

SOV/135-59-5-11/21

Experience in the Use of Oxygen-Flux Cutting of Stainless Steel in Shipbuilding

cutting head designed by VNIIVAVTOGEN, the head designed by the plant has the joint of the flux-feed pipe in the additional head made at an angle of 30° instead of 90°. This insures an uninterrupted supply of flux to the cutter and prevents it from getting plugged up. Steel bushes have been used in the nozzle instead of brass. This increased their length of service by 10-12 times. After examination of the effect of the oxygen-flux cutting on the quality of the welded seam it was concluded that mechanization of this process enabled cuts of sufficient smoothness and accuracy to be made for the assembly and welding of frame constructions. After being cut, the edges of the sheets should be cleaned with an emery wheel. The surface of the cut in parts not to be immediately welded, should be cleaned with an emery wheel to a depth of at least 0.4 - 0.5 mm. The effect of the cutting on the structure of the stainless steel near the cut edges is negligible, consisting mainly in the formation of a fused dendrite structure a few tenths

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Experience in the Use of Oxygen-Flux Cutting of Stainless Steel in Shipbuilding

of a millimeter deep. Metallographic investigation of the edges of sheets of 12%Ni18%Cr9%Ti steel, which had undergone standard tests for intercrystalline corrosion, revealed no sections in the zone of influence of the oxygen-flux cutting in which the austenite of the original steel had disintegrated along the boundaries of its grains. Comparison of welded seams made along the edges of blanks after mechanical planing and oxygen-flux cutting showed that the mechanical properties of the structural components of the metal of the seam and around it were equal. It is finally concluded that the application of oxygen-flux cutting to the construction of framework constructions is economically sound, simplifies the work and is 4-5 times more efficient than mechanical treatment. There are 4 diagrams, 6 photos and 2 tables.

Card 3/3

SOV/135-59-10-17/23

18(5), 25(1)

AUTHOR: Smirnov, B.I., Engineer

TITLE: Self-Centering Nozzles for Acetylene-Oxygen Torches

PERIODICAL: Svarochnoye proizvodstvo, 1959, Nr 10, pp 39-41 (USSR)

ABSTRACT: The author gives a report on new, self-centering single-torch nozzles, worked out by TsNIITS. It is stated that the nozzles, now used in several shipbuilding enterprises - a construction of VNIIAVTOGEN - are not very economical and do not guarantee a safe connection between the end of the nozzle and the head of the torch. Fig.1 shows an outside nozzle which works with low and medium pressure acetylene. The corresponding inside nozzle is shown in fig.2. The following experiments were made: The self-centering nozzle gives a concentrated arrangement of the heating flame. The speed of gas cutting with self-centering nozzles under the conditions shown in table 1 is not lower than that when using nozzles with ring-clearance. The quality of the cutting is a little higher. Table 2 gives detailed data for cutting with self-centering nozzles. There are 4 diagrams and 2 tables.

Card 1/1

S/135/60/000/009/013/015  
A006/A002

Welding Plastics With High-Frequency Current

and the control parts of the technological cycle. Welding is performed by placing the bogie on a sheet so that the longitudinal symmetrical axis of the head passes along the sheet edge. From the side of the welding head the second sheet is placed under the electrodes, tightly contacting the first sheet. The gap must be correctly set and the electrodes must be arranged symmetrically to ensure satisfactory welds. In cases when the apparatus dimensions do not permit welding in narrow spaces, corners etc, the manual SPPR "ironing" device is used (Fig. 2). The electrodes are arranged in such a manner that the butt line of the sheets passes centrally between the electrodes; their ends coincide with the welded seam. The necessary pressure is produced by pressing the handles. High-frequency current is induced by reducing the pressure. Welding of vertically arranged sheets and of pipe bushings is made with a special-shaped ironing device. A high-frequency welding press (Fig. 3) serves to produce protective clothes and technical parts from plastic films. The press consists of a mechanical welding device with a pedal drive and an ultrasonic frequency generator. Technical characteristics are given. The high-frequency current passes between the upper and lower electrode, melts and connects the material in the contact spot, and repeats the shape of the upper electrode. This permits the control of the seam shape. A set of electrodes of different shapes and

Card 2/3

SMIRNOV, B.I., inzh.

Use of a propane-butane mixture for the gas cutting of metal.

Svar. proizv. no.4:35-36 Ap '61.

(MIRA 14:3)

(Gas welding and cutting)

SMIRNOV, B.I., inzh.

Using city gas for the oxygen cutting of metal. Svar. proizv.  
no.3:37-38 Mr '62. (MIRA 15:2)  
(Gas welding and cutting)

SMIRNOV, B.I., inzh.

Electric arc welding of thick copper bus bars. Svar. proizv.  
no.6:36-37 Je '62. (MIRA 15:6)

(Copper--Welding)  
(Bus conductors (Electricity)--Welding)

SMIRNOV, B.I., inzh.

Improving the PDGP semiautomatic machine for welding in carbon dioxide. Svar. proizv. no.9:29 S '62. (MIRA 15:12)  
(Electric welding—Equipment and supplies)



SMIRNOV, B.I., inzh.

Semiautomatic electric arc stud welding with a nonmagnetic gun.  
Svar. proizv. no.4:38-40 Ap '63. (MIRA 16:5)  
(Electric welding---Equipment and supplies)

L 12851 65 AFETR/ASD(a)-5/RAEM(c)/RAEM(a)/ESD(s)/ESD(t) 8/0091/84/000/009/0001/0005  
ACCESSION NR: AP5000436

AUTHOR: Medvedev, O. S. (Engineer); Smirnov, B. I. (Engineer)

TITLE: Using pulse meters for troubleshooting overhead electric transmission lines B

SOURCE: Energetik, no. 9, 1964, 1-5

TOPIC TAGS: transmission line, pulse meter, electric equipment, electric wire, electric measuring device, electric measurement, pulse generator

Abstract: Pulse meters have been installed for remote determination of damage spots in electric transmission lines at 110-500 kv Moscow power substations. All 220-500 kv lines and a considerable part of the 35-110 kv lines may be checked with these meters. The action of the pulse meters is based on the phenomenon of the reflection of a pulse transmitted in the line from spots where there is a considerable change in the characteristic impedance of the line. Such spots in electric transmission lines may be: transpositions, intersections with other lines, large river

Card 1/2

L 12851-65  
ACCESSION NR: AP5000436

crossings, sections where the wires are aligned in a manner which differs from the basic line arrangement and also various damaged spots in the line. The accuracy of pulse measurements when the signal transmitted in the line is held at a constant level depends on the high-frequency characteristics of the lines, the rate at which the pulse is propagated and the distance to the damage spot. Schematic diagrams are given for connection of the meter to the lines and to two high frequency pulse generators. Orig. art. has: 4 figs.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: EE

NO REF SOV: 000

OTHER: 000

JPRS

Card 2/2

ACC NR: AM6012450

(N)

Monograph

UR/

Smirnov, Boris Ivanovich

The use of capron in mechanical engineering for ships (Primeneniye kaprona v sudovom mashinostroyenii) Leningrad, Izd-vo "Sudostroyeniye", 65. 0118 p. illus., biblio. 2,300 copies printed.

TOPIC TAGS: marine engineering, ship component, marine engine, synthetic material, caprone

PURPOSE AND COVERAGE: The book discusses the use of capron in marine machinery, the technology of manufacturing components of ship mechanisms, equipment, and fittings made of capron, and special aspects of their construction. Problems of the effectiveness of substituting capron for metal are also considered. The book is intended for engineering and technical personnel in shipbuilding enterprises, workers in design offices, and may be used as a textbook by students at institutions of higher learning and technical schools, specializing in shipbuilding.

