ACCESSION NR: AR4041604   S/0137/64/000/005/I033/I03 4

SOURCE: Ref. zh. Metallurgiya, Abs. 5I207

AUTHOR: Postnikov, V. S.; Postnikov, V. S.

TITLE: Influence of different factors on the character of temperature dependence
of internal friction of aluminum

CITED SOURCE: Sb. Relakstats. yavleniya v met. i splavakh. M., Metallurgizdat,
1963, 159-164

TOPIC TAGS: aluminum, internal friction, temperature dependence

TRANSLATION: Investigation was conducted with the help of torsion pendulum on wire
samples of Al with 99.98% purity. Analysis of influence of different factors on the
character of temperature dependence of internal friction shows that with decrease
of diameter of sample from 5 to 1.5 mm the level of internal friction of metal is
lowered, and peak of internal friction in region ~350° shifts to the side of
lower temperatures. Up to temperatures ~150° the change of length of sample

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ACCESSION NR: AR4041604

from 200 to 50 mm (with constant diameter of 1 mm) does not affect the magnitude of internal friction. For sample with length of 20 - 30 mm in this region of tempera- tures there occurs sharp increase of internal friction and significant amplitude dependency of internal friction is observed. At temperatures >150° a noticeable decrease of level of internal friction with decrease of length of sample is observed. Up to temperature ~300° the weight of torsion system does not affect the magnitude of internal friction; however at higher temperatures increase of weight from 30 to 150 g leads to sharp growth of internal friction. Increase of frequency of oscillations of pendulum from 1 to 51 cycles per second leads to gradual lowering of peak of internal friction and displacement of it in the direction of higher temperatures. Presence of impurities in metal suppresses the grainborder peak of internal friction. Magnitude of peak and its position essentially depend on degree of preceding deformation. In case of polymorphous metal preliminary plastic flow sharply increases internal friction in region of transformation. Bibliography: 6 references.

SUB CODE: MM   ENCL: 00

Card 2/2

ACCESSION NR: AR4041610   S/0137/64/000/005/I050/I050

SOURCE: Ref. zh. Metallurgiya, Abs. 51292

AUTHOR: Postnikov, V. S.; Zolotukhin, I. V.

TITLE: Investigation of thermal fatigue of alloys of aluminum with copper by method of internal friction

CITED SOURCE: Sb. Relaksats. yavleniya v met. i splavakh. M., Metallurgizdat, 1963, 105-111

TOPIC TAGS: thermal fatigue, aluminum alloy, copper containing alloy, internal friction

TRANSLATION: By method of internal friction the influence of cyclical heat treatment on form change of single crystals and polycrystalline alloys of system Al-Cu was investigated (0.5; 4; 5.5; 10 and 33.8 weight % Cu), possessing isotropic properties with respect to thermal expansion. Samples in the form of wire 100 mm

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in length and 1 mm^2 in section were annealed at a temperature equal to $0.8T_m$ for 1 hour and then were tested on special installation, with the help of which internal friction was measured and cyclical heat treatment was carried out. Change of length of samples as a result of cyclical heat treatment was controlled with the help of MIR-12 microscope with accuracy up to 0.02 mm. Experiments showed that dependences of high-temperature part of internal friction (background) and δ with given cyclical heat treatment (number of cycles n = 0 and 2000 cycles) on composition of alloy have identical character. Level of internal friction at room temperature and δ in region of low concentrations (up to 0.5% Cu) are changed differently. Increase of maximum temperature of cycle causes sharper decrease of background with growth in n and leads to growth of internal friction at room temperature. The latter is connected with formation of Guigner-Preston zones during cooling of sample from maximum temperature of cycle. Character of change of temperature dependency of internal friction during cyclical heat treatment for poly- and single crystals is approximately identical. For alloy with 0.5% Cu as a result of cyclical heat treatment on temperature curves of internal friction of single crystals and polycrystalline samples there appears a peak whose height

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ACCESSION NR: AR4041610

is the higher, the greater the maximum temperature of cycle. High-temperature
annealing for 5 hours completely destroys this peak in the case of single crystals.
In case of polycrystalline samples annealing even for 35 hours does not destroy
peak appearing as a result of cyclical heat treatment, but only displaces it into
region of higher temperatures. Bibliography: 9 references.

SUB CODE: MM, TD   ENCL: 00

Card 3/3

L 11458-65   EWT(m)/EWP(w)/EWA(d)/EPR/EWP(t)/EWP(b)   Ps-4   AFWL/SSD/AEDC(b)/
AS(mp)-2/ASD(a)-5/ASD(m)-3/ESD(t)   JD

ACCESSION NR: AP4046374   S/0020/64/158/003/0590/0593

AUTHORS: Postnikov, V. S.; Zolotukhin, I. V.

TITLE: On the "grain-boundary" peak of internal friction in metals

SOURCE: AN SSSR. Doklady*, v. 158, no. 3, 1964, 590-593, and insert
facing p. 589

TOPIC TAGS: internal friction, single crystal, aluminum, cadmium,
grain structure, metallography, x ray diffraction, crystal lattice
defect, heat treatment

ABSTRACT: To obtain new data on the internal-friction peak in
metals, the authors tested pure single crystals of aluminum and
cadmium, using equipment described elsewhere (Sborn. Relaksatsionny*-
ye yavleniya v metallakh i splavakh [Collection: Relaxation Pheno-
mena in Metals and Alloys], 1963, p. 105). The test results have
shown that thermocyclic processing of the single crystals results

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ACCESSION NR: AP4046374

in a peak of internal friction lying in the same region as the grain-boundary peak, but the latter disappear with increasing number of thermal cycles, whereas the former do not. Plots of the internal friction against the temperature and against the time are presented. It is pointed out that the internal-friction peak is more likely to occur in less pure metal. A metallographic and x-ray diffraction study was made of the defects produced on the samples. The results of the experiments indicate that these defects are responsible in the case of cyclic heat treatment for the occurrence of the internal-friction peak in the single-crystal samples. The defects are located in planes with close packing of the atoms, similar to dislocation loops, and have probably the same nature. Another conclusion is that the grain boundaries do not play the principal role in the formation of the peak on the internal friction curve of polycrystalline metal. It is more likely that defects accumulating on the grain boundaries, and not the grain boundaries themselves, are responsible for the scattering of the elastic energy of the vibrating polycrystal.

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ACCESSION NR: AP4046374

The gradual decrease of the grain-boundary peak in polycrystals with increasing number of thermal cycles is apparently due to the change in the structure of the grain-boundary defects. This report was presented by G. V. Kurdyumov. Orig. art. has: 3 figures.

ASSOCIATION: Voronezhskiy politekhnicheskiy institut (Voronezh Polytechnical Institute)

SUBMITTED: 30Mar64   ENCL: 00

SUB CODE: MM   NR REF SOV: 006   OTHER: 011

Card 3/3

MESHKOV, S. I. (Voronezh); POSTNIKOV, V. S. (Vororezh); SHERMERGOR, T. D.
(Voronezh)

Temperature dependence of the internal friction of a standard
linear solid under heavy damping conditions. Izv. AN SSSR.
Mekh. i mashinostr. no.3:90-95 '64 My-Je '   (MIRA 17:')

ACCESSION NR: AT4014055   S/3073/63/000/000/0275/0282

AUTHOR: Postnikov, V. S.; Zolotukhin, I. V.

