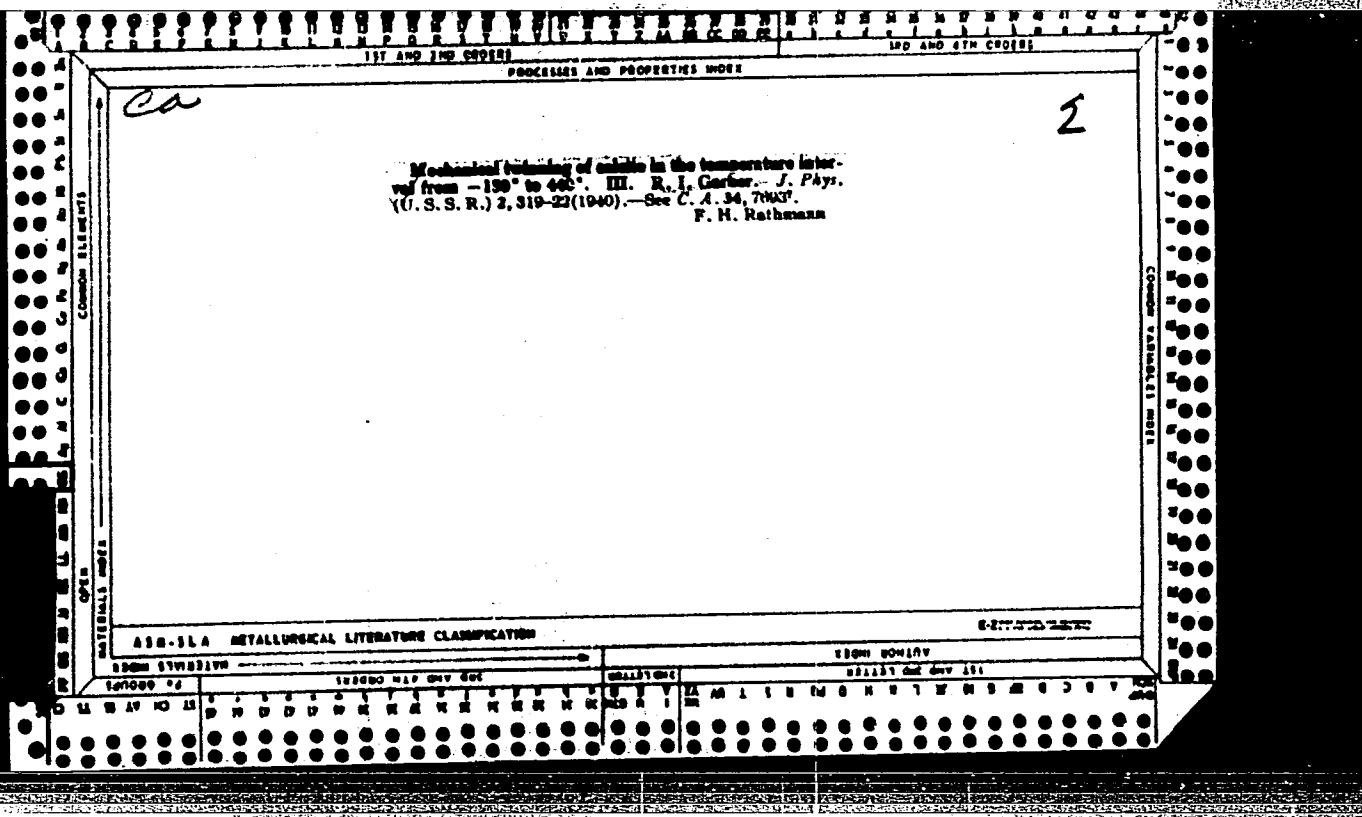
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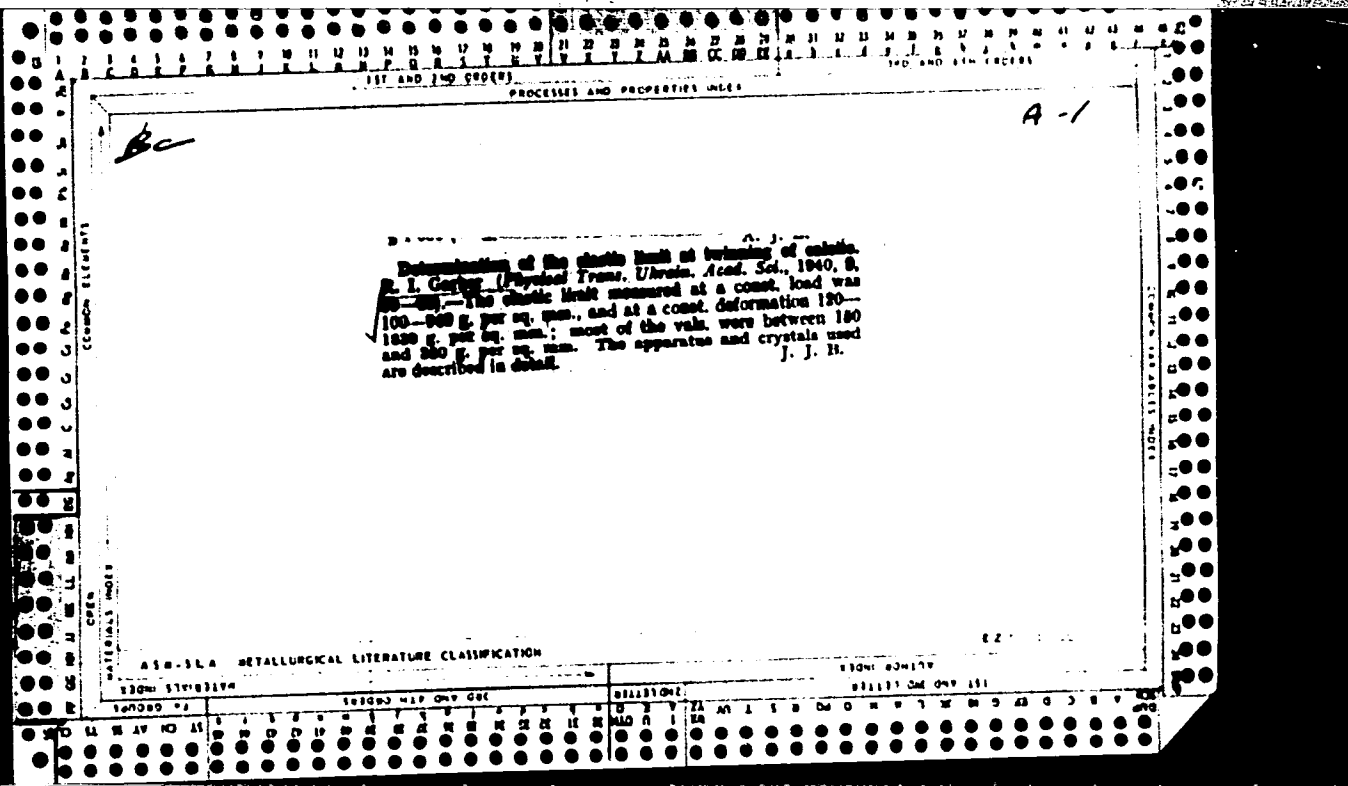
NO REF SOV: 000

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Card 2/2







1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

BC

A-1

Mechanical twinning of calcite between -100° and 600° .
 N. I. Gurev. (*Physical Trans. USSR Acad. Sci.*, 1968, 8, 67-70). The elastic limit (see preceding abstract) was 200-300 g. per sq. mm. at 600° and 800-700 g. per sq. mm. at -100° . Below -100° CaCO₃ was brittle, and no permanent twinning took place. J. J. R.