TABLE OF CONTENTS (abridged):

Foreword--4

Ch. I. The manufacture of products made of capron--5

Ch. II. Use of capron in marine machinery manufacture--55

Bibliography--118

SUB CODE: 13,07/SUB DATE: 07Oct65/ ORIG REF: 039

Card 1/1

MEDVEDEV, D.M., inzh.; SMIRNOV, B.I., inzh.

Use of pulse-type measuring devices for locating damages in over-  
head power transmission lines. Energetik no.9:1-5 S '64.

(MIRA 17:10)

NEYMAN, R.I., inzh.; SMIRNOV, B.I.

Use of split wooden pole arms on 35-110kv. overhead power  
lines. Energetik 12 no.11826-27 N '64 (MIRA 18:2)

KASHCHENKO, F.D.; GARYAYEV, A.I.; SMIRNOV, B.I.

New powder wire for hard facing rolling mill rolls. *System. svar.*  
17 no. 10:47-52 O '64 (MIRA 1831)

1. Magnitogorskiy metallurgicheskiy kombinat.

PA - 2185

AUTHOR  
TITLE

SMIRNOV, B.I.

Intensity Change of X-Rays, Scattered from Polycrystals due to Deformation  
(K vopresu ob izmenenii intensivnosti rentgenovskikh liniy pri deformirovani polikristallov).

PERIODICAL

Zhurnal Tekhn.Fiz., 1957, Vol 27, Nr 1, pp 218-220 (U.S.S.R.)

ABSTRACT

Received 2/1957

Reviewed 4/1957

The present work investigates the change of intensity of X-rays in the case of the deformation of polycrystals of ARMKO-iron. On the lateral surface of the cylindrical samples (diameter 10 mm, height 20 mm) there is a plane piece of ~5 mm width. The samples first annealed in the vacuum at 600° C were compressed gradually by some percents. Even in the case of a maximum deformation of 30% the samples retained their cylindrical shape. By means of the ionization-device URS-50 I an X-ray-picture was made of the plane piece of the lateral surface after each stage of deformation. The interference lines (110), (200), (211), and (220) in the K<sub>α</sub>-radiation of Fe were investigated. The samples were not rotated while the picture was being taken. Each sample was X-rayed 4 times. The intensity was determined as the plane of the curve which was automatically plotted by the device. The error on the occasion of the determination of intensity remained under 3%. The results obtained are illustrated in a diagram. After passage through the plane of flow (flow-boundary), the intensity I of all X-ray-lines increases. The greatest increase was observed in the case of the line (110), but the ratio I<sub>200</sub>/I<sub>110</sub> decreases. With further deformation the intensity of the various lines changes in

Card 1/2



*Smirnov B.I.*

57-8-34/36

AUTHOR  
TITLE

Tsobkallo S.O., Smirnov B.I.  
X-Ray Study of Distortions in Crystal Lattice of Aluminum Deformed  
at the Temperature of Boiling Nitrogen.  
(Rentgenograficheskoye izucheniye iskazheniy v kristallicheskoy  
reshetke alyuminiya, deformirovannogo pri temperature kipeniya azota-  
- Russian)

PERIODICAL  
ABSTRACT

Zhurnal Tekhn. Fiz., 1957, Vol 27, Nr 8, pp 1912- 1914 (U.S.S.R.)  
The authors show that the strength of the samples deformed in li-  
quid nitrogen increases linearly with the increase of the deforma-  
tion  $\epsilon$  for two temperatures. The intensity of x-ray lines I (expo-  
sed to air) decreased linearly with the increase of deformation and  
this took place quicker than in the case of deformation in liquid  
nitrogen. The intensity of line obtained in the case of deformation  
in liquid nitrogen increased with the time, however, without reach-  
ing the values of those samples that were deformed in the air. The  
widening of B-lines (unimportant as regards their magnitude) rea-  
ches a saturation in the case of a deformation of about 15 %. The  
results show that aluminum can, by means of deformation at low tem-  
peratures, be solidified to a greater extent than is otherwise the  
case. This effect is maintained for a long period also at room  
temperature. The unimportant widening of x-ray lines in aluminum  
depends on its low melting temperature as well as on the small ela-  
stic anisotropy of its crystal.  
(1 illustration and 7 Slavic references).

Card 1/2

24(6)

AUTHOR:

Smirnov, B. I.

SOV/57-58-12-7/15

TITLE:

Investigation of the Intensity of X-Ray Lines of Molybdenum During Deformation (Issledovaniye intensivnosti rentgenovskikh liniy molibdena pri deformirovanii)

PERIODICAL:

Zhurnal tekhnicheskoy fiziki, 1958, Nr 12, pp 2693-2695 (USSR)

ABSTRACT:

In the present case the ratio of two reflections at planes with a high square sum of the indices in which case the influence of third order distortions must be high, were investigated. For this the variation of the X-ray lines (200) and (400) in intensity caused by a deformation of molybdenum polycrystals was examined. The cylindric samples with a diameter of 10 mm and a height of 20 mm had a 5 mm wide side face on the surface. The samples previously annealed in vacuum were deformed at a pressure of  $10^{-4}$  torr at  $1050^{\circ}\text{C}$  for two hours by a step-by-step compression. The results showed that after the first deformations (the flow curve) the intensity of the (400)-lines does not change while the intensity of the (200)-lines increases somewhat. In the case of further deformation the intensity of both lines in first approximation varies linearly with deformation. After the deformation the

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Investigation of the Intensity of X-Ray Lines of  
Molybdenum During Deformation

SOV/57-58-12-7/15

ratio of the line intensity  $I_{400}/I_{200}$  remains constant. The results of the experiments may be explained in the same way as in the case of the experiments with iron (Ref 2). The results obtained in the present case differ from those obtained in the paper mentioned in reference 9. The present paper once again shows that the intensity variation of a single line or the variation of the ratio of the intensities of two lines do not provide an unequivocal means of characterizing the distortions of third order, if an influence of texture and of extinction cannot be excluded. Apparently the effect of the distortions of the third order is considerably less than the influence of texture and extinction and varies within the limits of the experimental errors. The work was carried out in the laboratory supervised by N. N. Davidenkov, Professor. There are 1 figure and 13 references, 7 of which are Soviet.

Card 2/3

Investigation of the Intensity of X-Ray Lines of  
Molybdenum During Deformation

SOV/57-58-12-7/15

ASSOCIATION: Leningradskiy fiziko-tehnicheskii institut AN SSSR  
(Leningrad Physical and Technical Institute AS USSR)

SUBMITTED: February 4, 1958

Card 3/3

85762

18.7100 1422

S/137/60/000/009/013/029  
A006/A001

Translation from: Referativnyy zhurnal, Metallurgiya, 1960, No. 9, pp. 237-238,  
# 21427

AUTHORS: Klyavin, O.V., Smirnov, B.I.