TITLE: Investigation of thermal fatigue of alloys by the method of internal friction

SOURCE: Prochnost' metallov pri peremenny*kh nagruzkakh; materialy* tret'yego soveshchaniya po ustalosti metallov, 1962 g. Moscow, Izd-vo AN SSSR, 1963, 275-282

TOPIC TAGS: alloy, thermal fatigue, internal friction, cadmium zinc alloy, zinc containing alloy

ABSTRACT: The physical nature of the thermal fatigue of alloys of cadmium and zinc containing from 0.5 to 24% zinc has been studied by the metallographic and internal friction methods. The cast polycrystalline specimens were annealed at 200 C for 1 hour. Monocrystals of some specimens containing 1.5-17% zinc were obtained using a device similar to that used by Lichtmann and Maslennikov. The dependence of internal friction and relative elongation on alloy composition at $\Delta T = 150$ C and $t = 30$ seconds is shown in Figure 1 of the Enclosure. The lowest relative elongation and internal friction was shown by alloys corresponding to the limiting solubility of zinc in the alpha phase at 266 C. The effect of temperature and duration of the cycles of heating on the internal friction of

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ACCESSION NR: AT4014055

the alpha solid solution of zinc in cadmium is shown in Figure 2 of the Enclosure. At $\Delta T = 150$ C, maximal changes in internal friction occur in the area of the first thousand thermocycles when $t = 30$ seconds. After 2000 thermocycles, the changes in internal friction are very slight. The effect of structure on the relationship between internal friction, temperature and the number of thermocycles is shown in Figure 3 of the Enclosure. The metallographic investigation of pure polycrystalline metals and of alloys containing 1.5% zinc showed, after a few thermocycles, lines of sliding in the separate grains of the pure metal and separate microcracks in the alloy. After 250 cycles, fatigue cracks were formed and in the area of 1500-3000 cycles, the individual grains and their boundaries were destroyed and complete destruction of the metal due to fatigue was seen. Orig. art. has: 5 figures.

ASSOCIATION: None

SUBMITTED: 00   DATE ACQ: 20Feb64   ENCL: 03

SUB CODE: MM   NO REF SOV: 020   OTHER: 003

Card   2/5
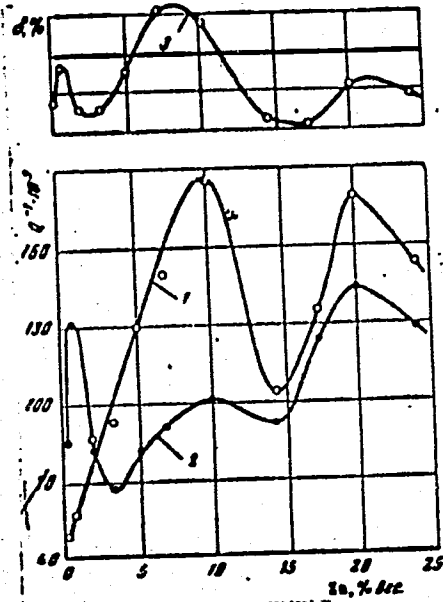
ACCESSION NR: AT4014055

Fig. 1 - Relationship between internal friction, relative elongation and alloy composition during cyclic heat treatment at $\Delta T = 150C$ and $t = 30$ seconds.;

$1 - T = 0.8\ T_g$, $n = 0$; $2 - T = 0.8\ T_g$, $n = 3000$ cycles

$3 - T = 20°$. $n = 3000$ cycles

ENCLOSURE:01
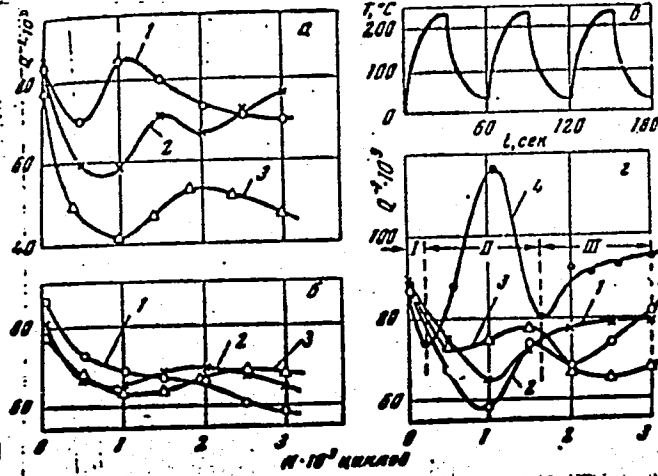
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ACCESSION NR: AT4014055

Fig. 2 - Effect of cycle
length t and temperature
interval ΔT on internal
friction $Q^{-1}(T)$ of Cd-Zn
alloys at $T = 0.8\ T_S$.
a - 1.5% Zn, τ - 60 sec.
(1 - $\Delta T = 60°$, 2- $\Delta T = 150°$,
3 - $\Delta T = 200°$);
b - 2.95% Zn, $\tau = 30$ sec.
(1 - $\Delta T = 60°$; 2 - $\Delta T = 100°$;
3 - $\Delta T = 150°$);
c - shape of the thermal cycle
d - 1.5%, Zn, $\Delta T = 150°$
(1 - $\tau = 30$ sec.; 2 - $\tau = 60$ sec.
3 - $\tau = 90$ sec.; 4 - $\tau = 120$ sec.

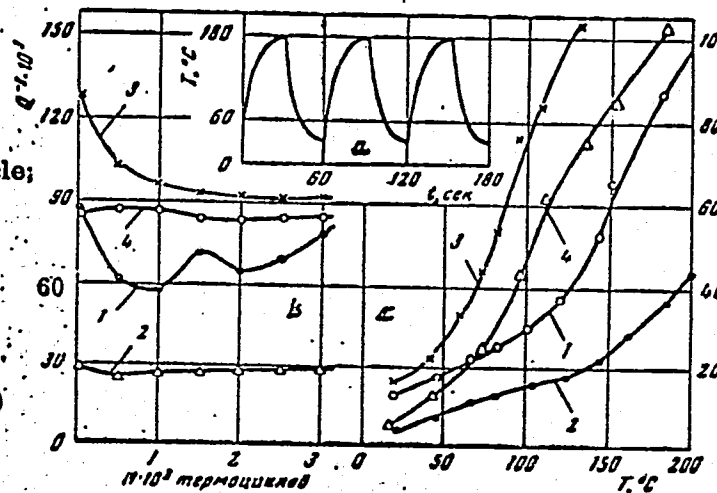Card 4/5

ACCESSION NR: AT4014055   ENCLOSURE: 03

Fig. 3 - Relationship
between internal friction
temperature, number of
cycles and state (A or B)
or Cd-Zn alloys.
a- shape of the thermal cycle;
b - t = 30 sec.,
$\Delta T = 150°$, $T = 0.8 T_S$
(1 - A, 1.5% Zn; Σ- B,
1.5% Zn; 3 - A, 17.4% Zn;
4 - B, 17.4% Zn);
c - n = 0 (1 - A, 1.5% Zn;
2 - B, 1.5% Zn; 3 - A,
17.4% Zn; 4 - B, 17.4% Zn)

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Card

MAL'TSEVA, G.K.; POSTNIKOV, V.S.

Internal friction of cadmium-magnesium alloys. Izv. vys. ucheb.
zav.; chern. met. 6 no.11:153-156 '63.   (MIRA 17:3)

1. Voronezhskiy politekhnicheskiy institut.

MAL'TSEVA, G.K.; ZOLOTUKHIN, I.V.; POSTNIKOV, V.S.

1. Kemerovskiy pedagogicheskiy institut, Voronezhskiy tekhnolo-
gicheskiy institut i Voronezhskiy politekhnicheskiy institut.

MAL'TSEVA, G.K.; POSTNIKOV, V.S.; USANOV, V.V.

Internal friction in binary ordered alloys with a face-centered
cubic lattice. Fiz. met. i metalloved. 16 no.2:302-309 Ag '63.
(MIRA 16:8)

1. Voronezhskiy politekhnicheskiy institut i Kemerovskiy
pedagogicheskiy institut.
            (Alloys—Metallography)   (Crystal lattices)
                    (Internal friction)

ACCESSION NR: AP4009391

AUTHORS: Postnikov, V. S.; Zolotukhin, I. V.