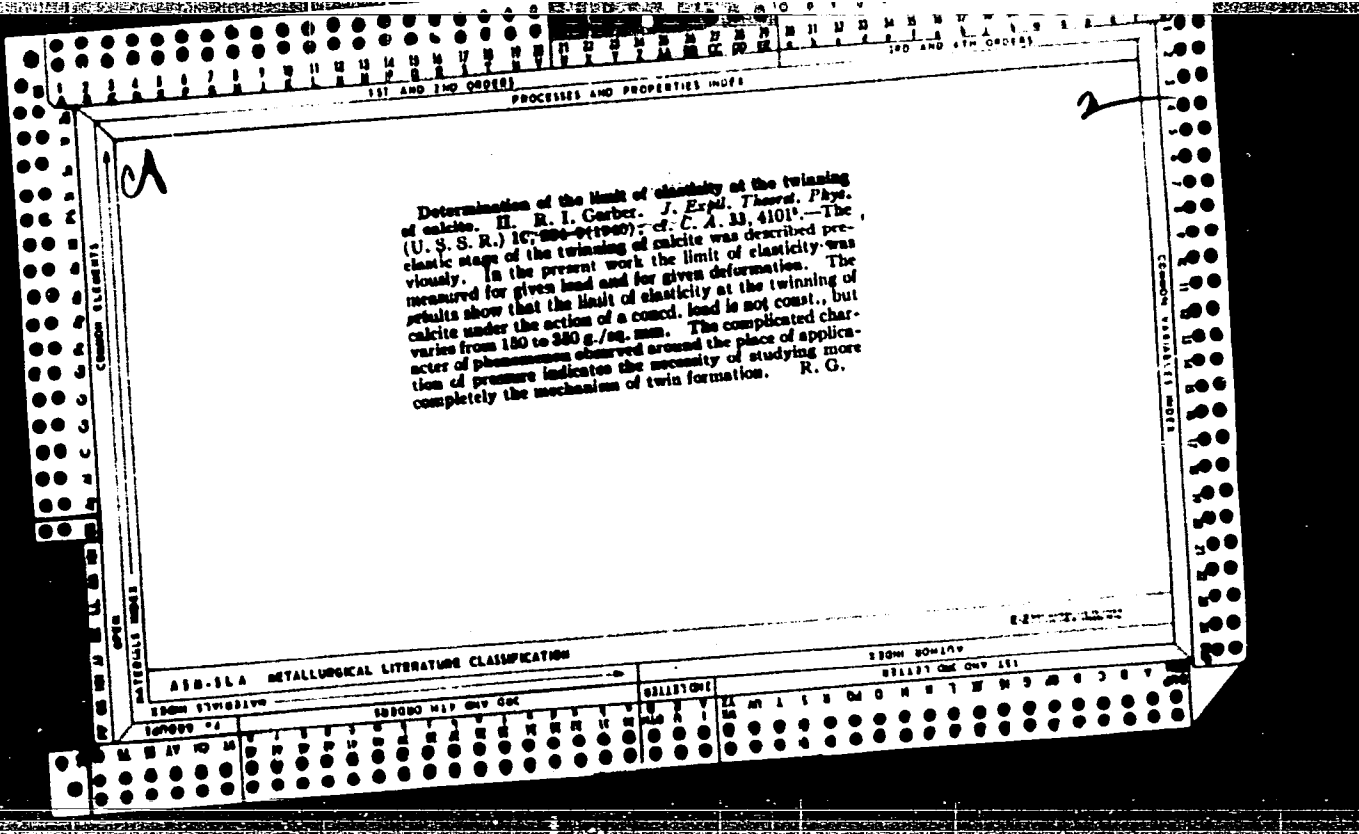
ASB-31A METALLURGICAL LITERATURE CLASSIFICATION

GROUPS

SUBGROUPS

SUBSUBGROUPS

SUBSUBSUBGROUPS



2

Mechanical twinning of calcite within the range -150-440°. III. R. J. Gerber, *J. Exptl. Theoret. Phys.* (U. S. S. R.) 16, 566-7 (1940).—The investigation of twinning of calcite shows that the elastic stage of twinning (twining of calcite) takes place for all temps. from -150 to 440°. The transformation of elastic twinning into residual twinning was not observed for temps. lower than -110°, partly because calcite becomes very fragile at low temp. and partly because the limit of elasticity of twinning probably becomes much higher.
 Rokhlana Gamow

A.S.B.-S.L.A. METALLURGICAL LITERATURE CLASSIFICATION
 HIGH QUALITY
 011111 QM QM 151

8

CP

Mechanism of calcite and silver twinning under plastic deformation. R. I. GARBE, *J. Phys. (U.S.S.R.)* 11, 55-60(1947)(in English); cf. C.A. 41, 2024a. The process of twinning under plastic deformation is described as a sequence of 4 distinct stages, elastic deformation of the single crystal, formation of "elastic twins," formation of stable twin layers, and thickening of the twin layers. A new method is described for the *interferential investigation of pressure figures* which makes it possible to observe distortions of the crystal surface during the formation of "elastic twins." It is shown that the load distribution on the contact surface is of prime importance. It is demonstrated that increase or decrease in length or thickness of the "elastic twins" is detd. by conditions on their boundary surfaces. The formation of polysynthetic twins is explained. Methods are given for controlling the thickness of layers.

No. 1

J. M. Blocher, Jr.

Physico-Technical Institute, Academy of Sciences of the Ukrainian SSR,

ASIA 514 METALLURGICAL LITERATURE CLASSIFICATION

Q

3

Mechanism of twinning of calcite and of soda niter by plastic deformation. R. J. Garber, *J. Exptl. Theoret. Phys.* (U.S.S.R.) 17, 47-62 (1947) (in Russian); cf. C.A. 41, 7314g. — New expts. of G., which comprise the observation of the Newton interference rings formed on the surface of a calcite crystal in contact with a lens-shaped hard tool, show the characteristic development of so-called elastic twins in the first stage of gliding and plastic yield. The elastic twins are very thin wedge-shaped lamellas in the interior of the crystal under load which grow as a function of the load and change to thicker twin lamellas under heavier loads at a later stage. The elastic twin lamellas are reversible, i.e. they can be resorbed by unloading the crystals. Occasionally, there are also irreversible phenomena of elastic twins which are not totally resorbed but remain partly stable especially if soda niter is pressed under a load of a wedge-shaped tool (e.g. a blade of a knife). These so-called "wedged elastic twins" are, however, re-

sorbed by heat-treatment (following abstr.). For the formation of elastic twins the local convex. of the load near the contact point of the tool and the crystal is essential, since only under special conditions is the necessary formation of twin nuclei warranted. As tools G. used spherical and cylindrical lenses for which the optical conditions of the observation of the interference phenomena were particularly elementary. The formation of the elastic twins is very sensitively indicated by distortions of the initial regular interference rings or stripes. The multiple formation of polysynthetic lamellas is especially well observed and illustrated in a superficial roughening of the crystals near the contact. The thickness of the individual elastic twin lamellas is only in the order of the magnitude of 0.1-1.0 microns. But by secondary growth they can be changed under load to microscopic and macroscopic systems of more or less thick ordinary twin systems which follow the same rules of crystallographic orientation as was previously described by Rensch, Baumhauer, Muegge, Johnson, and many other authors. No numerical data are included except some elementary calcns. on the gliding tensions and the stress growth of the lamellas. W. Littel

Phy. Inst., AS Khaikov

ASB 35A METALLURGICAL LITERATURE CLASSIFICATION

Handwritten initials or mark.

3

Heat exposure of twinned crystals of calcite and soda niter. R. I. Garber. *J. Exptl. Theoret. Phys.* (U.S.S.R.) 17, 63-7(1947) (in Russian). — The "wedged elastic twin" formed by the plastic deformation of calcite or soda niter crystals under load are unstable when heated. Crystals with existing twin lamellas of this kind (cf. preceding abstr.) were heated in porcelain, glass, or silica glass containers to temps. near their m. or decompn. temps.: calcite in boiling S (b. 441°) or in a muffle furnace to 400 and 600°; soda niter in boiling benzophenone (b. 305.0°) or naphthalene (218°) or water. The higher the exposure temp., the more promptly and completely the wedged elastic twin lamellas disappeared (numerous photomicrographs show details). It is most remarkable that normally no new crystn. nuclei are observed forming in the neighborhood of the elastic twin lamellas. It is therefore evident that recrystn. does not take place in such mechanically deformed plastic materials by twin gliding. Only rarely is it observed that the twins are subdivided to smaller twin areas before disappearing, and new nuclei of crystn. are formed. W. E.