TITLE: Studying the Width of Roentgen Lines of Nickel, Deformed at 4.2°K

PERIODICAL: V sb.: Nekotoryye probi. prochnosti tverdogo tela, Moscow-Lenin-  
grad, AN SSSR, 1959, pp. 55-60

TEXT: The authors investigated the width of the reflex (420) of Ni deformed by elongation at 4.2, 77°K and room temperature, and changes in width during annealing up to 700°C. It was found that the width increased with a higher deformation degree and dropping temperature of deformation; in the case of stepped deformation of the specimen at various temperatures, it was established that the changes in the width depended on the temperature of the preceding deformation. The authors note the similar course of curves of changes in width and elongation

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85762

S/137/50/000/009/013/029  
AC06/AC01

Studying the Width of Roentgen Lines of Nickel, Deformed at 4.2°K

curves. It is established that the temperature of eliminating crystal lattice distortions during annealing process is the lower, the lower the temperature of deformation of the specimen. There are 14 references. ✓

A.E.

Translator's note: This is the full translation of the original Russian abstract.

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DAVIDENKOV, N.N.; SMIRNOV, B.I.

Investigating the width of x-ray lines of molybdenum de-  
formed at various temperatures. Issl.po zharopr.splav. 4:  
147-151 '59. (MIRA 13:5)  
(Molybdenum--Metallography) (Deformations(Mechanics))

66253

SOV/181-1-7-9/21

~~24(6)~~ 24,7100

AUTHOR: Smirnov, B. I.

TITLE: On the Differentiation of Distortion Effects of the Crystal Lattice and Dispersiveness in Polycrystals During Harmonic Analysis of an X-ray Line

PERIODICAL: Fizika tverdogo tela, 1959, Vol 1, Nr 7, pp 1072-1075 (USSR)

ABSTRACT: The blurredness of the radiographic lines of deformed polycrystals is due to two causes: small degree of dispersiveness of the samples and distortion of the crystal lattice. Either causes entails another kind of blurredness. The method of analysis suggested allows not only to establish the reason for the blurredness but also to give a quantitative description of the characteristic effect producing the blurredness. The coefficients  $A_t$  of the Fourier expansion of the function of "true" line widening are calculated from the experimentally determined intensity distribution among the X-ray lines of the deformed standard sample. The afore-mentioned effects may be distinctly differentiated for some reflection orders.

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$A_t = A_t^d \cdot A_t^i$  holds for simple reflection, where  $A_t^d$  denotes

4



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SOV/181-1-7-9/21

On the Differentiation of Distortion  
Effects of the Crystal Lattice and Dispersiveness in Polycrystals During  
Harmonic Analysis of an X-ray Line

dispersiveness, and  $A_t^i$  distortion. To obtain the actual value of the blocks in angstroms and the value of distortion with respect to an arbitrary lattice length  $L$ , the scale of the reciprocal lattice is to be substituted for the chosen experimental scale of resolution. The relation between the experimental interval of resolution  $\alpha$  and the theoretical interval is  $L \sim \frac{t}{\alpha}$  expressed by the order of the coefficient. Thus, the whole problem serves the purpose of finding the curve  $A_t(L)$  and to apply its tangent line to the point  $L = 0$ . The first point on the curve  $A_t(L)$  is always found for any value  $L_1$  (at  $t = 1$ ) and the curve itself by extrapolation. For comparison, the contour of the X-ray line was harmonically analyzed for an interval division into 48 and 1,200 parts. Nickel served as test material. Figure 1 shows the coefficients  $A_t$  of the expansion as dependent on  $L$  for various resolutions. The straight passing through the first point may be

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On the Differentiation of Distortion  
Effects of the Crystal Lattice and Dispersiveness in Polycrystals During  
Harmonic Analysis of an X-ray Line

SOV/181-1-7-9/21

considered an approximate tangent line. A table illustrates the actual values of the blocks (D) for the straights 1-6. Accordingly, the D-values are found between 2,000 and 200 angstroms. Figure 2 shows the dependence of the microdeformation on the distance:

$D = f \sqrt{\Delta L^2}$ . In the ~~first part~~ the curves are almost parallel. All distortions are of the same order  $\epsilon = \frac{\sqrt{\Delta L^2}}{L} \approx 1.8 \cdot 10^{-3}$

approximately if they are determined from the gradient of the curves in this part. The method described is applicable only if the Fourier coefficients  $A_t$  have been determined with sufficient accuracy. In conclusion, the author thanks N. N. Davidenkov, head of the laboratory at which this investigation was made, and V. I. Iveronova for figures. Calculations on the computer were made by T. N. Smirnova. There are 2 figures, 1 table, and 11 references, 5 of which are Soviet.

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4

On the Differentiation of Distortion  
Effects of the Crystal Lattice and Dispersiveness in Polycrystals During  
Harmonic Analysis of an X-ray Line

66253

SOV/181-1-7-9/21

ASSOCIATION: Fiziko-tekhnicheskiy institut, Leningrad  
(Physical and Technical Institute, Leningrad)

4

SUBMITTED: August 5, 1958

Card 4/4

24(7)

SOV/48-23-5-18/31

AUTHORS:

Davidenkov, N. N., Smirnov, B. I.

TITLE:

Study of the Width of X-Ray Lines of Metals, Deformed at Various Temperatures (Izucheniye shiriny rentgenovskikh liniy metallov, deformirovannykh pri raznykh temperaturakh)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 5, pp 624-628 (USSR)

ABSTRACT:

By way of an introduction the change of metal properties at low temperatures is pointed out. Special mention is made of the increase in hardness in metals with cubic face-centered lattice (Al, Ag, Au, Cu, Ni, Pb) and the high flow limits occurring at a moderate hardness in certain ranges of low temperatures in cubic space-centered lattice metals (Fe, Mo, W, Ta). The metals investigated in the present paper are tungsten and iron with cubic face-centered lattice and nickel with cubic space-centered lattice. The dimensions of the samples, their composition and thermal pre-treatment are specified next. A short description is given of the experimental arrangement, an ionization apparatus of the URS-50I type, and the X-ray spectral lines used are summarized in a table. Experimental results are represented in diagrams. The first two diagrams show the deformation of the nickel and tungsten

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SOV/48-23-5-18/31

Study of the Width of X-Ray Lines of Metals, Deformed at Various Temperatures

samples in dependence on pressure; the nickel deformation was carried out at temperatures of  $-196^{\circ}\text{C}$  and  $20^{\circ}\text{C}$ , and in the case of tungsten at temperatures of  $20^{\circ}\text{C}$ ,  $150^{\circ}\text{C}$ ,  $300^{\circ}\text{C}$  and  $400^{\circ}\text{C}$ . Other diagrams show the dependence of the line width of the abovementioned samples on deformation. Depending on the X-ray line used, the widths exhibit an amplification of up to more than double. In addition, as concerns tungsten, a further diagram shows the dependence of the grain sizes and the distortions of the 2nd kind on deformation. As concerns iron, it is shown that after a deformation at the temperature of liquid nitrogen of 9.5%, the width of the X-ray lines at  $20^{\circ}\text{C}$  does not change even after about 5,000 min. There are 6 figures, 1 table, and 8 references, 5 of which are Soviet.

ASSOCIATION: Leningradskiy fiziko-tehnicheskii institut Akademii nauk SSSR  
(Leningrad Physical-technical Institute of the Academy of Sciences, USSR)

Card 2/2

9.4300  
18.7510

87509  
S/181/60/002/0:2/009/018  
3006/3063

AUTHORS: Nadgornyy, E. M. and Smirnov, B. I.