TITLE: The effect of cyclic thermal treatment on the internal friction and relative elongation of Al-Zn alloys

SOURCE: Fizika metallov i metallovedeniye, v. 16, no. 6, 1963, 937-939

TOPIC TAGS: Zn-Al alloy, internal friction, cyclic thermal treatment, metal elongation, Zn-Al alloy elongation

ABSTRACT: The samples studied here consisted of Al with 10, 20, 30, 60, 80 and 98% (by weight) of Zn. The initial purity of Al and Zn was 99.99 and 99.97% respective- ly. The alloy ingots were 12 mm long and 6 mm in diameter. They were annealed in a special device designed for measuring the internal friction. Subsequently they were subjected to cyclic thermal treatment, after which the change in their length was determined with a MIR-12 microscope. The curves of the relation between internal friction and temperature showed a peak, increasing in length with the increase in Zn content from 32 to 98 wt%. Cyclic thermal treatment had almost no effect on the position of the peak in respect to the temperature axis, but it broadened the peak considerably and increased its height. With the increase in the number of thermal

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ACCESSION NR: AP4009391

cycles the internal friction decreased and reached its minimum at 570 cycles and then started increasing again. This was true for the samples with 10, 20, 30 and 98% of Zn. The variation in the internal friction with respect to the number of cycles was different in the samples with 60 and 80% of Zn. The curve of the 60% alloy had a maximum at about 600 thermocycles, while that of the 80% sample increased gradually. Orig. art. has: 2 figures.

ASSOCIATION: Voronezhskiy politekhnicheskiy institut (Voronezh Polytechnical Institute)

SUBMITTED: 12May63   DATE ACQ: 03Feb64   ENCL: 00

SUB CODE: ML   NO REF SOV: 009   OTHER: 000

Card 2/2

POSTNIKOV, V.S., red.

[Relaxation phenomena in metals and alloys; transactions]
Relaksatsionnye iavleniia v metallakh i splavakh; trudy.
Pod red. V.S.Postnikova. Moskva, Metallurgizdat, 1963.
339 p.   (MIRA 17:7)

1. Vsesoyuznaya konferentsiya po relaksatsionnym yavleniyam
v metallakh i splavakh. 3d, Voronezh, 1962.

POSTNIKOV, V.S.; MAL'TSEVA, G.K.; RAZUMOV, V.I.

Temperature dependence of internal friction and the modulus of
rigidity of ferromagnetic alloys. Izv. vys. ucheb. zav.; chern.
met. 6 no.7:149-154 '63.   (MIRA 16:9)

1. Voronezhskiy politekhnicheskiy institut i Kemerovskiy
pedagogicheskiy institut.
    (Ferromagnetism) (Metals, Effect of temperature on)

MAL'TSEVA, G.K.; POSTNIKOV, V.S.; USANOV, V.V.

Internal friction in Cu-Au and Cu_3-Au. Izv. vys. ucheb. zav.; chern. met. 6 no.5:156-161 '63.   (MIRA 16:7)

1. Voronezhskiy politekhnicheskiy institut i Kemerovskiy pedagogicheskiy institut.
                        (Copper-gold alloys--Testing)
                        (Internal friction)

L 11074-63   EWP(q)/EWT(m)/BDS--AFFTC/ASD--JD/JG
ACCESSION NR: AP3001379   S/0148/63/000/005/0156/0161

AUTHOR: Mal'tseva, G. K.; Postnikov, V. S.; Usanov, V. V.

TITLE: Internal friction of CuAu and Cu sub 3 Au alloys

SOURCE: IVUZ. Chernaya metallurgiya, no. 5, 1963, 156-161

TOPIC TAGS: internal friction, CuAu alloy, Cu sub 3 Au alloy, reorganization of atoms, bond energy, hetero atoms, activation energy, peak properties

ABSTRACT: The internal friction of CuAu and Cu sub 3 Au alloys was studied during cooling in order to determine its peak properties. It is assumed that temperature change reflects the kinetics of the regulation processes. If an hypothesized tolerance for the interaction between internal friction and process regulation is correct, it is possible to compute from isothermic curvature, the time of relaxation of the system to a thermodynamically stable state. From examination of frequency of fluctuation of the peak, displacing toward the high temperatures and decreasing in size, it is inferred that the processes which cause peaks in internal friction apparently involve a reorganization of atoms during regulation. Thus the bond energy of hetero atoms is somewhat greater than that of the uniform atoms. The experimentally determined value for activation energy reflects this fact. Orig. art.

Card 1/2

POSTNIKOV, V.S.

Internal friction in prue metals and alloys at high tempera-
tures. Issl.po zharopr.splav. 4:181-187 '59.
(MIRA 13:5)

(Friction) (Metals at high temperatures)

S/058/63/000/001/069/120
A160/A101

AUTHORS: Postnikov, V. S., Zolotukhin, I. V., Gorshkov, G. A.

TITLE: An investigation of the mechanical and thermal fatigue of metals
             by the internal friction method

PERIODICAL: Referativnyy zhurnal, Fizika, no. 1, 1963, 9%, abstract 1B637
             (In collection: "Tsiklich. prochmost' metallov." M., AN SSSR,
             1962, 218 - 226)

TEXT: Investigated was the low-frequency internal friction of Cd, Zn, Al,
and Au under mechanical and thermal fatigue conditions. It was established that
the total amount of defects in polycrystals especially strongly increases during
the first $2 \cdot 10^3$ cycles, and then a saturation takes place up to the failure.
During the first $2 \cdot 10^3$ cycles, an accumulation of the defects takes place, and
then defect coagulation processes and other preparational fracture processes
commence. The amount of defects for the single crystals continuously in-
creases up to the failure. The peak of the internal friction, which is charac-
teristic of polycrystalline metals, disappears during a cyclic load. This is

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An investigation of the...   8/058/63/000/001/089/120
                                              A160/A101

apparently caused by the broadening of the relaxation time spectrum of sliding
along the division boundaries. The thermal cycles also destroy almost complete-
ly the peak of the internal friction in the polycrystalline metal. The latter
seems to be caused by a fractionation of the grains. In proportion to an in-
crease of the number of the thermal cycles, the background of the internal fric-
tion increases, passes through the maximum and then decreases. Hereby, the
background of the internal friction of the metal which is subjected to a large
number of thermal cycles has a smaller magnitude than the background for an an-
nealed metal.

                                              L. Mirkin

[Abstracter's note: Complete translation]

Card 2/2

S/123/62/000/024/001/005
A006/A101

AUTHOR: Postnikov, V. S.

TITLE: Internal friction and strength

PERIODICAL: Referativnyy zhurnal, Mashinostroyeniye, no. 24,1962, 11 - 12, ab-
             stract 24A68 (In collection: "Tsiklich. prochnost' metallov",
             Moscow, AN SSSR, 1962, 207 - 217)

TEXT: Results are given from investigations of the temperature dependence
of internal friction for 59 alloys. In cases when the melting point of the al-
loy was below 1,100°C, internal friction was measured up to the temperatures
when the specimen broke down. More refractory alloys were studied at tempera-
tures up to 1,000 - 1,100°C. The investigations made it possible to establish
a well-defined relation between the internal friction level and strength charac-
teristics in a 0.55 - 0.85 T_s temperature range. In this connection it can be
considered that the internal friction level at high temperatures can serve as a
peculiar relative characteristic of the material strength in the indicated tem-
perature range. It was also established that in this temperature range changes

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POSTNIKOV, V.S.

PHASE I BOOK EXPLOITATION   SOV/6025

Soveshchaniye po ustalosti metallov. 2nd., Moscow, 1960.

Tsiklicheskaya prochnost' metallov; materialy vtorogo soveshchaniya
po ustalosti metallov, 24 - 27 maya 1960 g. (Cyclic Metal
Strength; Materials of the Second Conference on the Fatigue of
Metals, hold May 24 - 27, 1960) Moscow, Izd-vo AN SSSR, 1962.
338 p. Errata slip inserted. 2800 copies printed.