Phys-Tekh Inst. Ufa AS - Kharkov

ASBLSL METALLURGICAL LITERATURE CLASSIFICATION

GARBER, R. I.

Nov 1947

USSR/Chemistry - Sodium Nitrate
Chemistry - Crystals - Twinning

"Effect of Mosaic on the Resistance of the Mechanical Twinning of Sodium Nitrate," R. I. Garber, S. Ya. Zalivadnyy, V. I. Startsev, Physiotechical Institute, Academy of Sciences of the USSR, Khar'kov, 2pp

DAN, Vol 58, No 4, p. 571-2.

Process of teinning in both sodium nitrate and potassium nitrate crystals is very similar. Authors attempt to show that a further study of this process has resulted in the observation that some multicrystals of sodium n nitrate show anomalies of great resistance to mechanical twinning. Submitted by Academician M. A. Leyontovich, 13 May 1947.

PA 38T10

GARBER, R. I.

PA 55/49T103

USSR/Physics
Plastic Deformation

Nov 48

"Retrospective Slippage During the Plastic Deformation of Rock Salt," R. I. Garber, Physictech Inst, Acad Sci USSR, 22 pp

"Dok Ak Nauk SSSR" Vol LXIII, No 3

Retrospective slippage must be considered a general property of rock salt crystals. Its importance in the theory of plasticity is that the process of the formation and disappearance of slippage zones is, in some respects, like such a process in twin layers. Submitted by Acad S. I. Vavilov 1 Oct 48.

55/49T103

GARBER, R. I.,

USSR :

Annealing twinned crystals of iron. R. I. Garber, I. A. Gindin, M. G. Konstantinovskij, and V. I. Startsev (Phys. Tech. Inst., Acad. Sci. Ukr. S.S.R., Kharkov). *Doklady Akad. Nauk S.S.S.R.* 74, 343-4 (1960).—Specimens of C-free steel were annealed at 300° for 3 hrs., elongated 2-3%, then annealed 8 days, increasing the temp. gradually from 400 to 550° to give an av. grain size of 1.5-2 mm. The specimens were then broken under tension at temp. of liquid N, forming twinned crystals in grains near the fracture. Twinned layers began to disappear after 10 hrs. annealing at 850°, and all had disappeared after 55 hrs. at 850° followed by 60 hrs. at 900°. H. W. Rathmann

GARBER, ~~R. I.~~

6

~~Sintering of electrolytic copper. R. I. Garber and S. S. V. Dvachenko (V. I. Lenin Polytech. Inst., Kharkov). Zhur. Tekh. Fiz. 22, 1097-1103(1952). Sintering of electrolytic Cu powder spread on a perforated Cu plate was followed by electronographs taken periodically of identical areas after aging at room temp. in vacuo. Irregular projections were rounded and shortened but not eliminated. Cavities diminished gradually and finally bridged over, but at no time were the original sharp outlines of the cavities destroyed, though some rounding of the surface edges took place. The rate of surface growth and cavity filling was uniform but fluctuated stepwise as a function of aging. This fluctuation, greater than the exptl. error, was attributed to fluctuating processes of cryst. reconstruction (cf. Lukinskii, C.A. 39, 4784'). The processes were identical but more rapid when the powder was aged at 100 and 150° in an atm. of H. I. Bencowitz~~

①
DfPM

Garber, R. I.

400

U S S R .

539.373 : 539.27

1917. Electron microscopic investigation of slip bands. R. I. GARBER AND A. I. KOVALEV. *Dokl. Akad. Nauk SSSR*, No. 5, 901-4 (1952) *In Russian*. Shadowed silica replicas of cleavage face of deformed rock salt crystals show presence of cracks adjacent to slip bands. Hardening of crystals by deformation under water explained by removal of cracks by solution of surface layers. J. W. MENTER

RAW

Garber, R. I.
USSR/Solid State Physics - Mechanical Properties of Crystals and Polycrystalline
Compounds, E-9

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 34862

Author: Garber, R. I., Gindin, I. A., Kogan, V. S., Lazarev, B. G.

Institution: None

Title: Investigation of Plastic Properties of Beryllium Monocrystals

Original Periodical: Fiz. metallov i metallovedeniye, 1955, 1, No 3, 529-537

Abstract: Specimens made of Be (99.7%) were subjected to single-axis compression at temperatures from -253 to 800°. The speed of deformation was constant (0.03 mm/sec). At higher temperatures, the tests were performed in vacuum. The specimens were shaped as rectangular parallelepipeds. The axis of the compressing forces was in the plane of the base (001). Over the entire temperature range, the deformation of Be was accompanied by the appearance of twin streaks. The twins occurring at -253 and 196°, were characterized by small thickness (2-4 μ) owing to the considerable reinforcement on their boundaries with the mother crystal. At higher temperatures, thicker streaks are formed. When the individual streaks merge with each other, the entire volume of the crystal is transformed into the twin state without damage to its solidity. The

1 of 2

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Fiziko-tekhnicheskij inst. Akademi' nauk USSR

USSR/Solid State Physics - Mechanical Properties of Crystals and Polycrystalline Compounds, E-9

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 34862

Author: Garber, R. I., Gindin, I. A., Kogan, V. S., Lazarev, B. G.

Institution: None

Title: Investigation of Plastic Properties of Beryllium Monocrystals

Original Periodical: Fiz. metallov i metallovedeniye, 1955, 1, No 3, 529-537

Abstract: transition of the Be monocrystal into a fully-twinned state is related to the process of mechanical twinning in the (102) plane, and is particularly easy to effect at 400° and above. In addition to the principal system of twins along (102), one observes also twins in the (101) and (103) planes. The mechanism of slipping of Be depends substantially on the temperature and orientation of the specimen. In some specimens, base slipping is observed even at -196°. The plasticity of Be, which increases monotonically with temperature, reaches a maximum at 400° ($\delta = 26\%$) and diminishes somewhat at 600°, and increases again at 800°. The mechanical characteristics of the plasticity of monocrystals of beryllium are determined, and their dependence on temperature. The yield point when slipping along the (100) and (101) planes diminishes by approximately 4 times when heated from 200 to 800°.

2 of 2

- 2 -

M. M. Lamm
LAMM, M.M.; GARBER, R.I., professor, otvetstvennyy redaktor; LUTSENKO, B.S.,
tekhnicheskiy redaktor

[Hydrodynamic theory of metal cutting and its practical application]
Gidrodinamicheskaya teoriya rezaniya metallov i praktika ee primeneniya.
Khar'kov, Izd-vo Khar'kovskogo gos. univ. im. A.M.Gor'kogo, 1956.
243 p. (MIRA 10:1)
(Metal cutting)

Garber, R.I.
Category: USSR/Solid State Physics - Diffusion. Sintering

E-6

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1260

Author : Garber, R.I., Polyakov, L.M., Mikhaylovskiy, V.M.

Title : Investigation of Processes in Roasting of Copper

Orig Pub : Ukr. fiz. zh., 1956, 1, No 1, 88-97

Abstract : The tearing strength of a junction of copper rings, formed at various compressions and roasting temperatures, was studied at room temperature. The roasting was done in vacuum (10^{-5} mm mercury). The strength of the joint is proportional to the compression, and the proportionality coefficient increases with temperature. The dependence of the logarithm of the strength of the joint plotted vs. the reciprocal of the roasting temperature is a straight line, the slope of which can be used to determine the activation energy of the roasting process. The latter is 27.6 kcal/g-atom at a pressure of 0.7 kg/mm^2 , and decreases with increasing compression. The growth of the crystal grain does not influence the strength of the joint, which depends on the true contact area. Diffusion processes of surface displacement of atoms contribute to an increased joint strength. The reduced activation energy resulting from the increased pressure is attributed to the influence of the

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Card : 2/2 *7*

GARBOR, R.I.