TITLE: Structure of Copper Microwire

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 12, pp. 3048-3049

TEXT: The authors examined copper microwires 4, 5, 6.6, 8, 9, 10.5, 14, 15, and 17 $\mu$  in diameter which was calculated from the resistance of one linear unit. X-ray diffraction analysis revealed the structure of the wires and, in the case of single-crystal wires, also the orientation relative to the wire axis. The principal studies were made with a YPC-50N (URS-50I) diffractometer. Analysis of the results indicated that copper wires with a gage less than 14 $\mu$  were single crystals, the axes of which coincided with the [001] plane. Microwires 15 and 17 $\mu$  in diameter are polycrystalline and consist of large, desorientated grains. It was thus found that the wire structure is determined by its diameter and manufacturing method. Gold, silver, and copper microwires 2.3, 3, and 5 $\mu$  in diameter showed the same results. There are 4 references: 2 Soviet and 2 US. X

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87909

Structure of Copper Microwire

S/181/60/002/012/009/018  
B006/B063

ASSOCIATION: Fiziko-tehnicheskiy institut AN SSSR Leningrad (Institute  
of Physics and Technology AS USSR, Leningrad)

SUBMITTED: April 28, 1960

X

Card 2/2

PRODUCTION, ...

Structure of ...  
3048 D 140. (CIA 14:2)

1. Fiziko-tekhnicheskii ...  
(Rare, ...)



S/126/60/009/06/021/025  
E073/E335

AUTHOR: Smirnov, B.I.

TITLE: Comments to the Paper "X-ray Diffraction Studies<sup>21</sup> of Lattice Distortions in Metals Deformed at Low Temperatures" by V.R. Golik, G.A. Sirenko and V.I. Khotkevich (same Journal, 1959, Vol 8, Nr 2, P 235)

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 6, pp 936 - 937 (USSR)

ABSTRACT: The authors used the method of harmonic analysis of the lines on X-ray diffraction patterns of deformed polycrystals and determined the microdistortions and the sizes of the areas of coherent scattering from the blurring of one line. They found that "the relative microdeformation is considerably nonuniform and increases with increasing distance, passing through a maximum" (Figure 6 of the discussed paper); they observed a change in the magnitude of the maximum and its position with decreasing deformation temperature. The author of this comment does not agree with this conclusion and he explains the presence of the maximum on the  $\epsilon = f(L)$  curves by the fact that the authors applied the

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S/126/60/010/005/020/030  
E193/E483

AUTHOR: Smirnov, B.I.

TITLE: On the Problem of the Yield Point of Iron After Strain Ageing

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.5, pp.763-766

TEXT: The stress-strain diagram of a plastically deformed iron specimen has no yield point; this effect is not permanent and disappears after ageing at room temperature. The object of the investigation, described in the present paper, was to study the effect of ageing on the yield point of plastically deformed iron for the case when the preliminary and subsequent deformation are not of the same sign. To this end, stress/strain diagrams were constructed for Armco iron specimens, subjected to the following treatments: (a) vacuum-annealed at 700°C for 1 h ; (b) annealed, subjected to 10% plastic deformation in tension, aged at room temperature and tested in tension; (c) as (b) but tested in compression; (d) annealed, plastically deformed in compression, aged at room temperature and tested in compression; (e) as (d) but tested in tension. As was to be expected, diagrams obtained

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S/126/60/010/005/020/030  
E193/E483

On the Problem of the Yield Point of Iron After Strain Ageing

for specimens (a), (b) and (d) had the characteristic yield point which, however, was absent on diagrams obtained for specimens (c) and (e), even after they had been aged for 1 h at 100°C; (all tensile and compression tests were carried out at the rate of strain of 2 mm/min). It was only when the specimens were aged at 130°C that the yield point re-appeared on the appropriate stress/strain diagrams. Based on the theory of interaction between impurity atoms (N,C) and dislocations, a tentative explanation of the effects observed is presented. The work was directed by N.N. Davidenkov. There are 3 figures and 6 references: 4 Soviet and 2 Non-Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR  
(Physical-Technical Institute AS USSR)

SUBMITTED: April 6, 1960

Card 2/2

22062

S/181/61/003/004/028/030  
B102/B209

24.7200 (1153, 1160, 1385)

AUTHORS:

Muravtsov, L. P. and Smirnov, B. I.

TITLE:

X-Ray diffraction study of packing faults in deformed tantalum

PERIODICAL:

Fizika tverdogo tela, v. 3, no. 4, 1961, 1272-1276

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fa  
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F

TEXT: It has earlier been shown that packing faults in the {211} planes of cubic body-centered metallic crystals must exert an influence upon X-ray diffraction. Such investigations have been made for special cases, e. g., for  $\beta$ -brass, molybdenum, iron, tungsten, and tantalum; however, only two lines of the latter have been examined. The present study was made with tantalum specimens which had been briquetted from powder (containing 0.63% of niobium) by means of cellulose-nitrate varnish. A tablet pressed from powder and heated in vacuo for three hours at 1050°C served as a standard. The annealed specimen had an interplanar spacing of  $d = 2.3 \text{ \AA}$  and exhibited only very weak reflection. The X-ray diffraction studies were made with a YPC-50 W (URS-50I) apparatus with a scintillation counter. The reflection lines 110, 200, 211, 220, 400, and 422 were examined. Filtered Cu radiation

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that c  
Card 2

Card 1/3

... are isotropic, i. e., that an effect of packing  
... taken from other publications shows

550  
150  
1260

23100  
S/181/61/003/005/005/042  
B101/B214

9.4300 (1055, 1469, 1072)

AUTHORS: Klyavin, O. V. and Smirnov, B. I.

TITLE: Study of the x-ray line-width of aluminum deformed at 4.2°K

PERIODICAL: Fizika tverdogo tela, v. 3, no. 5, 1961, 1335-1337

TEXT: The object of the work was to extend the data on the broadening of the x-ray lines of deformed aluminum to temperatures lower than those studied so far. The aluminum studied was of the type A8000 (AV000) which was deformed at 300, 77, and 4.2°K. The 20 · 0.5 · 5 mm large sample was heated at 150°C in vacuum ( $10^{-4}$  mm Hg) and then stretched at a rate of 1.6 mm/min and the same temperature by an apparatus described in Ref. 9 (O. V. Klyavin, A. V. Stepanov, FMM, 8, 274, 1959). The x-ray pictures were taken at 300°K, by means of JPC-50M(URS-50I). The 200 and 400 interference line in the  $K_{\alpha}$  radiation of iron was investigated. The following results were obtained (Fig. 2): 1) Initially, the width of the line increases rapidly with deformation; 2) the increase of width at lower deformations is larger; 3) the curve of the line broadening becomes gradually flatter, as deformation increases. The quantity D of the block and its

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+

23100

Study of the x-ray ...

S/181/61/003/005/005/042  
B101/B214

distortion  $\Delta d/d$  of the second kind was calculated on the strength of the broadening of the 200 and 400 line under the assumption that the line intensity follows a Gaussian curve. The results of this calculation are given in the table. It was found, further, that the broadening of the line decreases again during a longer storing (Fig. 3). It had been observed by other research workers (M. S. Paterson, Ref. 2, see below; N. N. Davidenkov, B. I. Smirnov, Izv. AN SSSR, ser. fiz., 23, 624, 1959) that the samples initially deformed at low temperatures showed no broadening of the x-ray lines on further deformation at higher temperatures. This was confirmed experimentally. Since, however, samples deformed at the temperature of liquid helium did not stand a second deformation at 300°K, a cold hardening was carried out by compression between hard plates. In this way (Fig. 3) there occurred a diminution of the line width to about the same value as was observed after maximum stress at 300°K. This shows that the distortions of the crystal lattice became smaller. In general, no essentially different behavior of the x-ray lines from what had already been obtained at 77°K was observed at 4.2°K. The present work was done at the laboratory directed by N. N. Davidenkov and A. V. Stepanov. They and N. M. Reynov, the director of the Cryogenic Laboratory, are thanked. There

Card 2/4

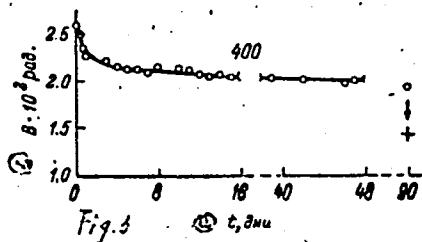
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S/181/61/003/005/005/042  
B101/B214

Study of the x-ray ...