Resp. Ed.: I. A. Oding, Corresponding Member of the Academy of
Sciences of the USSR; Ed. of Publishing House: A. N. Chernov;
Tech. Ed.: A. P. Gusova.

PURPOSE: This collection of articles is intended for scientific
research workers and metallurgists.

COVERAGE: The collection contains papers presented and discussed
at the second conference on fatigue of metals, which was held
at the Institute of Metallurgy in May 1960. These papers deal
with the nature of fatigue fracture, the mechanism of formation

Card 1/0

Cyclic Metal Strength (Cont.)   SOV/6025

and growth of fatigue cracks, the role of plastic deformation
in fatigue fracture, an accelerated method of determining
fatigue strength, the plotting of fatigue diagrams, and
various fatigue test methods. New data are presented on the
sensitivity of high-strength steel to stress concentration,
the effect of stress concentration on the criterion of fatigue
failure, the effect of the size factor on the strength of
metal under cyclic loads, and results of endurance tests of
various machine parts. Problems connected with cyclic metal
toughness, internal friction, and the effect of corrosion
media and temperature on the fatigue strength of metals are
also discussed. No personalities are mentioned. Each article
is accompanied by references, mostly Soviet.

TABLE OF CONTENTS:

NATURE OF FATIGUE FRACTURE

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2

Cyclic Metal Strength (Cont.)   SOV/6025

EFFECT OF THE STRESS CONCENTRATION
AND THE SIZE FACTOR ON THE FATIGUE
STRENGTH

CYCLIC TOUGHNESS AND INTERNAL
FRICTION

Cyclic Metal Strength (Cont.)   SOV/6025

EFFECT OF ENVIRONMENT
ON THE FATIGUE STRENGTH

Card 7/9

28062 S/137/61/000/004/026/039
A056/A101

18-8100

AUTHOR: Postnikov, V. S.

TITLE: Internal friction of plastically deformed metals and alloys at high temperatures

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 4, 1961, 36-37, abstract 4Zh227 ("Relaksats. yavleniya v metallakh i splavakh", M., Metal-lurgizdat, 1960, 264-278)

TEXT: The author studies the temperature dependence of internal friction of plastically deformed samples, from the viewpoint of the atomic theory of metals and alloys. Detailed analysis is given of internal friction due to slip viscosity at the grains boundaries (with a purpose of simplification the author considers the case of identical grains with equal axes for which the slip viscosity at the boundaries is characterized by one relaxation time τ), and internal friction due to the motion of defects in the stress field. The latter pertains to internal friction manifested at high temperatures, since for the given conditions the energy dissipation in the oscillating sample is originated chiefly from the defect displacements in the stress field. The present reasoning

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18 8200   24567   S/137/61/000/005/041/060
                                                             A006/A106

AUTHORS: Lebedev, R. S.; Postnikov, V. S.

TITLE: The effect of plastic deformation on internal friction of iron-base
                alloys

PERIODICAL: Referativnyy zhurnal. Metallurgiya, no. 5, 1961, 32, abstract 5Zh243
                (V sb. "Relaksats. yavleniya v metallakh i splavakh", Moscow,
                Metallurgizdat, 1960, 199-221)

TEXT: The low-frequency method of low-amplitude twisting oscillations was
used to investigate the effect of case-hardness on internal friction of electro-
lytic Fe and Fe-W, Fe-Si, Fe-Ni and Fe-Ti alloys. The measurements were made in
a vacuum ($\sim 10^{-3}$mm Hg) on 300 mm long specimens of 0.7 mm in diameter at 1 cycle
oscillation frequency. All the specimens were annealed in a vacuum at 825°C for
90 minutes. It was established that internal friction of plastically deformed
non-annealed alloys was high in comparison to that of the same alloys which were
preliminary annealed, and that it strongly depended on the heating rate and the
holding time. On the temperature curve of internal friction a peak of internal
friction was observed which was shifted to the side of low temperatures with an

Card 1/2

POSTNIKOV, V. S. Doc Phys-Math Sci -- "Internal friction of pure metals and alloys

under high temperatures." Kemerovo, 1959. (Tomsk State Univ im V, V. Kuybyshev)

(KL, 1-61, 178)

-2-

POSTNIKOV, V. S.

PHASE I BOOK EXPLOITATION   SOV/5305

Moscow. Institut stali

Relaksatsionnye yavleniya v metallakh i splavakh; trudy Mezhvuzovskogo soveshchaniya. (Relaxation Phenomena in Metals and Alloys; Transactions of the Inter-Institute Conference) Moscow, Metallurgizdat, 1960. 386 p.

Sponsoring Agency: Ministerstvo vysshego i srednego spetsial'nogo obrazovaniya RSFSR and Moskovskiy institut stali imeni I.V. Stalina.

Ed. (Title page): B.N. Finkel'shteyn; Ed. of Publishing House: Ye.I. Levin; Tech. Ed.: A.Y. Karasev.

PURPOSE: This collection of articles is intended for personnel in scientific institutions and schools of higher education and for physical metallurgists and physicists specializing in metals. It may also be useful to students of these fields.

COVERAGE: The collection contains results of experimental and theoretical investigations carried out by schools or higher education and scientific research institutions in the field of the relaxation phenomena in metals and alloys. Several articles are devoted to the investigation—by the internal-friction method—of the decomposition of supersaturated solid solutions. Also analyzed are the defects of the crystalline lattice, plastic deformation, high-temperature behavior of alloys, and creep. Problems of the relation between internal friction and temper brittleness, the use of the method of internal friction in the investigation of powder-metallurgy products, and the mechanics of impact fatigue are discussed. The collection also contains articles on the graphic characteristics of materials, elastic after-effect, and the new slow-detection method. No personalities are mentioned. References follow most articles. There are 366 references: 192 Soviet and 174 non-Soviet.

Zurik, E.D. [Moscow Steel Institute].   On Dispersion Correlations in   55
the Theory of Elastic Relaxation

Starodubov, L.F., and A.A. Sacoona [Dnepropetrovsk metallurgicheskiy   58
Institut (Dnepropetrovsk Metallurgical Institute)]. Effect of the Tempering
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Vsesoyuznyy Institut Aviatsionnykh materialov (All-Union Institute of Aviation
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Friction of Iron-Vanadium Alloys

POSTNIKOV, V.S.

PHASE I BOOK EXPLOITATION   SOV/5305

Moscow. Institut stali

Relaksatsionnye yavleniya v metallakh i splavakh; trudy Mezhvuzovskogo soveshchaniya. (Relaxation Phenomena in Metals and Alloys; Transactions of the Inter-Institute Conference) Moscow, Metallurgizdat, 1960. 325 p.

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PURPOSE: This collection of articles is intended for personnel in scientific institutions and schools of higher education and for physical metallurgists and physicists specializing in metals. It may also be useful to students of these fields.

COVERAGE: The collection contains results of experimental and theoretical investigations carried out by schools of higher education and scientific research institutions in the field of the relaxation phenomena in metals and alloys. Several articles are devoted to the investigation—by the internal-friction method—of the decomposition of supersaturated solid solutions. Also analyzed are the defects of the crystalline lattice, plastic deformations, high-temperature behavior of alloys, and creep. Problems of the relation between internal friction and temper brittleness, the use of the method of internal friction in the investigation of powder-metallurgy products, and the mechanics of impact fatigue are discussed. The collection also contains articles on the damping characteristics of materials, elastic after-effect, and the new slow-deflection method. No personalities are mentioned. References follow most articles. There are 366 references. 342 Soviet and 17% non-Soviet.