Category : USSR/Solid State Physics - Mechanical Properties of Crystals and Crystalline Compounds E-9

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6787

Author : Garbor, R.I., Gindin, I.A., Kogan, V.S., Lazarev, B.G.
Inst : Physico-Technical Institute, Academy of Sciences, Ukraine SSR
Title : X-ray Investigation of the Elasticity of Single Crystals of Beryllium

Orig Pub : Izv. AN SSSR, ser. fiz., 1956, 20, No 6, 639-640

Abstract : X-ray diffraction, metallography and micro-interferometry have been used to investigate single crystals of beryllium, cut in the form of rectangular parallelepipeds, with one of the faces aligned with the plane of the base. The specimens were deformed by unilateral compression at temperatures from -253 to 800° . The results of the investigations are summarized in a table.

Cerd : 1/2

GARBER, R. I.

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The production of ultramicroscopic nonuniformities during the plastic deformation of rock salt. R. I. Garber, I. V. Oshinoy, and L. M. Polyakov (Phys. Tech. Inst., Acad. Sci. Ukr. S.S.R.; Kharkov), *Doklady Akad. Nauk S.S.S.R.* 168:425-428 (1966); I. V. Oshinoy and Shubnikov, *G.A.* 21: 2200; Garber, G. A. 11: 2334. Natural rock salt crystals were split along their natural cleavage planes into small plates of various sizes which were heated for an absence of days, then heated to 200°C at 100°C and cooled in the furnace, when cooled in the air, characteristic thermal stresses were produced and the slip bands were connected with the stress. Light diffraction, similar to the dispersion caused by crystals and compression, is observed in this case. The same results were tested in an apparatus permitting simultaneous measurements of stress deformation and of light dispersion. The results of the measurements are observed at low pressure. In addition, the measurements of stress dispersion and of light diffraction of a lamellar plate and film. The results of the measurements will come under the optical microscope. These results justify the statement that the nonuniformities of ultramicroscopic nonuniformities are produced by a break of local sheets of slip lines and the plastic flow lines in the latter case are described as a series of slip lines.

Chloe Karpovitch Dr. S.S.R. (for literature)

GARBER, R.I.

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1479
AUTHOR GARBER, R.I., GINDIN, I.A., KOGAN, V.S., LAZAREV, B.G.
TITLE The Recrystallization of Metals at Low Temperatures.
PERIODICAL Dokl. Akad. Nauk, 110, fasc. 1, 64-66 (1956)
Issued: 11 / 1956 reviewed: 11 / 1956

This work deals with the direct observation of the microstructure of technical iron (0,03% C) and nickel deformed at the temperature of liquid nitrogen. The examination of iron and nickel makes it possible to explain the influence exercised by the principal forms of plastic deformation, namely of twin-formation(?) and creeping on the creation of inhomogeneities of the crystal lattice caused by deformation and on the occasion of processes of recrystallization which are due to these inhomogeneities. Fine- and rough-grained samples with 25-30 μ and 100 - 200 μ diameter were examined. Deformation was brought about either by rolling or by pressing a hardened ball through an immobile thin-walled tube in liquid nitrogen. The degree of deformation was between 5 and 14%. The X-ray structure analysis was carried out: a) in the initial state, b) immediately after the deformation in liquid nitrogen without heating up to room temperatures, c) after a 10 to 12 hours' stay period at room temperature. Parallel with X-ray investigation a metallographical investigation of the samples was carried out. In the case of the iron and nickel deformed in liquid nitrogen the structure was refined by recrystallization after heating up to 20°. A microphotograph of the structure is attached. While the ball is pressed through the tube (in liquid nitrogen) a deformation structure is produced in the sample which is destroyed

INSTITUTION: Physical-Technical Institute of the Academy of Science in the
USSR.

APPROVED FOR RELEASE: 07/19/2001

CIA-RDP86-00513R000514310020-5

Garber, R.I.

AUTHOR: Garber, R.I., Kogan, V.S. and Polyakov, L.M. 113

TITLE: Coagulation of pores in polygonised common salt. (Koagulyatsiya por v poligonizovannoy kamennoy soli.)

PERIODICAL: "Fizika Metallov i Metallovedenie" (Physics of Metals and Metallurgy), 1957, Vol.IV, No.1 (10), pp. 89-93, (U.S.S.R.)

ABSTRACT: Annealing at 780 °C of common salt single crystals under natural conditions or subjected to slight plastic deformations causes polygonisation. Utilising the translucency of specimens, it was possible to study optically the process of coagulation of pores at the surface of blocks and the macro-mosaic of blocks forming during the process of polygonisation. It is shown that the point boundaries of the blocks forming during polygonisation of pure single-phase substances consist of chains of coagulated pores. The formation of a step-wise relief at the surface of the crystal near the pores have been established which has the shape corresponding to the orientation of the faces of the cube and the faces of a rhombic dodekhedron lattice of common salt. Comparing the results described in this paper with known observations of polygonisation processes in metals, it can be assumed that metallographic detection of blocks is apparently possible only in cases in which the metal possesses pores, admixtures or other

Coagulation of pores in polygonised common salt. ¹¹³ (Cont.)

easily diffusing components, although blocks can also occur which cannot be detected metallographically.
7 figures, 12 references, 5 of which are Russian.

Physico-Technical Institute,
Ac.Sc. Ukraine.

Recd. May 3, 1956.

GARBER, R.I.

reports of an Inter-vuz Conference on
Relaxation Phenomena in Pure Metals and Alloys
2 - 4 Apr 1958, Moscow Inst. of Steels.

SOV-3-58-9-25/36

Institute) covered the resilient reaction of spring alloys, various physical and technological effects on it and the methods of its measurement. Ya.P. Selisskiy (Institute of Precision Alloys TsNIICHM) told of subsiding oscillations of ultrasonic frequency in some ferromagnetic solid solutions. R.I. Garber and A.I. Kovalev (Physico-Technical Institute UkrSSR AS in Khar'kov) spoke of the temperature dependency of moduli of elasticity of iron.

Card ~~4/4~~

GARBER, R. I., GINDIN, I. R. and POLYAKOV, L. M.

"Fractioning and Sintering of Microblocks during the Plastical
Deformation of Crystals."

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

Physical-Technical Institute of the Ukrainian Academy of Sciences, Kharkov.

GARBER, R. I., Ye. A. TSINZERLING, M. .A CHERNYSHEVA

"Problems of Mechanic Twin Formation of Crystals."

report presented at the Conference on Investigation of Mechanical Properties of
Non-Metals, by the Intl. Society of Pure and Applied Physics and the AS USSR,
at Leningrad, 19-24 May 1958.
(Vest. Ak Nauk SSSR, 1958, no. 9, pp. 109-111)

GARBER, R. I.

"Mechanical Properties of Single Twill Layers."

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

Physical Tech. Inst., Acad. Sci. Ukr SSR, Khar'kov

SOV/126-6-5-29/43

AUTHORS: Garber, R. I., Kogan, V. S., and Polyakov, L. M.

TITLE: Dislocations or Pores? (Dislokatsii ili pory?)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 6, Nr 5, pp 934-935 (USSR)

ABSTRACT: Hirsch et al. (Ref 1) reported direct observation of dislocations which appear in aluminium foils rolled down or otherwise reduced to 0.5μ thickness, annealed in vacuum and etched in a dilute hydrofluoric acid solution. These dislocations were observed by means of an electron microscope. The present authors suggest that the electron micrographs given by Hirsch et al. may also be interpreted as assemblies of micropores at boundaries of blocks of polygonized aluminium. Such micropores were observed by the present authors (Ref 2) in their studies of polygonization of rock-salt. Comparison of optical micrographs of polygonized rock-salt with electron micrographs of aluminium films (Fig 2, taken from Ref 1) shows that they are very similar. In both cases the mutual orientation of adjacent blocks is almost the same ($1-2^\circ$) and the distances between defects distributed

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Dislocations or Pores?