Fig. 3. Dependence of the width of the 400 x-ray line of aluminum deformed in liquid helium on the duration of their storage at 300°K.

Legend: a) t, days; b)  $v \cdot 10^2$  rad; (+) after cold hardening at 300°K.



Table

| T, °K | v, % | D · 10 <sup>-3</sup> Å | $\frac{\Delta d}{d} \cdot 10^4$ |
|-------|------|------------------------|---------------------------------|
| 300   | 20   | 5                      | 5                               |
| 78    | 20   | 2                      | 6                               |
| 4.2   | 20   | 1                      | 7                               |
| 4.2   | 70   | 0.6                    | 10                              |

Card 4/4

18 8200  
94 7500

3/11/61 001/006/01 1011  
B 02/310'



AUTHORS: Davidenko, N.S., Smirnov, B.I., and Yanovskaya, V.D.

TITLE: Influence of the temperature effect upon the rate of growth of dislocations in crystals

PERIODICALS: Zhurnal teoreticheskoi i prikladnoi fiziki, no. 6, 1961, pp. 11-14

TEXT: The authors attempt to show that the strong rise in plasticity in cubic body-centered lattices on a drop of temperature cannot be brought into relation with the appearance of "impurity clouds" (A.H. Cottrell, B.A. Bilby, Proc. Phys. Soc. A63, 42, 1949). There is experimental and theoretical proof of the relationship between shearing stress  $\tau$  on the

field plane and the dislocation density in metals with such lattices is given by  $\tau = \tau_0 + \tau_D^{1/2} = \tau_0 + \tau_0 k d^{1/2}$ , ( $k = \tau_D^{1/2}$ );  $\tau_D$  is, according to Cottrell, the shear stress required for liberating dislocations from impurity clouds (atoms, interstitials and others). The first equation may also be written in the form  $\tau = \tau_0 + \tau_0 k d^{1/2}$ ; for the simple expansion Card 1/4



Problem of the temperature dependence of the yield point

S/191/61/003/0.6/011/031  
B102, B201



(compression) if  $\sigma_y = \sigma_0 + \sigma_K$ , here,  $\sigma_K$  describes the interaction of dislocation and impurity clouds. It is considered the cause of a rise of the yield point with dropping temperature. The authors of the present paper studied the temperature dependence of  $\sigma_y$  and  $T_y$  on the basis of previously published experimental data. The results of this analysis of experimental data are collected in the table. It is thus found that  $\sigma_0$ , not  $\sigma_K$  is responsible for the rise of the yield point, i.e., not the impurity cloud effect. In addition, in a rise of  $\sigma_K$  and with dropping temperature,  $d\sigma_y/dT = \text{const.}$ , i.e., the  $\sigma_K(T)$  curve has nothing in common with the theoretical curves. There are two cases, where  $\sigma_K$  also drops with dropping temperature. L.I. Vasil'yev and L.M. Shestopalov are thanked for their discussions. There are 9 figures, 1 table, and 20 references: 1 Soviet-bloc and 19 non-Soviet-bloc. The most important references to English-language publications read as follows: G. Szelek, A. Seeger, Acta. Met. 7, 469, 1959; H. Conrad, Phil. Mag. 5, 145, 1960; D.E. Stein, J.R. Low, J. Appl. Phys. 21, 632, 1950.

Page 2/4

SMIRNOV, B.I.

Separating the effects of Debye line blurring by harmonic analysis of one and two other reflections. Fiz. met. i metalloved. 12 no.3:449-453 S '61. (MIRA 14:9)

1. Fiziko-tekhnicheskiy institut AN SSSR imeni A.F. Ioffe.  
(X rays--Diffraction)

21229

18 8200

1418,1138

S/053/61/073/003/003/004  
B125/B201

AUTHORS: Vasil'yev, D. M., and Smirnov, B. I.

TITLE: X-ray methods of studying plastically deformed metals

PERIODICAL: Uspekhi fizicheskikh nauk, v. 73, no. 3, 1961, 503-558

TEXT: The present survey deals chiefly with structural distortions of plastically deformed metals, as become manifest by a change of position, shape, width, and the integral intensity of the lines. The methods first developed for the study of macrostrains under macroelastic stress are also discussed briefly. The present paper does not, however, deal with studies concerning the various methods of studying the mosaic structure and its effect upon metal properties, as this problem had already been studied by P. Hirsch (Progr. Metal. Phys. 6, 236 (1956)). The present report is the first systematic description of the principal results available in the literature. In fact, the well-known survey by G. Greenough (Progr. Metal. Phys. 3, 176 (1952)) is concerned with publications until 1951 only. The lectures by Barrett and Green at the congress in Detroit (International

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X-ray methods of studying...

where  $\sigma_{\perp}$  denotes the stress in perpendicular to the surface. The coefficient  $k$  takes account of the effect of  $\sigma_{\perp}$  on the position of the X-ray lines. According to H. Möller and H. Barbers, the use of elastic constants  $E_m$  and  $\mu_m$  for the calculation of  $\sigma_r$  leads to a difference between  $\sigma_r$  and  $\sigma_m$ . Vasil'yev and Yerashev confirmed the hypothesis advanced by G. Greenough, Nature, 160, 258 (1947); Proc. Roy. Soc. A197, 556 (1949). According to B. M. Rovinskiy, the hypothesis of the boundary-near zones and of the inner parts of the grains explains the phenomena observed. The following conclusions can be drawn from the papers discussed in the second chapter: The hypothesis of the "weakened" layer does not explain all of the phenomena observed. The hypothesis by Greenough yields values of  $\Delta d/d$  (relative change of distances between the layers) that are by one order of magnitude smaller than the observed ones. The hypothesis of the weak zones of the matrix and of the strong boundary-near zones gives a satisfactory explanation of the phenomena observed. 3. Study of X-ray line expansion: The possible causes of the blurredness of the lines, the

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S/053/61/073/003/003/004  
B125/B201

X-ray methods of studying...

correction rendered necessary by the geometrical conditions of the recording, the separate determination of expansion effects, separation of these effects with the method of the harmonic analysis of the form of lines, modification of the shape of blocks, and microdistortions in the deformation of metals. According to G. I. Aksenov, V. A. Moshchanskiy, and several non-Soviet authors, the macroelastic deformation of a polycrystalline specimen is bound to cause an insignificant reversible expansion of the X-ray lines if the elastic properties of crystallites are anisotropic. According to N. Ya. Selyakov and Scherrer  $\beta_r = \lambda/D\cos\psi$

holds for this expansion, where D denotes the size of the particle in perpendicular to the reflection plane. L. I. Lysak and other authors have supplied formulas for the abovementioned correction for the geometrical conditions of recording. A. G. Khachatryan has written on the separation of effects. Also O. N. Shvirin's method is mentioned, along with papers by B. I. Smirnov, N. N. Davidenkov, O. V. Klyavin, L. Rybakova, O. N. Shvirin, N. I. Sandler and V. I. Khotkevich. 4. Effect of the packing error upon the diffraction of the X-ray lines: Lattices of face-centered and volume-centered cubes, 5. Change of intensity of X-ray lines:

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21229

S/053/61/073/003/003/004  
B125/B201

X-ray methods of studying...