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Garber, R.I., and I.T. Mogil'nikova [Fiziko-tekhnichesky institut AN UkrSSR (Physicotechnical Institute of the Academy of Sciences UkrSSR)]. Internal Friction and Plastic Deformation in Overstressed Microzones of Rigid Bodies   178

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Datsko, O.I., and V.A. Pavlov [Institute of Physics of Metals of the Academy of Sciences USSR]. Dependence of the Internal Friction in Pure Nickel on the Temperature   234

Barisova, N.S., and V.M. Rozenberg [Institute of Science of Metals and Physics of Metals, TsNIICM]. Study of the Effect of the Intergranular Structure of Austenite on the Internal Friction and Creep   241

Samoylova, A.Ye., and V.S. Postnikov [Kemerovo Pedagogical Institute]. Recovery of the Internal Friction in Aluminum, Silver, and Platinum After the Removal of the Loading   251

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Bernshteyn, N.L., and Ye.S. Tikhodeyeva [Moscow Steel Institute]. Effect of Surface-Hardening on the Internal Friction of Commercial-Grade Iron   279

Malakhov, P.A. [Kiyevsky gosudarstvennyy universitet (Kiev State University)]. Analysis of the Maximum Internal Friction on Grain Boundaries in the Aluminum-Copper-Nickel Alloys   289

POSTNIKOV, V.S.

Internal friction of phenol-formaldehyde plastics at various
temperatures. Plast.massy no.11:60-68 '60.   (MIRA 13:12)
              (Phenol condensation products) (Plastics—Testing)

S/191/60/000/011/015/016
B013/B054

15.8106

AUTHOR: Postnikov, V.S.

TITLE: Internal Friction of Phenol Formaldehyde Plastics at Different Temperatures

PERIODICAL: Plasticheskiye massy, 1960, No. 11, pp. 60-68

TEXT: The author studied the temperature dependence of internal friction of plastics by the method of small-amplitude, low-frequency oscillations. For this purpose, he developed a "vacuum relaxator" consisting of a torsion pendulum, a thermostat, and an optical system. Two types of molding materials were investigated: on the basis of novolaks of the type 18, and on the basis of Resol resins No. 21 and No. 22. The component ratio was changed during experiments (Tables 1 and 2). All experiments were made in air. To examine the effect of air on the degree of internal friction, the samples were subsequently investigated in vacuo. It was found that the character of the curves observed was hardly influenced by evacuation (Fig. 11). It was proved by experiment that the temperature dependence of internal friction changed on gradual transition from pure resin to the finished plastic.

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Internal Friction of Phenol Formaldehyde
Plastics at Different Temperatures

88553

S/191/60/000/011/015/016
B013/B054

A peak of internal friction can be observed on the $Q^{-1}(T)$ curve for hardened resin. In the finished plastic, the number of these peaks increases to four and more. On re-heating, both in air and in vacuo, the peaks disappear, and the level of internal friction is considerably reduced. It was shown to be possible to draw qualitative conclusions on the character of temperature dependence of internal friction of plastics, and on the causes of disappearance of peaks on the $Q^{-1}(T)$ curves on re-heating, with the aid of Maxwell's model and the model of the "linear standard body" (Ref. 10). The method suggested is a suitable means of studying relaxation phenomena occurring in plastics under the influence of mechanical and thermal effects. For this reason, it can be stated that a systematic investigation of internal friction in plastics with respect to various factors (temperature, time, degree of deformation, quality and quantity of fillers, etc.) might supply valuable experimental data to clarify the structure of polymers and plastics. The author thanks V. I. Ryashentsova, I. P. Rotenberg, and P. I. Ageyev, Engineers of the Kemerovskiy zavod "Karbolit" (Kemerovo "Karbolit" Works) and of the filial NII Plastmass (Branch of the Scientific Research Institute of Plastics), for valuable

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Internal Friction of Phenol Formaldehyde
Plastics at Different Temperatures

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S/191/60/000/011/015/016
B013/B054

Card 3/3

POLYAKOV, V.N., inzh.

High-temperature cooling of a locomotive internal-combustion engine.
Trudy KHIIT no.35:108-117 '60.   (MIRA 13:10)
        (Gas and oil engines--Cooling)

/P.8200

AUTHOR: Postnikov, V.S.

TITLE: On Internal Friction in Metals at High Temperatures

ABSTRACT: An error was made in one of the author's papers (Ref 1)
           in discussion of the effect of weight of the torsional
           system on the magnitude of the energy of formation of
           vacancies; this was correctly pointed out by
           V.T. Shmatov. This mistake was, however, pointed out by
           the present author (Postnikov) in the 1959 Nr 2 issue of
           the present journal. V.T. Shmatov proceeds from pointing
           out this error to say that "the mechanism suggested for
           the relationship of internal friction with motion of
           vacancies is inconsistent since a shearing stress θ_i
           cannot produce ordered motion of vacancies in the direction
           of θ_i because θ_i is a scalar component of an elastic-
           stress tensor and consequently such direction does not
           exist." The author (Postnikov) refutes this criticism by
           showing that Ya.I. Frenkel' (Ref 2), N.S. Fastov (Ref 8)
           and B.Ya. Pines (Ref 9) also used the idea of directed flow
           of defects or atoms under the action of elastic forces.
           The required gradient of elastic stresses across the L.

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66607
SOV/139-59-3-29/29

On Internal Friction in Metals at High Temperatures

sample cross-section was due to non-uniformity in the distribution of stresses (produced by structure defects in polycrystalline metals). The proposed elementary theory of internal friction at high temperatures should be regarded as a first attempt which needs further development. The author (Postnikov) does not say that the hole mechanism of scattering of energy by a vibrating sample at high temperatures is the only possible mechanism. On the contrary, in later papers (Ref 13 and some work in press) it is shown that the hole mechanism does not give a satisfactory quantitative agreement of theory with experiment, especially in the case of alloys. For example, with copper alloyed with 10% of aluminium very high internal friction peak ($Q^{-1} \sim 1$) was found at 920 °C. At ~ 1010 °C internal friction falls reaching a value of $Q^{-1} = 0.18$. For these reasons the author (Postnikov) considered also, apart from the hole mechanism, a dislocation mechanism. Processes of intersection of dislocations and of encompassing of obstructions by dislocations etc. (Ref 12) are taken into account since they produce vacancies on a large scale and this increases

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SOV/139-59-2-30/30

AUTHOR: Postnikov, V.S.

TITLE: Letter to the Editor

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika, 1959, Nr 2, p 176 (USSR)

ABSTRACT: The author corrects his paper on "The Relationship Between Internal Friction and Creep in Metals at High Temperatures" published in Izvestiya vysshikh uchebnykh zavedeniy, Fizika, 1958, Nr 6. On p 138 of that paper Eq (7) has to be replaced by

$$U(\sigma_i) = U_1 - \frac{4\pi^2 m f^2 a^2}{2 E^2} \sigma_i^2$$

where m is the mass and f is the frequency of vibrations of atoms, a is the mean distance between neighbouring atoms in the direction parallel to the sample axis and E is the modulus of elasticity. The second term of the above equation is numerically equal to the work done in extension, divided by the number of atoms. The text of the above paper between Eq (5) and Eq (7) should be omitted.

Card 1/1   n.b. This is a complete translation.

SOV/126-8-2-23/26

AUTHORS: Lebedev, R.S. and Postnikov, V.S.

TITLE: Influence of Plastic Deformation on Internal Friction of Iron and Iron-nickel Alloy

ABSTRACT: The authors describe a continuation of their work (Ref 1) on the influence of plastic deformation on internal friction of iron-base alloys. In the present work, they used their former method and conditions except for a higher heating rate (60 °C per minute); the error at high temperature has been reduced to about 1%. Results for electrolytic iron reduced by 8, 17, 30, 47, 70 and 92% and armco-iron + 4% Ni reduced by 20-80% are tabulated (for the Fe-Ni alloy) and shown in Figures 1-5. Some specimens were annealed at 825 °C for 1.5 hours. Figures 1-4 show internal friction and shear modulus as functions of temperature for different reductions. Figures 1 and 3 relate to iron and iron-nickel, respectively, without annealing; Figures 2 and 3, respectively.