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along block boundaries differ by three orders of magnitude, simply because of the difference between the magnification in the two cases (400X optical, 100 000X electron-microscopic). In photographs reproduced by Hirsch et al. there are lines, marks, spots, etc. inside polygonized blocks. These are ascribed to dislocation lines and traces. The present authors point out that such marks, lines etc. may also be due to non-uniformities which are produced inside polygonized blocks by deformation. Annealing by the electron microscope beam produces grouping of vacancies along such non-uniformities and some of such groupings may migrate to the block surfaces. The authors conclude, therefore, that the results of Hirsch et al. cannot be taken as a proof of the presence of dislocations in their aluminium samples. In contrast to Hirsch et al. (Ref 1), Heidenreich (Ref 4) did not observe any dislocations or pores in aluminium foils produced by rolling and electrolytic etching with intermediate annealing. This may be due to insufficient saturation with vacancies of such foils, because Hirsch et al. reduced the thickness of their

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Dislocations or Pores ?

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samples to 0.5 μ , while Heidenreich's samples were of 125 μ thickness.

There are 2 figures and 4 references, 2 of which are Soviet and 2 English.

ASSOCIATION: Fiziko-tekhnicheskii Institut AN SSSR
(Physico-Technical Institute, Ac.Sc., USSR)

SUBMITTED: August 26, 1957

Card 3/3

AUTHORS: Garber, R.I., Kovalev, A.I.

32-24-4-46/67

TITLE: Investigations of the Temperature Dependence of the Elasticity Modulus of Iron (Issledovaniye temperaturnoy zavisimosti moduley uprugosti zheleza)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol. 24, Nr 4, pp. 477-479 (USSR)

ABSTRACT: S.A. Lavrent'yev (Ref 2) suggested a system for the determination of normal elasticity and of the bending modulus at low frequencies. However, the method causes difficulties if measurements have to be carried out in a vacuum and at high temperatures as well as in the case of determinations of damping decrement. A method is described which can be applied for determinations at the above mentioned conditions at temperatures of up to 1000° C and in a high vacuum at frequencies of from 1 to 12 c. It may be seen from a schematical drawing that the sample under investigation, which is in a molybdenum resistance furnace, is fastened above to a sill beam, whereas the lower end is connected with a pendulum. A platinum-platinum/rhodium element is welded to the upper part of the sample and the weights are welded onto the ends of the pendulum. The weights at the same time serve as the magnetic cores for two

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Investigations of the Temperature Dependence of the
Elasticity Modulus of Iron

32-24-4-46/67

magnets each. One pair of the latter is used for rotation and the other for the bending of the sample. A revolving drum with a photographic paper which records the beam of light reflected by a mirror on the pendulum and thus also the motions performed by the pendulum. In the course of the determinations of the elasticity- and bending modulus the logarithmic damping decrement did not exceed 0.3, so that the maximum error amounted to 0.2%. Results were computed according to given formulae. The total maximum error at increased temperatures amounted to 2.5%. From the results mentioned, a hysteresis phenomenon at the temperature drop at 900°C is mentioned, which had already been observed by Köster (Ref 5). There is good agreement between results obtained by investigation and published data, according to which the plasticity of iron shows a sharp rise in the course of polymorphous transformations. For the paper under discussion Poisson's ratio, which rises sharply at 750° and attains its maximum at 900°, is considered to be a quantitative characteristic of plasticity. There are 2 figures, and 6 references, 3 of which are Soviet.

1. Iron--Mechanical properties
2. Iron--Test methods
3. Iron--Temperature factors

Card 2/2

24(2)

AUTHORS:

Garber, R. I., Kogan, V. S., Polyakov, L. M. SOV/56-35-6-7/44

TITLE:

The Growth and the Dissolution of Pores in Crystals
(Rost i rastvoreniye por v kristallakh)

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35,
Nr 6, pp 1364-1368 (USSR)

ABSTRACT:

In the present paper the authors describe the experimental determination of the time-dependence of diffusion processes of sintering and of pore coalescence in rock salt. The results obtained agree well with the theoretical formulae by I.M. Lifshits and V.V. Sledov (Ref 1): $\bar{R}^3 = (4/9) \cdot D_v \alpha \tau$, $\xi(\tau) = 2(D_v \alpha \tau)^{1/2} / Q_0^{1/2}$ and $\alpha = \sigma V_c / kT$ (D_v = diffusion coefficient of vacancies, τ = duration of sintering, Q_0 = total initial oversaturation, σ = surface tension, V = the volume of a vacancy, c_0 = vacancy concentration; the first equation describes the law of pore growth, the second the time-dependence of the zone breadth ξ in which the pores dissolve). The authors numerically determined a number of parameters characterizing diffusion in rock salt, as e.g. the diffusion

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The Growth and the Dissolution of Pores in Crystals

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coefficient D(T), T in °K:

T	C
693	$7.9 \cdot 10^{-10}$
773	$3.1 \cdot 10^{-9}$
923	$1.6 \cdot 10^{-8}$
1023	$0.7 \cdot 10^{-7}$

further, the time-dependence of the breadth of the sintering zone for 500 and 650°C (Fig 4), the dependence of pore dimension on sintering of long duration (t=500°C) (Fig 5), $\ln(/)$ as a function of \ln (Fig 6), etc. Attached to this article are very good photographs of salt-, iron-, and magnesium single crystals, of pores and salt

crystal bridges in various degrees of enlargement, at various sintering temperatures, and various durations of sintering (up to 60 hours). It is shown that sintering phenomena develop not only as a result of the dissolution of pores and the direct exit of the vacancies on the free surface, but also via an intermediate stage in which the vacancies accumulate on macrodefects with subsequent formation of large negative crystals on the latter. Coalescence of pores was observed in the annealing of single crystals of metallic samples, the preparation method of which (vacuum distillation etc.) is made responsible for the initial porosity. Thus, the vacuum treatment of iron crystal took 42 hours at 1000°C (Fig 11), that of the Mg single crystal 60 hours at 400-420°C. In conclusion

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The Growth and the Dissolution of Pores in Crystals

SOV/56-35-6-7/44

the authors thank Professor I. M. Lifshits and V. V. Slezov for discussions, and V. K. Sklyarov for his help in carrying out the experiments.-There are 12 figures, 1 table, and 4 Soviet references.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR
(Physico-Technical Institute of the Academy of Sciences,
Ukrainskaya SSR)

SUBMITTED: June 17, 1958

Card 3/3

GARBER R 1
AUTHORS:

Garber, R. I., Mogil'nikova, T. T.

20-3-17/59

TITLE:

Internal Friction and Plastic Deformation of Overstressed Micro-Regions in a Solid (Vnutrenneye treniye i plasticheskaya deformatsiya perenapryazhennykh mikroblastey tverdogo tela)

PERIODICAL:

Doklady AN SSSR, 1958, Vol. 119, Nr 3, pp. 479-482 (USSR)

ABSTRACT:

The increase of the viscosity with the amplitude of the oscillation must be attributed to the influence of the overstresses which are located in the micro-regions (mikroblast'). Here the following must be assumed: At every cycle of the change of the stress in such micro-regions a certain part of the elastic energy is consumed for the work, which has to be performed in the plastic deformation. But various basic ideas of the theory of the elastic - plastic deformation disagree with such an assumption. Obviously this theory, including the plasticity of the overstressed micro-regions, has to be examined more closely. The inhomogeneity of real solids becomes manifest in completely different investigations. Very small deformations

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Internal Friction and Plastic Deformation of Overstressed
Micro-Regions in a Solid