Origin of conceptions regarding the distortions of the third kind, first studies, further development of these studies, study of deformed metals in the form of powders, change of the intensity of lines in the deformation of complicated polycrystalline specimens, static and dynamic distortions, problems of classification of structural distortions of deformed metals and corresponding inner distortions. The results of studies by V. K. Kritskaya, G. Gertsriken, Ya. S. Umanskiy, V. A. Il'ina, and several non-Soviet authors diverge considerably. A paper by A. Kochanovska and a formula by Vil'khinskiy are mentioned. D. Batrus', V. I. Iveronova, G. P. Revkevich studied the nature of extinction in deformed metals. In deformed powders, the intensity of X-ray lines may vary due to the following causes: fragmentation of crystals, whereby extinction is altered; appearance of distortions in the lattice, associated with displacements of the atoms from their position of equilibrium (distortions of third kind), appearance of errors in the layer packing. M. A. Krivoglaz made critical remarks on a separation procedure. N. N. Davidenkov gave a definition of remanent distortions. 6. Data on dislocations resulting from the diffraction of X-ray lines. Determination of density of dis-

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X-ray methods of studying...

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B125/B201

locations from roentgenograms by Debye-Scherrer and from the expansion of the curve of rotation on a double crystal spectrometer, direct observation of dislocations. There are 20 figures, 9 tables, and 335 references: 130 Soviet-bloc and 205 non-Sovietbloc. The three most recent references to English language publications read as follows: S. Chandrasekhar, Extinction in X-ray Crystallography. - Advances Phys. 9, 363 (1960). S. Chandrasekhar, An Experimental Method of Correcting for Extinction in Crystals. - Acta Crystallogr. 13, 588 (1960), W. Webb, J. Appl. Phys. 31, 194 (1960). X

Card 6/6

L 19670-63

EWP(q)/EWT(m)/EWP(B)/BDS

AFFTC/ASD JD

ACCESSION NR: AR3006984

S/0058/63/000/008/E044/E044

59  
58

SOURCE: RZh. Fizika, Abs. 8E314

AUTHORS: Zimkin, I. N.; Nadgorny\*y, E. M.; Smirnov, B. I.

TITLE: X-ray diffraction study of filament-like sodium chloride crystals

CITED SOURCE: Sb. shchelochnogaloidn. kristallov, Riga, 1962, 463-465

TOPIC TAGS: filament-like crystal , sodium chloride, X-ray dif-  
fraction study

TRANSLATION: The method of diffraction microoentgenography (the Lang method) has been used to investigate the dislocation structure of filament-like crystals (FC) of NaCl. FC of NaCl grown by crystallization through a porous partition were investigated. It was

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ACCESSION NR: AR3006984

shown that in thin FC (10--20 $\mu$ ) there are only dislocations, which are located along the growth axis (along the direction  $\langle 100 \rangle$ ). Crystals of larger size have as a rule a more complicated dislocation structure. Heating of plastically bent FC leads to restoration of the dislocation structure existing prior to their bending. V. Regel'.  
14

DATE ACQ: 06Sep63

SUB CODE: PH

ENCL: 00

Card 2/2

ZIMKIN, I. N.; NADGORNYY, E. M.; SMIRNOV, B. I.

Studying whisker crystals of sodium chloride by the micro-  
radiographic method. Fiz. tver. tela 5 no.1:170-176. Ja '63.  
(MIRA 16:1)

1. Fiziko-tekhnicheskiy institut imeni A. F. Ioffe AN SSSR,  
Leningrad.

(Microradiography) (Salt crystals)

KLYAVIN, O.V.; SMIRNOV, B.I.

Effect of preliminary plastic deformations on the brittle strength  
of steel at 4.20° K. Fiz. met. i metalloved. 16 no.1:134-136 J1'63.  
(MIRA 16:9)

1. Leningradskiy fiziko-tekhnicheskii institut imeni A.F.Ioffe AN  
SSSR.

(Steel—Brittleness) (Deformations (Mechanics))

KORCHUNOV, B.N.; SMIRNOV, B.I.

Effect of grain size on the curves of iron deformation at various  
temperatures. Fiz. met. i metalloved. 16 no.4:603-609 0 '63.  
(MIRA 16:12)

1. Fiziko-tehnicheskiy institut imeni A.F.Ioffe.

SMIRNOV, B.I.; PATRIKEYEV, Yu.I.

Effect of the conditions of deformation on the yield strength  
and dislocation structure of LiF crystals. Fiz. tver. tela 6  
no.6:1664-1670 Je '64. (MIRA 17:9)

1. Fiziko-tekhnicheskiy institut imeni Ioffe AN SSSR, Leningrad.

ACCESSION NR: AP4017358

S/0126/64/017/002/0252/0255

AUTHOR: Yaroshevich, V. D.; Smirnov, B. I.

TITLE: Temperature dependence of the plastic flow stresses in volume-centered cubical metals

SOURCE: Fizika metallov i metallovedeniye, v. 17, no. 2, 1964, 252-255

TOPIC TAGS: iron, molybdenum, tantalum, plastic flow, plastic flow stress, volume centered metal, cubical metal, plastic flow stress temperature dependence

ABSTRACT: In order, to fill gaps in the literature, tests were undertaken in which cylindrical specimens, 8 mm in diameter and 12 mm high of technically pure Fe (0.0034% C), Mo (99.9% Mo) and Ta (99.11% Ta, 0.63% Nb) were vacuum-tempered at 900 K for two hours (Fe) or at 1100 K for one hour (Mo and Ta) and compressed in an IM-12A machine at 77 (liquid nitrogen) or 300 K up to 40% of their initial height. For all the metals, the curves relating  $\Delta\sigma/\sigma_0$  and the degree of deformation show on otherwise uniform patterns, an upward trend with increasing deformation. Control studies showed that no fatigue, which might have affected the yield stress and interfered with temperature dependence tests, occurs during the 77-300 K transition. Of the current theories proposed to explain the mechanism of the dependence, the authors believe that a stepwise

Card 1/2

FAZIN, Grigoriy Markovich, kand. tekhn. nauk; SMIRNOV, Boris Ivanovich,  
inzh.; KITAYEV, V.V., inzh., reitsent; SHIROV, M.F., inzh.,  
reitsent; POPILOV, L.Ya., nauchn. red.; VLASOVA, Z.V., red.

[Ship equipment from plastics] Sudovye del'nye veshchi iz plast-  
mass. Leningrad, Sudostroenie, 1965. 239 p. (MIRA 18:3)

L 1607-66 EWT(l)/EWT(m)/EPF(c)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD/JW/JG/GG

ACCESSION NR: AP5014558

UR/0181/65/007/006/1649/1652/6

AUTHORS: Smirnov, B. I.; Patrikeyev, Yu. I.