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SOV/126-8-2-23/26

Influence of Plastic Deformation on Internal Friction of Iron and Iron-nickel Alloy

with annealing. Internal-friction peak values are plotted against degree of reduction for the various tests in Figure 5. The internal-friction curve for iron-nickel has two maxima, while the iron-tungsten alloy (Ref 1) has only one. The first maximum disappears almost completely after high-temperature annealing but the second does not. The first is thus due mainly to previous deformation and, as confirmed by activation-energy values (table), is associated with recrystallization; the second maximum is associated with grain-boundary relaxation. The authors suggest that internal-friction values give some indication of high-temperature strength. As before (Ref 1), the activation energy of internal-friction recovery in iso-thermal soaking was found to be considerably less than that of diffusion or of recrystallization. Although this suggests that recovery is not diffusional, the authors consider that insufficient experimental data are available to discuss a dislocation mechanism (Refs 4-6).

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Influence of Plastic Deformation on Internal Friction of Iron and Iron-nickel Alloy
SOV/126-8-2-23/26

There are 5 figures, 1 table and 6 references, of which 4 are Soviet, 1 English and 1 German.

ASSOCIATION: Kemerovskiy gosudarstvennyy pedagogicheskiy institut (Kemerovo State Pedagogical Institute)

SUBMITTED: March 6, 1959

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POSTNIKOV, V.S.

Relationship between internal friction and creep of metals at high
temperatures. Izv.vys.ucheb.zav.; fiz. no.6:137-144 '59.
(MIRA 12:4)

1. Kemerovskiy pedagogicheskiy institut.
(Viscosity)   (Creep of metals)

ACCESSION NR: AR4044012

S/0058/64/000/006/E087/E087

SOURCE: Ref. zh. Fizika, Abs. 6E664

AUTHOR: Postnikov, V. S.; Sharshakov, I. M.; Maslennikov, E. M.

TITLE: The question of grain-boundary stress relaxation in pure metals

CITED SOURCE: Sb. Relaksats. yavleniya v met. i splavakh. M., Metallurg-izdat, 1963, 165-170

TOPIC TAGS: grain boundary stress relaxation, stress relaxation, metal, internal friction

TRANSLATION: On 23 pure metals taken in the annealed state there are in-vestigated peaks on the curves of the temperature dependence of internal friction, connected with the viscous behavior of grain boundaries. For all investigated polycrystalline metals, on the curve of the temperature dependence of internal friction there is a peak caused by the existence of grain broundaries. The height of the peak depends on the amount and form of the impurities; very

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ACCESSION NR: AR4044012

pure metals should have a high internal-friction peak. Available data show that the height of the peak internal-friction peak. Available data show that the height of the peak in the case of Zn and Al depends significantly on the frequency of the oscillations. Furthermore, periodic heating of single-crystal Al and the macrocrystalline alloy of Al with 0.5% Cu causes the appearance of a peak on the internal-friction temperature curve. This peak appears in that temperature region where there is revealed the "grain-boundary" peak of internal friction of polycrystalline Al. The conclusion is drawn that the internal-friction peak on the curve of the temperature dependence of the internal friction of a pure polycrystal may be caused not only by viscous slip along the grain boundary but also by some other mechanism.

SUB CODE: AS, MM   ENCL: 00

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ACCESSION NR: AR4044000   S/0058/64/000/006/E041/E041

SOURCE: Ref. zh. Fizika, Abs. 6E308

AUTHOR: Shermergor, T. D.; Postnikov, V. S.

TITLE: Temperature relaxation in solids

CITED SOURCE: Sb. Relaksats. yavleniya v met. i splavakh. M., Metallurgizdat, 1963, 27-30

TOPIC TAGS: absorption coefficient, irreversible process, irreversible process thermodynamics, heat equation, wave propagation, isotropic medium, thermal conductivity, temperature relaxation

TRANSLATION: Gives a comparison of two methods of calculating the absorption co-efficient; one is based on thermodynamics of irreversible processes, the other on use of the heat equation. Examines the propagation of a plane longitudinal wave in an unbounded isotropic medium in which thermal conductivity is the only relaxa-tion mechanism. It is found that for high frequencies the wave is isothermal, while for low frequencies it is adiabatic; the propagation rates of these waves

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S/0058/64/000/006/E088/E088

ACCESSION NR: AR4044013

SOURCE: Ref. zh. Fizika, Abs. 6E669

AUTHOR: Postnikov, V. S.; Belyayev, A. M.

TITLE: The influence of various factors on the nature of the temperature dependence of the internal friction of aluminum

CITED SOURCE: Sb. Relaksats. yavleniya v met. i splavakh. M., Metallurgizdat, 1963, 159-164

TOPIC TAGS: internal friction, aluminum

TRANSLATION: Research is conducted using a torsional pendulum on wire samples of 99.98% pure Al. Analysis of the influence of various factors on the nature of the temperature dependence of internal friction shows that with a decrease of the diameter of the samples from 5 to 1.5 mm the level of internal friction is lowered, and the internal-friction peak in the region of temperatures ~350° C shifts toward lower temperatures. To temperatures of ~150° C a change in length of the samples from 200 to 50 mm (with a constant diameter of 1 mm) does not influence the magnitude of internal friction. For samples with length 20-30 mm in

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SOV/139-58-6-22/29

AUTHOR: Postnikov, V.S.

TITLE: Connection of Internal Friction with Creep in Metals
             at High Temperatures (Svyaz' vnutrennego treniya s
             polzuchest'yu metalla pri vysokikh temperaturakh)

PERIODICAL: Izvestiya Vysshikh Uchebnykh Zavedeniy, Fizika,
            1958, Nr 6, pp 137-144 (USSR)

ABSTRACT: A mathematical analysis of the movement of defects,
            principally vacancies, in metals leads to a three-term
            equation for internal friction, measured as Q^{-1}. One
            term of the equation contains the creep velocity ε,
            another has a maximum at a particular temperature T_m.
            Curves of Q^{-1} against temperature for Al, Al + 1% Mg
            and Fe + 4% Ni all show maxima, the Al materials at
            about 250°C and the Fe + 4% Ni at about 500°C. The fact
            that internal friction can be expressed in terms of
            creep velocity means that heat-resisting alloys should
            have a low internal friction at the working temperature.
            Comparison of the curves of Q^{-1} against temperature for
            pure Ni and three Ni alloys (Nichrome, Elzhiloy and

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SOV/139-58-6-22/29

Connection of Internal Friction with Creep in Metals at High
Temperatures

Nimonik 80) verifies this conclusion. There are
2 figures and 27 references of which 22 are Soviet,
3 English and 2 German.

ASSOCIATION: Kemerovskiy Pedinstitut (Kemerovo Pedagogical
Institute)

SUBMITTED: 26th June 1958

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SOV/126-6-4-20/34

AUTHOR: Postnikov, V.S.