20-3-17/59

seem to divide the solid into micro-blocks. The plastic deformation of such a block must lead to a new distribution of the stresses in the micro-region, which surrounds this block, by which the plastic blocks can become plastically deformed. The authors here investigated the dependence of the logarithmic decrement of the damping of oscillations in lead on the additional (with advancing time increasing) stresses. The performance of these investigations is shortly described. Provisional investigations showed that the decrement of the damping in lead at room temperature does not depend on the amplitude of the oscillations. The same decrement does, at these conditions, not depend of those additional stresses either, which in a thin-walled tube are caused by the suspended stress and by the pressure of the compressed air inside the tube. The results of the measurements are illustrated in diagrams. The various curves, which are contained in this diagram, correspond with the oscillograms taken up at the various pressures. The difference between the initial values and the final values of the decrement decreases with the decrease of that pressure at which the oscillograms were taken. As soon as

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Internal Friction and Plastic Deformation of Overstressed
Micro-Regions in a Solid

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the increase of the pressure in the tube was interrupted the decrement of damping immediately decreased to the initial value, and this independent of the fact, if pressure in the tube is present or not. The observed increase of the decrement of damping obviously depends on the velocity of pressure rise and also on the magnitude of the additional stress. The result of this work can be interpreted as follows: In the case of the elastic torsion-oscillations of the tube a part of the elastic energy is consumed for the plastic deformation of the overstressed micro-regions which occur on occasion of the increasing of the additional stresses at increasing pressure inside the tube. There are 2 figures and 5 references, 3 of which are Slavic.

ASSOCIATION: Physical Technical Institute of the AN USSR, Khar'kov
(Khar'kovskiy fiziko-tekhicheskiy institut Akademii nauk
SSSR) Pedagogical Institute imeni G. S. Skovoroda, Khar'kov
(Khar'kovskiy pedagogicheskiy institut imeni G. S.
Skovorody)

Card 3/4
3

GARBER R.I.

30V/2355

PLANE I BOOK EXPLORATION

24 (6)

Академија наук СССР

Историче пробасти ћероко толо; шмук стато (Some Problems in the Strength of Solids) Collection of Articles Moscow, Ltd-no AS USSR, 1959. 300 p. Брета алип лнстред. 2,000 копие прннтед.

М. of Publishing House: V. I. Авер'янов; Тех. Ed.: B. S. Рывнер; Editorial Board: A. F. Ioffe, Academician; O. V. Руркунов, Academician; S. E. Шурлов, Corresponding Member, USSR Academy of Sciences; J. P. Константинов, Corresponding Member, USSR Academy of Sciences; P. P. Vitman, Doctor of Physical and Mathematical Sciences, Professor (Resp. Ed.); L. A. Олифан, Doctor of Technical Sciences, Professor; E. A. Златин, Doctor of Physical and Mathematical Sciences; V. A. Степанов, Doctor of Technical Sciences; I. B. Фрицман, Doctor of Technical Sciences, Professor; B. S. Ioffe, Candidate of Technical Sciences (deputy Resp. Ed.).

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

ОБЪЕМ: This collection of articles was compiled by the Odobrenlye fiziko-matematicheskiy otdel AS USSR (Department of Physical and Mathematical Sciences) and the Fiziko-khimiya institut AS USSR (Institute of Applied Physics, Academy of Sciences, USSR) in commemoration of the 80th birthday of Nikolai Nikolayevich Davidenko, Member of the Ukrainian Academy of Sciences, founder and head of the Odessa prochodil materialny (Department of the Strength of Materials) at the Institute of Applied Physics, Academy of Sciences, USSR, founder of the Fakultet fizicheskoy mekhaniki (Department of Physical Mechanics) at the Leningradskiy politekhnicheskiy institut (Leningrad Polytechnic Institute), recipient of the Stalin Prize (1943), the Order of the Red Banner of Labor (1948) and the Order of Lenin (1953). The articles deal with the strength of materials, phenomena of inhomogeneous elasticity, creep of metals, creep of polymers, brittle fracture, fatigue of metals and alloys, and the mechanical properties of composites. Review of stress and strain problems of the strength plasticity and mechanical properties of composites. Numerous personalities are mentioned in the introductory profile of Professor Davidenko. References are given at the end of each article.

ОЛДИН, Л.А., В.О. Казаный, Я.В. Шурлов, and V.I. Ryzhenko. Физико-химический институт АН СССР-Института прикладной физики Академии наук СССР. Low-temperature Polymorphism of Metals 61

Дуктор-Физ., and V.Ye. Зыбарский (Institute of Applied Physics, Academy of Sciences, USSR, Leningrad). Time Dependency of Strength Under Different Load Conditions 68

Рубинин, Л.З., Т.К. Овдинов, А.А. Зуборитский, and S.T. Митлин. Влияние stresses and deformation on the process of diffusion 76

Плес, B. Ye., and A.Ye. Мисанов (condratsevnyy universitet imeni Gorkogo, St. Petersburg State University imeni Gorkogo, Leningrad). Diffusion Creep of Great Specimens Pressed from Powdered Iron 87

Рубинин, Л.З., and E.S. Яковлев (Institut fiziki metallov Ural'skogo SSSR, Sverdlovsk-Institute of Metal Physics, Sverdlovsk Branch, Academy of Sciences, USSR, Sverdlovsk). Influence of Aluminum and Copper on the Deformation of Nickel 93

Колотков, Т.А. (Institut poprovochnikov AS SSSR, Leningrad-Diel-Rodnikov Institute, Academy of Sciences, USSR, Leningrad). Relationship between the Mechanical and Thermal Characteristics of Crystals 105

Овдинов, Т.К., and I.I. Шибанов (condratsevnyy pedagogicheskiy institut imeni Gorkogo, Sverdlovsk, Sverdlovsk Branch, Academy of Sciences, USSR, Sverdlovsk). Strengthening of Rock Salt Crystals by Nepeated Reverse Loading 109

Овдинов, М.О., and V.A. Рублов (Institute for Metal Physics, Ural Branch, Academy of Sciences, USSR, Sverdlovsk). Some Aspects of Stress Relaxation in Bronze $Br_{31}Zn_{69}$ 111

Трубалло, В.О., and Z.A. Vashchenko (Polytechnic Institute imeni M.I. Kalinin, Leningrad). Increasing the Elastic Limit and Decreasing the Elastic Aftereffect During Cold Working and Tempering of Spring Aluminum Bronze Bn7 118

Олифан, Л.А., and E.E. Колпаков (MIP po pererabotke mestri i polucheniyu i ispytaniyu khitogo volokra, s. Leningrad-Scientific Research Institute for the Study of the Production of Synthetic Liquid Polysulfide, Leningrad). Nature of the Physical Field Point of Steel 130

GARBER, R.I.

Mechanical properties of one of twins interlayers. Fiz.tver.tela
1 no.5:814-825 My '59. (MIRA 12:4)

1. Fiziko-tehnicheskij institut AN USSR, Khar'kov.
(Calcite crystals) (Dislocations in crystals)

GARBER, R.I.; GINDIN, I.A.; STARODUBOV, Ya.D.

Thermal hardening of twinned layers of iron crystals. Fiz.tver.
tela 1 no.12:1801-1805 D '59. (MIRA 13:5)

1. Fiziko-tehnicheskij institut AN USSR, Khar'kov.
(Iron--Heat treatment)

24.7500

66900

SOV/126-8-1-18/25

AUTHORS: Garber, R. I., Gindin, I. A., Kovalev, A.I. and Shubin, Yu. V.

TITLE: ¹ Study of the Plastic Properties of Monocrystals of Beryllium. II.