TITLE: On the connection between the dislocation density and stresses in the deformation of LiF crystals

SOURCE: Fizika tverdogo tela, v. 7, no. 6, 1965, 1649-1652

TOPIC TAGS: dislocation density, dislocation motion, lithium fluoride, crystal lattice structure, crystal deformation, deformation stress, yield point

ABSTRACT: This is a continuation of earlier work by the authors, (FTT v. 6, 1664, 1964), where it was shown that the density of screw dislocations in the slip bands, near the yield point of LiF crystals, is linear in the ultimate yield, regardless of the hardness of the crystal and of the rate and temperature of the deformation. In the present study the authors investigated the density of screw dislocations in LiF crystals deformed by compression at 377K, and measured its dependence on the deformation stress beyond the yield point. In

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L 1607-66  
ACCESSION NR: AP5014558

15

addition, observations were made of the changes in the dislocation structure with variation of the deformation temperature. The LiF crystal was grown by the Kiropoulos method and annealed. The deformation was produced by compression along the 001 axis using equipment described by G. A. Dubov and V. R. Regel' (ZhTF v. 25, 2542, 1955) at a rate of  $10^{-4}$  sec<sup>-1</sup>. Some samples tested at one temperature were compressed further at another temperature. At the same time, the stresses at which plastic deformation began during the course of the second loading was measured. The tests showed that the screw dislocation density is determined by the yield point and by the finally attained stresses, and varies linearly with these quantities. A decrease in the dislocation density was observed in samples deformed at 300K after first compressing them at 77K. The results are analyzed and compared with those by others, and it is concluded that the stresses at which intense flowing of the sample begins are determined by other factors, besides the dislocation density, and further study in this direction is needed. <sup>44,55</sup> The authors thank N. I. Bispen', Z. A. Smirnova, S. F. Sal'nikova, <sup>44,55</sup> and P. A. Tsirul'nik for supplying the LiF crystals with low dislocation density, and are grateful to L. M.

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L 1607-66

ACCESSION NR: AP5014558

Shestapalov and A. N. Orlov<sup>44, 55</sup> for reading the manuscript and for  
comments.' Orig. art. has: 1 figure, 9 formulas, and 1 table. 6

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR  
Leningrad (Physicotechnical Institut, AN SSSR) <sup>44, 55</sup>

SUBMITTED: 13Nov64

ENCL: 00

SUB CODE: SS

NR REF SOV: 003

OTHER: 008

Card

3/3 *OP*

ACCESSION NR: AP4039651

S/0181/64/006/006/1664/1670

AUTHORS: Smirnov, B. I.; Patrikeyev, Yu. I.

TITLE: Effect of deformation conditions on the limit of fluidity and dislocation structure of LiF crystals

SOURCE: Fizika tverdogo tela, v. 6, no. 6, 1964, 1664-1670

TOPIC TAGS: deformation mechanism, fluidity, dislocation, lithium fluoride, shear stress/ MBI 6 microscope

ABSTRACT: Previous experiments with LiF showed that the shear stress  $\tau$  was linearly dependent on the dislocation density  $\rho$  ( $\tau = \alpha \rho$  where  $\alpha = 3.7$  dynes/dislocation) and that an increase in  $\tau$  led to a narrowing of the slippage bands and an increase in  $\rho$ . The authors studied the effect of changes in the rate and temperature of deformation on the above relationship. Large LiF crystals contaminated with Mg  $\sim 0.002\%$  and Fe  $\sim 0.004\%$  were annealed at 750C for 48 hours, cooled at the rate of  $\sim 100$ /hour, and then segmented. Some segments were reannealed and cooled at  $\sim 200$ /hr. The specimens ( $\sim 5 \times 5 \times 15$  mm<sup>3</sup>) had a  $\rho \sim 10^4$  cm<sup>-2</sup> (exposed by etching and examined under the microscope MBI-6). The

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ACCESSION NR: AP4039651

deformation (in the  $\sqrt{001}$  direction) for doubly annealed specimens was tested at 77 and 300K over deformation rates  $10^{-5}$ - $10^{-2}$ sec $^{-1}$ , and for the singly annealed specimens at the rate  $10^{-4}$ sec $^{-1}$  at 77, 180 and 300K. Three types of deformation curves were observed (see Fig. 1 on the Enclosure) from which the fluidity limit  $\sigma$  and the limit of proportionality  $\sigma_c$  may be determined. Figure 2 on the Enclosure shows the experimental results which proved  $\sigma = B\epsilon^r$  (for the fluidity limit  $\sigma_g$ ; at 300K,  $r = 0.1$ ; at 77K,  $r \sim 0$ ). Slippage occurred on two orthogonal planes, either on (101) and ( $\bar{1}01$ ) or (011) and ( $0\bar{1}1$ ). In the initial deformation  $\rho$  remains nearly constant as long as the slippage planes do not cover all the surfaces of the sample. Only the  $\rho$ 's of ordinary bands were included in the deformation study on the fluidity plateau at 77, 180, and 300K. Studies were also made with stress maintained for about 1 second, resulting in nearly complete coverage of the sample by slippage planes. Tests of differently hardened crystals distorted the linearity of  $\rho = \beta\tau$  ( $\beta = 2.4$ - $2.7 \cdot 10^5$  dislocation/kg). The results are discussed in the light of the motion of the dislocations and its relation to the stresses, the number of mobile dislocations (initially constant despite the increase in the total number of dislocations), and the composition of the shear stress  $\tau$ . This shear is determined by the forces of Peierls-Navarro, by dislocation drag at the steps, by impurities and other defects in the lattice, and by

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ACCESSION NR: AP4039651

interaction with other dislocations which may cause plastic deformation ( $\tau = \tau_0 + \tau_G + \tau_f + \tau_d$  where  $\tau_0$  is initial stress,  $\tau_G$  is the counteraction using Burgers vector,  $\tau_f$  pertains to the group of dislocations, and  $\tau_d$  deals with the dipole dislocation). The authors thank E. M. Nadgornyy and A. N. Orlov for their discussion, and V. R. Regel' for the use of the dislocation machine. Orig. art. has: 1 table, 4 figures, and 18 equations.

ASSOCIATION: Fiziko-tekhnicheskij institut im. A. F. Ioffe AN SSSR Leningrad  
(Physico-technical Institute AN SSSR)

SUBMITTED: 17Dec63

ENCL: 01

SUB CODE: SS

NO REF SOV: 002

OTHER: 012

Card. 3/4

ACCESSION NR: AP4039651

ENCLOSURE: 01

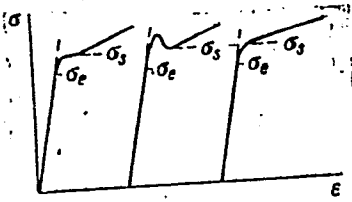


Fig. 1. Form of deformation curves of LiF crystals.

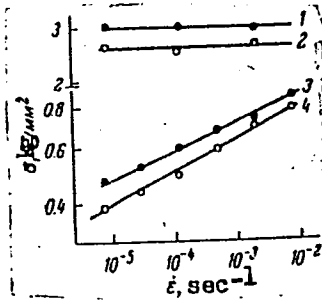


Fig. 2. Dependence of fluidity limits (1 and 3) and proportionality (2 and 4) on the deformation rate at 300K (3,4) and 77K (1,2).

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KASHCHENKO, F.D.; SMIRNOV, B.I.

Investigating the metal deposited by an MMK-61 powder wire.  
Avtom.svar. 18 no.11:20-24 N '65. (MIRA 18:12)

1. Magnitogorskiy metallurgicheskiy kombinat. Submitted  
February 9, 1965.

I 04792-67 EWT(L)/EWT(M)/EWP(W)/EWP(S)/ETI LJE(c) JD/GG

ACC NR: AP6024463

SOURCE CODE: UR/0181/66/008/007/2048/2053

AUTHOR: Nadgorny, E. M.; Smimov, B. I.