TITLE: The Temperature Dependence of the Shear Modulus of Certain Pure Metals, Solid Solutions and Alloys (Temperaturnaya zavisimost' modulya sdviga nekotorykh chistykh metallov, tverdykh rastvorov i splavov)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 6, Nr 4, pp 706-716 (USSR)

ABSTRACT: The investigated materials included: (i) Titanium, iron, cobalt, nickel, molybdenum and tungsten (Table 1); (ii) cast and sintered alloys of the "Nimo" type and a cast Nimonic alloy (Table 2) and (iii) binary solid solutions of Be, B, C, Ti, Cr, Mn, Fe, Zr, Nb, Mo and W in nickel, prepared by a vacuum treatment consisting of heating the nickel wires in contact with the powdered alloying elements. The temperature dependence of the shear modulus G of these materials was studied by the method of low frequency (1 cycle/sec), low amplitude torsional vibrations. Since $G = \dfrac{8\pi l I}{r^4} f^2$, where

l - length of the wire specimen, r - its radius,
I - moment of inertia of the auxiliary inertia number

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The Temperature Dependence of the Shear Modulus of Certain Pure
Metals, Solid Solutions and Alloys

and f - frequency of the free torsional vibrations of
the specimen, the variation of G was presented in terms
of the relative values of f^2. The experimental results
for pure metals are reproduced graphically on Figs.1, 2,
3 and 4. Graphs 1 and 11 on Fig.1 show the temperature
dependence of the shear modulus (f^2/T), and variation
of the internal friction of polycrystalline annealed
iron. Graphs 111 and IV show the f^2/T relationship
of a single iron crystal. In the 20-440°C temperature
interval, f^2 of polycrystalline Fe decreases almost
linearly. The internal friction graph shows a maximum
at approx 440°C and beginning from this temperature f^2
decreases at a much faster rate which changes again at
about 770°C. The temperature dependence of f^2 of
annealed, polycrystalline cobalt is shown in Fig.2
(graph 1 - heating, graph 1' - cooling). The two
graphs are similar in character, both being
characterised by a maximum which occurs at 450°C on
heating and at 320°C on cooling. A similar "hysteresis"

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The Temperature Dependence of the Shear Modulus of Certain Pure Metals, Solid Solutions and Alloys

effect is observed on the internal friction graphs (ll and ll') of this metal. The f^2/T graphs for W, Mo and Ti are shown in Fig.4 (curves l, ll and lll respectively). In every case there is a gradual decrease of f^2 with rising temperature. In the case of nickel, the f^2/T relationship has an anomalous character in the 20-340°C temperature interval (graph l, Fig.3), being characterised by a minimum at approx 150°C. The value of f^2 at this temperature is 15.3% lower than that at room temperature and 11.7% lower than at 340°C. As regarding the solid solutions of various elements in nickel, the f^2/T graphs of these materials reproduced in Fig.5-10 show that: (i) The anomalous character of the f^2/T relationship in pure nickel is either reduced or completely eliminated by the introduction of a soluble alloying element, the effect of Be, C, Ti, Cr and Fe being, in this respect, greater than that of Mn, Zr, Nb, Mo and W. (ii) The mean temperature coefficient of the shear modulus, $\beta = \frac{1}{G}\cdot\frac{dG}{dT}$, of solid

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The Temperature Dependence of the Shear Modulus of Certain Pure
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solutions is lower than that of pure nickel.
(iii) Within a wide temperature interval the value of
G of solid solutions is considerably higher than that
of pure nickel. The f^2/T graphs of various alloys,
reproduced in Fig.5 (curve lll -- cast Nimo 20,
lV - sintered Nimo 20, V and Vl - cast and sintered
Nimo 28, Vll - cast Nimonic 80) show that the shear
modulus depends not only on the composition of the alloy
(G of Nimo 28 is higher than that of Nimo 20), but also
on the method of its preparation: At any given
temperature the value of G of an alloy prepared by the
powder metallurgy method is higher than that of the
same alloy prepared by melting. Theoretical
considerations and the results of the present
investigation led the author to the following
conclusions: (i) The temperature dependence of G of
pure metals can be expressed by

Card 4/8 $G_T = G_o \left[1 + (\beta_\alpha + \beta_T + \beta_r)\right]T$ where β_α- the temperature

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The Temperature Dependence of the Shear Modulus of Certain Pure
Metals, Solid Solutions and Alloys

coefficient of G associated with the thermal expansion
of the lattice, β_T - the temperature coefficient of
G due to increase of the thermal energy of the lattice
and β_r - the temperature coefficient of G associated
with various relaxation processes which occur
particularly at temperatures near and above the
recrystallisation temperature of the metal. (β_r accounts
for approximately 50% of the decrease of G in this
temperature region.) (ii) The anomalous character of
the f^2/T relationship observed in the case of Ni is
associated with the ferromagnetic properties of this
metal. This view is supported by the fact that the
variation of f^2 is normal above 360°C (Curie point of Ni)
and that no anomalies are observed if the temperature
dependence of f^2 is studied in a magnetic saturation
field (H = 500 Oerst)(Ref.12). Akulov and Kondorsky
(Ref.13) use the concept of mechano-striction in order
to explain the anomalous temperature dependence of the
Yound's modulus E. Directly connected with mechano-
striction is the variation of E of ferro-magnetic

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The Temperature Dependence of the Shear Modulus of Certain Pure Metals, Solid Solutions and Alloys

materials under the influence of a magnetic field, or so-called ΔE-effect. The shear modulus is subject to a similar effect, and according to Vonsovsky and Shur (Ref.15) and Becker and Doering (Ref.22), the anomalous temperature variation of E and G can be explained in terms of the ΔE -- and ΔG-effects. (iii) In the case of cobalt, the anomalous character of the f^2/T relationship (the presence of a maximum) is associated with the $Co_\beta \rightleftarrows Co_\gamma$, allotropic transformation occurring at approximately $430^\circ C$ on heating and at $360^\circ C$ on cooling. (iv) The fact that G of the Ni-base alloys is higher than that of pure Ni can be attributed to the higher resistance to shear by which the lattice of binary or more complex alloys is characterised. The decrease of the mean temperature coefficient of G observed in the Ni-base alloys (as compared with pure Ni) can be explained in the following way: The temperature dependence of G of alloys can also be represented by

$$G_T = G_0 \left[+ (\beta_\alpha + \beta_T + \beta_r) \right] T. \quad \text{Although the meaning}$$

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The Temperature Dependence of the Shear Modulus of Certain Pure
Metals, Solid Solutions and Alloys

of β_α, β_T and β_r is the same as in the equation for
pure metals, the values of these coefficients depend
not only on the nature of the alloy components but also
on the composition of the alloy. It is known that the
maximum present on the internal friction/temperature
curve and resulting from the viscous flow along the
grain boundaries of the pure metals, either disappears
or is replaced by a deflection point on similar curves
of alloys. This means that in the latter case the
resistance to shear along the grain boundaries is
considerably higher, as a result of which the magnitude
of the coefficient β_r is decreased. A further decrease
of β_r of alloys is due to the fact that, owing to the
increase of the mean heat of activation, the process of
self-diffusion of atoms in the lattice under the
influence of the stress field is slowed down. Although
the value of β_T of alloys is not very different from
that of pure metals, the fact that (in the absence of
solid state transformations) the coefficient of thermal
expansion of alloys is always lower than that of their

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The Temperature Dependence of the Shear Modulus of Certain Pure
      Metals, Solid Solutions and Alloys

components results in that the magnitude of
is lower in alloys than in pure metals. Consequently
the value of $(\beta_\alpha + \beta_T + \beta_r)$ of alloys is also lower than
than that of their separate components. There are
10 figures, 3 tables and 22 references of which
16 are Soviet, 3 English, 1 Italian and 2 German.

ASSOCIATION: Kemerovskiy Gosudarstvennyy Pedagogicheskiy Institut
      (Kemerovo State Pedagogical Institute)

SUBMITTED: 19th November 1956.

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SOV/126-6-6-17/25

AUTHORS: Samoylova, A. Ya. and Postnikov, V. S.