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 8, Nr 1, pp 130-139 (USSR)

ABSTRACT: In the present paper slip processes in monocrystals of beryllium which have not been submitted to preliminary twinning have been studied and the relationship between slip and fracture of beryllium in the white temperature range has been established. Specimens were made from monocrystals of a beryllium block grown by slow cooling of the melt in vacuum. The purity of the original material was 99.7%. Cutting of the block was carried out by an electro-corundum disk on a grinding machine. The worked layer was removed by etching the beryllium with an aqueous solution of hydrofluoric acid. The specimens had the shape of a rectangular prism, 3.5 x 4.0 x 7.0 mm. All prism facets were ground. Two side faces (3.5 x 7.0 mm - type-a face and 4.0 x 7.0 mm - type-b face) were polished. From the Lauegrams it was ~~+~~ evident that the crystals were undistorted. The experi-

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Study of the Plastic Properties of Monocrystals of Beryllium. II.

ments were carried out under conditions of compressive deformation on a special press (Ref 6) at a constant deformation rate (0.03 mm/sec) at temperatures of -253, -196, 20, 400, 600 and 800°C. The specimens were orientated in such a way that the basal plane (0001) made an angle of $45 \pm 1.5^\circ$ with the axis of the compressive forces (Fig 1). The side face of the specimen was parallel with the crystallographic plane of the primary prism (1100) and subsequently also parallel to the primary diagonal $[1120]$. The metallographic and X-ray methods used for the studies have been described earlier by Garber et al. (Refs 1,7). Indexing of the exposed elements of plasticity and fracture was carried out according to the traces of deformed bands and cracks on previously polished specimen faces. The results were plotted on a standard stereographic projection of the basis plane of the crystal. An X-ray analysis method was used for the orientation of specimens and for the supplementary control of elements of slip and fracture. The structure of the bands of basal slip was studied also electronmicroscopically. In Fig 2 traces of slip occurring in monocrystals of beryllium at

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various temperatures are shown schematically. Photomicrographs of the surface of specimen faces after compression at 20°C are shown in Fig 3a and b and the micro-interference picture of the relief of these surfaces in Fig 3β and 2. The slip bands have been resolved electromicroscopically as slip packets. At -196 and +20°C the thickness of the packet is the same, namely 0.1-0.3 μ (Fig 4). The magnitude of slip can be estimated from the displacement of a scratch intersecting the trace of the slip band in a type-b face (Fig 5). In Fig 6 compression curves for monocrystals of beryllium (curves for various slip temperatures along the abscissae axis) are shown. 1 mm along the abscissae axis corresponds to 60 μ deformation; 1 mm along the ordinate axis corresponds to a load of 18 kg. Fig 7 shows the temperature dependence of the mechanical characteristics of monocrystals of beryllium: σ_s - yield stress in compression; σ_b - UTS in compression; δ - total residual compression; δ_s - residual compression prior to the appearance of the first slip bands. Fig 8 shows the prismatic slip in monocrystals of beryllium: a - slip trace in a type-a face. Compression at 20°C by

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1.2%; X 10 000; b - trapeze-like slip trace in a type-a face. Compression at 400°C by 1.5%, X 432. Fig 9 shows photomicrographs of cross-sectional microcracks formed as a result of non-uniformity of shift in the slip along the slip bands. Fig 10 shows slip traces of a polygonized monocrystal of beryllium. The slip planes are wavy; polygonization blocks can be seen. The treatment consisted in compression by 0.6% at 20°C, annealing at 800°C for 3 hours, followed by repeated compression by 0.8% at 20°C, X 8000. The table on p 137 shows the crystallographic elements of slip, twinning and fracture and the temperature region in which they occur. Fig 11 is a standard stereographic projection of the basal plane (0001) of a monocrystal of beryllium. The orientation of monocrystals of beryllium is shown in Fig 12. The authors arrived at the following conclusions:

1. The essential aspect of plastic deformation of beryllium in a wide temperature range (-196° to +800°C) is slip along the base (0001) in the direction $[1120]$.

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The slip in beryllium differs fundamentally from that in

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other hexagonal crystals. Beryllium has a large number of different crystallographic twinning systems. Mechanical twinning is not responsible for the great brittleness of beryllium. Re-forming of twins within an entire crystal leads to an increased plasticity and strength of the crystal in subsequent slip. An unevenness in movement along basal slip planes has been observed. This causes the formation of microcracks along prism and secondary pyramidal planes. Thus the brittleness of beryllium is associated with a large number of cleavage planes which are exposed particularly strongly because of the non-uniformity of slip at low temperatures.

There are 12 figures, 1 table and 13 references, 8 of which are Soviet and 5 English.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR
(Physico-technical Institute, Ac.Sc., UkrSSR) ✓

SUBMITTED: December 24, 1957

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SOV/126-8-5-24/29

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AUTHORS: Garber, R.I., and Kovalev, A.I.

TITLE: Determination of the Relaxation Period in the Polymorphic Transformation of Iron¹⁸

PERIODICAL: Fizika metallov i metallovedeniye, Vol 8, 1959, Nr 5, pp 785-788 (USSR)

ABSTRACT: According to Köster (Ref 1) and Bratina and Winegard (Ref 2), in the polymorphic-transformation temperature regions of cobalt (Ref 1) and zirconium (Ref 2) a considerable increase in the logarithmic decrement of elastic oscillations takes place. This should lead to a sharp fall on the decrement-versus-temperature curves when phase changes are completed and the temperature is increased. The position of the fall does not change when the frequency changes which makes it difficult to determine the relaxation characteristics of the effect. This can be overcome by determining the dependence of the decrement on frequency at a fixed temperature. If there is a maximum at a definite frequency, the product of the relaxation period and the cyclic frequency is approximately unity. The present investigation of internal friction of iron at the alpha-gamma transformation

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Determination of the Relaxation Period in the Polymorphic Transformation of Iron

temperature was based on this. The test pieces and method were as previously described (Ref 3). The 0.04% C iron test pieces after machining were vacuum annealed at 950 °C for 15 hours and cooled to room temperature. The test temperature was then attained at 1 °C per minute, being maintained for 10-20 minutes to eliminate temperature gradients. Oscillographic recording of torsional vibrations was carried out at 10-15 °C intervals (8 °C in the transformation region). Five series were carried out with frequencies of 1.08, 1.80, 2.60, 5.00 and 6.80 c/s. Results for 0-1000 °C at 2.6 and 6.8 c/s are compared in Fig 1, while Fig 2 gives the curves for 800-1000 °C at 6.8 c/s obtained on heating and on cooling. Fig 1 shows that at a given temperature the decrement depends on temperature, the greatest difference being at the temperature of the sudden change. Fig 3 was therefore constructed, giving the greatest value of the decrement, obtained at the alpha-gamma transformation, as a function of the oscillation frequency. The curve has a pronounced

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maximum at 2.6 c/s, corresponding to a relaxation process whose period is 0.06 seconds. The authors attribute this to transformation processes localized at phase boundaries and compares the period with activation processes at phase boundaries at the transformation temperature. They obtain an activation energy of 64 kcal/g.atom, that for the coefficient of self-diffusion being 67, suggesting that the polymorphic transformation can be envisaged as the transfer of individual atoms from the lattice of the old to that of the new phase. The authors have insufficient data for a similar treatment of the gamma-alpha transformation. ✓

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There are 3 figures and 5 references, of which 2 are Soviet, 2 English and 1 German.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR
Physico-Technical Institute, Acad.Sci. Ukr.SSR)

SUBMITTED: April 10, 1959

05743
SOV/32-25-10-32/63

28(5)
AUTHORS: Garber, R. I., Miller, Yu. G.

TITLE: Accelerated Method of Computing the Oscillation Decrement
From the Oscillograms

PERIODICAL: Zavodskaya laboratoriya, 1959, Vol 25, Nr 10, p 1235 (USSR)

ABSTRACT: In investigating the internal friction in metals, the oscillation decrement is generally computed from the oscillograms by measuring the amplitudes, and a diagram of the dependence of the logarithm of the amplitude on the number of integral oscillations is then drawn. The tangent of the angle of inclination of the straight line obtained represents the decrement. As in the case of several oscillograms much time is required for measuring the amplitudes, it is more convenient to draw a net of curves, or a series of patterns, according to the equation

$$Y = \pm A_0 e^{-\delta n} \quad (1)$$

(n = number of integral oscillations, and δ = logarithmic oscillation decrement). If the oscillation period, or the scale of the oscillograms obtained, is changed simultaneously with the damping value, the diagrams drawn according to

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Accelerated Method of Computing the Oscillation Decrement From the Oscillograms

equation (1) are photographed and projected on the oscillogram on an enlarged scale. The scale of enlargement should always be chosen in such manner that the number of periods in the oscillogram agrees with the interval of the values for n (taken from equation (1)) (Fig). There is 1 figure.