ORG: Physicotechnical Institute im. A. F. Ioffe, AN SSSR, Leningrad (Fiziko-  
tekhnicheskiy institut AN SSSR)

40.  
B

TITLE: Connection between the mobility of dislocations and the mechanical characteristics of crystals under inhomogeneous deformation [Reported at the All-Union Conference on Dislocations and Mechanical Properties of Crystals, Odessa, May 1964]

SOURCE: Fizika tverdogo tela, v. 8, no. 7, 1966, 2048-2053

TOPIC TAGS: crystal dislocation phenomenon, crystal deformation, crystal property, plastic deformation

ABSTRACT: After pointing out in the introduction that many of the simplifying assumptions made in the theoretical calculations of the deformation resistance are not borne out in practice, the authors consider the connection between the macroscopic parameters of plastic deformation (stress  $\tau$ , rate of displacement of the testing machine clamps  $\dot{s}$ , delay time  $t_0$ , and length of samples), with microscopic characteristics pertaining to individual dislocations and the dislocation structure as a whole (the exponent  $m$  in the formula for the dislocation velocity vs. stress, the number  $N_0$  of glide bands, and the rate  $\omega$  of the lateral growth of the glide bands) under less general assumptions, especially without the assumption that the deformation in the sample is uniform. The following relations are obtained

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ACC NR: AP6024463

$$\tau_s \sim \left(\frac{\dot{s}}{N_0}\right)^{1/m}, \quad t_0 \sim \tau^{-m}, \quad \omega \sim \tau^m$$

and agree with the available experimental data. The results hold true for all crystals in which the deformation occurs via generation of glide bands and their lateral growth, particularly for metals with body-centered cubic lattice. They also hold for polycrystals in which the deformation takes place by passage of Luders bands. Orig. art. has: 10 formulas.

SUB CODE: 20/

SUBM DATE: 03Dec65/

ORIG REF: 003/

OTH REF: 012

Card 2/2 afs

L 36837-66 EWP(t)/ETI IJP(c) JW/JD

ACC NR: AP6024346

SOURCE CODE: GE/0030/66/016/001/0191/0196

AUTHOR: Smirnov, B. I.; Efimov, B. A.

35  
B

ORG: A. F. Ioffe Physico-Technical Institute, Academy of Sciences of the SSSR,  
Leningrad

TITLE: Development of glide bands during plastic deformation of LiF crystals

SOURCE: Physica status solidi, v. 16, no. 1, 1966, 191-196

27

TOPIC TAGS: lithium fluoride, alkali halide, plastic deformation, ~~dislocation, shear~~  
strain, *CRYSTAL DISLOCATION*

ABSTRACT: A study was made of the development of the dislocation structure and shear strain in glide bands of LiF crystals under an applied stress. The following parameters were determined: the rate of lateral band growth  $\omega$ , the change of shear strain  $\lambda$  in bands during the growth, and the average slip distance of screw dislocations  $\lambda$  during band formation. It was found that the widening of the bands occurs asymmetrically; an increase in the band width results in a decrease in  $\omega$  and in an increase in  $\lambda$  ( $\lambda$  eventually reaches a certain limiting value). On the average, the rate of lateral band growth was found to be about an order of magnitude less than the velocity of the individual dislocations. It was found that  $\lambda$  has a value of 1.5  $\mu$ m at 20C, which decreases both with an increase of the magnesium content of the crystal and with a decrease of the deformation temperature. Orig. art. has: 5 figures, 3 formulas, and 1 table.

Card 1/1 *na* SUB CODE: 20/ SUBM DATE: 18Apr66/ OTH REF: 004/ ATD PRESS: 5139 [CS]

SMIRNOVA, L.P.; SMIRNOV, B.I.

"Gergeit" from the salt deposits of the Inder Dome. Min.sbor. 18  
no.3:348-356 '64. (MIRA 18:8)

1. Institut geologii i geofiziki, Gur'yev.

SMIRNOV, B.I.

Dislocation density and deformation stresses in iron and  
nickel polycrystals. Fiz. met. i metalloved. 20 no.4:623-  
624 0 '65. (MIRA 18:11)

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Stroi. i dor. mash. 10 no.8:11-12 Ag '65. (MIRA 18:9)

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SMIRNOV, B.I.; UDALOV, N.I.

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(Drying apparatus--Textile fabrics)



L 26747-66 EWT(l)/EWT(m)/T/EWP(t) IJP(c) JD/JW/JG

ACC NR: AP6011476

SOURCE CODE: UR/0070/66/011/002/0323/0324

AUTHOR: Smirnov, B. I.; Yefimov, B. A.

ORG: Physicotechnical Institute im. A. F. Ioffe, AN SSSR  
tekhnicheskiy institut AN SSSR(Fiziko-  
1/2  
BTITLE: Influence of the surface on the density of screw dislocations in deformed  
LiF crystals 18

SOURCE: Kristallografiya, v. 11, no. 2, 1966, 323-324

TOPIC TAGS: lithium fluoride, crystal dislocation, surface property, crystal de-  
formation

ABSTRACT: This is a continuation of earlier work (Fiz. tverdogo tela v. 7, 1649, 1965) where it was observed that the density of screw dislocations decreases on polished surfaces of LiF crystals deformed at -196C. In the present investigation the same effect is investigated on LiF crystals deformed at 20C. In addition, the thickness of the layer with the increased dislocation density was estimated. The experimental procedure of deforming the samples and determining the dislocation density was the same as in the earlier paper. The results show that the dislocation density first drops rapidly with depth, by approximately 30%, after which it remains practically constant. This means that the surface layer with the increased dislocation density is of the order of several microns. Since the presence of such a layer can affect the mechanical properties of the crystals, the compression curves

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UDC: 548.4

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were plotted for deformed samples and for samples in which a layer of 7  $\mu$  was removed by polishing. The results showed that polishing this layer reduces the stresses at which noticeable plastic flow of the sample begins. This demonstrates that the surface layer with increased dislocation density affects the strength of the crystal. Some hypotheses concerning the course of the increased dislocation density are advanced, although a final explanation calls for additional experimental data. It is proposed that the phenomenon is not limited to LiF crystals. Orig. art. has: 2 figures.

SUB CODE: 20/      SUEM DATE: 18Apr65/      ORIG REF: 004/      OTH REF: 003

Card 2/2 *FV*

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V.V., red. izd-va; NAUMOVA, G.D., tekhn. red.

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GALITSKIY, Boris Mikhaylovich; SEMIBRATOV, Vsevolod Nikolayevich;  
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PA 149770

USSR/Medicine - Pharmacology  
Neurology  
Jan/Feb 49

"Experiment in Clasternal Introduction of Certain  
Medicinal Substances," B. L. Smirnov, Hon Worker  
of Sci, Clinic, Neurol Hosp, Med Inst Turkmen  
SSR, 22 pp

"Neuropatol i Psikhiat" Vol XVIII, No 1

Clasternal introduction of potassium phosphate  
solution in indicated doses often causes severe  
reaction, sometimes collapse. It has little  
effect in head contusions, avitaminosis, etc.  
Caffeine is effective in surgical collapse.

149770

USSR/Medicine - Pharmacology  
(Contd)  
Jan/Feb 49

Sulfadiene is effective in purulent meningitis and  
other purulent encephalopathies.

149770



SMIRNOV, B.M.

deceased  
c1960

1961/2

SEE ILC

CONSTRUCTION ENGINEERING  
(Ship building)

SMIRNOV, B.M., kandidat geologe-mineralogicheskikh nauk.

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