ASSOCIATION: Fiziko-tehnicheskii institut Akademii nauk USSR
(Physical-technical Institute of the Academy of Sciences of the UkrSSR)

Card 2/2

24(2)

AUTHORS:

Garber, R. I., Gindin, I. A., Shubin, Yu. V. SOV/56-36-2-5/63

TITLE:

The Slipping of Beryllium Single Crystals at Low Temperatures III
(Skol'zheniya monokristallov berilliya pri nizkikh temperaturakh;
III)

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959,
Vol 36, Nr 2, pp 376-384 (USSR)

ABSTRACT:

This paper is a continuation of parts I and II (Refs 1, 2), in which the authors had investigated slipping along the basis plane (0001) of technically pure beryllium single crystals (99.7%) at various temperatures. The investigations described here were carried out with purer Be single crystals (99.98%) at 77 and 20°K. Further, slipping on (0001) under the influence of a deforming force forming an angle of 45° with the plane (0001) was investigated. The direction of displacement in the case of basic slipping was parallel to the lateral face of the investigated crystal - the diagonal of first order [1120]. Deformation was brought about by means of a machine which was especially constructed for operation at low temperatures (Refs 3, 4); the rate of deformation was 0.03 mm/sec. The character of slipping was found to be highly dependent on

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the stage of deformation. In the case of weak deformations, there is no immediate slipping along the strips, and displacement occurs in a thin layer resting against the strips. Thus, the part of the crystal between two strips is displaced as a whole. Residual stress causes elastic displacement of the opposite sign in the crystal layers resting against the strips. In the case of strong pressure slipping takes place along the strip, and strong relative displacement occurs. The formation of a saw-shaped profile of the crystal face is characteristic of this stage; this may, according to reference 8, be looked upon as a result of twinning on planes with large indices in the case of basic slipping. The discontinuity of displacement is explained as being due to the existence of impurities. Purification of the beryllium contributed towards rendering the course of displacement along each strip more continuous, which leads to a higher degree of plasticity. At 77°K the formation of whole packets of strips can be observed, which is very clearly shown by figure 7. The method of building up the face profile of deformed crystals makes it possible to determine the basic dimensions of the fine structure of the elementary slipping strips and of the packets. The twist noticeable between the

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strips can, in the first stage, be considered to be due to residual stress; this twist, which increases with deformation, must necessarily be explained in the advanced stage, when it attains 30° , as a result of twinning. In conclusion, the authors thank I. M. Fishman for constructing and producing the replicas and for making electron-microscopical recordings. There are 9 figures, 1 table, and 13 references, 10 of which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR
(Physico-Technical Institute of the Academy of Sciences,
Ukrainskaya SSR)

SUBMITTED: July 16, 1958

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24(2)

AUTHORS:

Garber, R. I., Polyakov, L. M.

SOV/56-36-6-3/66

TITLE:

Investigation of the Initial Stages of the Plastic Deformation of Rock Salt Crystals (Issledovaniye nachal'nykh stadiy plasticheskoy deformatsii kristallov kamennoy soli)

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 6, pp 1625 - 1630 (USSR)

ABSTRACT:

The authors give a report on investigations of deformation processes in rock salt in the case of the formation of elementary displacements constituting a special deformation state (further deformation leads to the formation of individual gliding bands). The following stages are distinguished: Elastic deformation ($\sigma < 70$); elementary displacement ($\sigma \approx 70$); occurrence of single gliding bands ($\sigma \approx 100$); packets of gliding bands ($\sigma > 100$); isotropic light scatter (Tyndall cone) ($\sigma > 120$); asterism ($\sigma > 600$); destruction ($\sigma > 2000$). The σ -values give the normal tension in g/mm^2 . The activation energy required for annealing the residual stresses in elementary displacements is twice as small as that of the splitting bands. Additional attenuation of light was detected near the

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traces of the elementary displacements. It is suggested that this is due to the effect of the line inhomogeneities which are differently orientated on both sides of each trace. Some traces of elementary displacements have been found to contract after the load is removed as in the case of elastic twins of sodium salpeter. The trace of the elementary displacement on the lateral surface of the crystal was found to have a smooth profile extending over 1500 Å. This smooth profile can be satisfactorily explained by the effect of the surface tension forces which are in thermodynamic equilibrium with the additional residual stresses. The figures partly show very good photographs of elementary displacements. Figure 1 shows the photograph of a crystal with incomplete traces of an elementary displacement with respect to the (110)-plane, which was taken by means of a polarization microscope (25-fold enlargement); compression tension along the (010)-axis 70g/mm^2 ; figure 2 shows an electron-microscopic picture (25000-fold) of a disturbed elementary displacement; figures 3 and 4 show photographs of elementary displacements (also 25 times enlarged), and figure 6 is a very good reproduction of disturbed interference strips; figure 7

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is an electron-microscopic picture. The authors finally thank V. K. Sklyarov and I. M. Fishman for assisting in carrying out the experiments. There are 8 figures and 10 references, 8 of which are Soviet.

ASSOCIATION: Fiziko-tehnicheskii institut Akademii nauk Ukrainskoy SSR
(Physico-technical Institute of the Academy of Sciences, Ukrainskaya SSR)

SUBMITTED: December 20, 1958

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24(2)

SOV/20-128-3-18/58

AUTHORS: Garber, R. I., Stepina, Ye. I.

TITLE: Etching Patterns of Elastic Calcite Twins

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 3, pp 490-501
(USSR)

ABSTRACT: It appeared to be of some interest to investigate the etching patterns of the crystal during the formation of elastic twins, which differ from twin intermediate layers by their wedge-shaped appearance. Besides, the original position of the crystal planes is not yet found when investigating the elastic twin formation in the mother crystal. Strong deformations are thus caused in the neighborhood of the elastic twin. The latter have already been described by R. I. Garber (Ref 4) (see also G. B. Rays, Refs 1, 2). An elastic twin of the ordinary shape was completely contained within the sample and did not cause any particularities on its surface which occur on etching. It was particularly interesting that the twin left the crystal for the shear plane. The performance of these experiments is briefly described. Etching traces in the form of small slits occurred on the face along the line of intersection of the elastic twins and the surface crystal face.

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The etching patterns of the elastic twins are illustrated in a figure. They expand with decreasing thickness of the twin. Narrow lines occur on the etching of deformed crystals. The former are probably special deformation lines, which have not yet been found in calcite. By changing the distance from the point of contact of the wedge with the crystal up to the polished face, and also by changing the strain, it is possible to obtain various cross sections of the elastic twin with polished surface and, consequently, with different length of the etching trace, provided the twin length is given. Another figure shows the formation of a parallelogram on the etching pattern near the vertex of the elastic twin. This parallelogram forms the base of a roof-shaped cavity which is formed at the sharp edge of the elastic twin on etching. The fourth figure illustrates the arrangement of the traces of the cleavage faces on the shear plane near the peaks of the elastic twin. The formation of the latter may be regarded as a rotation of the ranges of planes about a definite angle within the twin range. According to the thickness of the wedge and the value of angle α at the boundaries of the twin range, different shift of the mixed ranges of each plane is obtained by the rotation. If this shift amounts to an integer k of the parameters

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λ_0 , the deformation at the boundary may assume its least value; otherwise defects of the kind of dislocations would occur. The least relative elastic deformations are found within the ranges of the least values of the above integer k . Certain deformations are periodically arranged along the boundary of the wedge-shaped twin at distances of λ_0 ($N = 720$). The typical etching pattern is formed only when the crystal emerges on the face. There are 4 figures and 4 references, 3 of which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR
(Physical-technical Institute of the Academy of Sciences of the UkrSSR)

PRESENTED: April 15, 1959, by I. V. Obreimov, Academician

SUBMITTED: April 13, 1959

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