TITLE: Re-Establishment of Internal Friction in Aluminium, Silver and Platinum After Removal of a Load (Vosstanovleniye vnutrennego treniya alyuminiya, serebra i platiny posle snyatiya nagruzki)

ABSTRACT: The authors studied isothermal re-establishment of internal friction in aluminium (99.98%), silver (99.99%) and platinum (99.87%) wires of 0.7 mm dia and 300 mm length. These wires were extension-deformed by loading them between 15 and 1500 g. The tensions produced in the samples are given in the 2nd column in the table on p 1081. The tension was applied for 1 hour to aluminium, for 30 minutes to silver and for 15 minutes to platinum. The loads were then removed and measurements of internal friction started within 1 min. Internal friction was determined, using the method of low-frequency (1 c/s) torsional vibrations of small amplitude described by Postnikov (Ref.12). All samples were annealed before the extension loads were applied to them. The results of measurements are given in Figs.1-10. Fig.1 shows the temperature dependence of internal friction and shear modulus

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Re-Establishment of Internal Friction in Aluminium, Silver and
Platinum After Removal of a Load

of aluminium (Curves I, II), silver (Curves III, IV) and
platinum (Curves V, VI). Re-establishment of internal fric-
tion in aluminium is shown in Figs.2-4. The constant temper-
atures at which this re-establishment occurred were: room
temperature (Fig.2), 45°C (Fig.3) and 80°C (Fig.4). Re-
establishment of internal friction in silver is shown in
Fig.6 (at 120°C) and Fig.7 (at 140°C). Re-establishment
of internal friction in platinum is shown in Fig.8 (at 450°C)
and Fig.9 (at 480°C). Fig.10 gives the dependence of inter-
nal friction of aluminium (Curve I was obtained at 20°C,
II - 45°C), silver (III - 120°C, IV - 140°C) and platinum

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Platinum After Removal of a Load

(V - 450°C, VI - 480°C) on the applied tension in g/mm^2;
internal friction was measured two hours after removal
of the loads. From the experimental data obtained the
authors calculated the values of the heat of activation
of re-establishment of internal friction in these three
metals. The values of the heat of activation were found
to be 4500, 6400 and 8000 cal/mole, respectively. The
value for Al was obtained from the curves of Fig.5,
which gives the temperature dependence of the relaxation
time in the process of re-establishment of internal

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Re-Establishment of Internal Friction in Aluminium, Silver and
Platinum After Removal of a Load

SOV/126-6-6-17/25

        friction. There are 10 figures, 1 table and 22 references,
        10 of which are Soviet, 8 English and 4 German.

ASSOCIATION: Kemerovskiy gosudarstvennyy pedagogicheskiy institut
        (Kemerovo State Pedagogical Institute)

SUBMITTED: July 30, 1957.

Card 4/4

SOV/137-57-10-20102

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 10, p 237 (USSR)

AUTHOR: Postnikov, V.S.

TITLE: Temperature Dependence of the Internal Friction of Certain
            Pure Metals (Temperaturnaya zavisimost' vnutrennego treniya
            nekotorykh chistykh metallov)

PERIODICAL: Uch. zap. Kemerovsk. gos. ped. in-t, 1956, Nr 1, pp 191-
            204

ABSTRACT: An investigation is made of changes in internal friction (I)
            with temperature of Al, Ti, Co, Ni, Cu, Mo, and W annealed
            at 800°C. The measure of I (Q) is taken to be the logarithmic
            rate of attenuation of free torque oscillations to π (the fre-
            quency of the free oscillations being ~1 cps). The maximum
            torsional deformation (D) is $\leq 10^{-5}$ (sic!), while the tensile D
            due to longitudinal load is $\leq 10^{-6}$. The measurements are run
            in a special instrument in a vacuum of ~ 10^{-4} to 10^{-5} mm Hg.
            It is shown that the I of Al, Cu, Ni, and Fe vary identically
            with temperature, and display a clearly defined maximum I at

Card 1/2

SOV/137-57-10-20102

Temperature Dependence of the Internal Friction of Certain Pure Metals

some specific temperature (Cu at 224°, Al at 280°, Ni at 390°, and Fe at 500°). The temperature graphs for the I of Ti, Mo, and W display no maximums. The only characteristic of these metals in this respect is the presence of a point of inflection on the temperature curve for Q at $>700^\circ$. Co displays the following I behavior with temperature: I rises sharply to a maximum at 450°, in which temperature region (when held at fixed temperature) I drops rapidly to a stable value within ~ 30 min; on further increase in temperature, I continues to rise without displaying any further peculiarities. This time instability of the I value is related to allotropic changes occurring in Co in this temperature interval. In addition, this temperature interval reveals a peculiar "hysteresis" phenomenon in I. It is shown by experiment that the I maximum (or the point of inflection) lies in the recrystallization interval of the metal. For a given metal its position depends upon the magnitude of prior plastic D: An increase in plastic D leads to a shift in the maximum toward a lower temperature. The I of binary alloys and metals contaminated by impurities rises with temperature considerably more slowly than the I of pure metals, particularly in the region of elevated temperatures.

L.G.

Card 2/2

AUTHOR: Postnikov, V. S.   SOV/53-66-1-2/11

TITLE: The Temperature Dependence of the Internal Friction of Pure
             Metals and of Alloys (Temperaturnaya zavisimost, vnutrennego
             treniya chistykh metallov i splavov)

PERIODICAL: Uspekhi fizicheskikh nauk, 1958, Vol. 66, Nr 1,
             pp. 43 - 77 (USSR)

ABSTRACT: In the present paper the author gives a detailed and complete
             survey on experimental and theoretical investigations of
             various physical phenomena connected with the internal friction
             and the particularly considers the temperature dependence. As
             introduction the problem and methods for the determination
             of the internal friction are discussed. In the second part
             of the paper experimental results are given; they concern:
             a)Pure metals, b) alloys. They are from more than 100 internal
             and foreign publications and are discussed by means of many
             diagrams. The third and most detailed part of the paper deals
             with the theory of internal friction; the author brings an
             almost textbook-like survey on the influence of various factors
Card 1/3   on the internal friction. The chapters of this section

The Temperature Dependence of the Internal Friction   SOV/53-66-1-2/11
of Pure Metals and of Alloys

are: The general thermodynamical theory of internal friction;
the internal friction caused under pressure by the regulation
of the atoms (substitution solutions,intrusion solutions);internal friction
caused by ferromagnetism (the "magnetic" losses - macro-eddy
currents, micro-eddy currents, magnetomechanic hysteresis); the
internal friction caused by heat conductivity; the internal friction
caused by interaction of a sonic field with phonons and con-
duction electrons; the internal friction caused by atom
migration in the tension field; the internal friction caused
by static hysteresis; the internal friction and the dislocation.
The last (fourth) section of the paper deals with the appli-
cation of the theoretical results concerning the temperature
dependence of the internal friction. There are 27 figures and
253 references, 72 of which are Soviet.

Card 2/3

The Temperature Dependence of the Internal Friction
of Pure Metals and of Alloys   SOV/53-66-1-2/11

1. Metals--Internal friction   2. Metals--Temperature factors

Card 3/3

POSTNIKOV, V.S.

Oscillation damping of cylindrical specimens. Fiz. met. i
metalloved.   6   no.3:522-533   '58.   (MIRA 11:10)

1. Kemerovskiy gosudarstvennyy pedagogicheskiy institut.
            (Elastic rods and wires--Vibration)

POSTNIKOV, V. S.

High-temperature internal friction in metals. Izv.vys.ucheb.
zav.; fiz. no.3:175-176 '59. (MIRA 12:10)

1. Kemerovskiy pedinstitut.
(Friction) (Metals at high temperatures)

67720

/8. 8200

AUTHOR: Postnikov, V. S.   SOV/126-7-3-16/44

TITLE: A Phenomenological Description of the Energy Dissipation
          in an Oscillating Wire Specimen (Fenomenologicheskoye
          opisaniye rasseyaniya energiy koleblyushchimsya
          provolochnym obraztsom)

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 7, Nr 3,
          pp 405-409 (USSR)

ABSTRACT: In Ref 1 the present author considered the damping of
          the vibrations of a uniform isotropic wire specimen
          executing small torsional vibrations. Assuming that
          the material of the specimen has relaxational properties,
          the appearance of the maximum in the curve showing the
          internal friction as a function of temperature was
          satisfactorily explained.   However, the observed
          monotonic increase ("background") in the internal
          friction at higher temperatures (Refs 2 and 3) was not
          explained. This was to be expected since among all the

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SOV/126-7-3-16/44

A Phenomenological Description of the Energy Dissipation in
an Oscillating Wire Specimen

properties which a real solid body can have, only the
relaxation properties were taken into account. In
the present paper an attempt is made to explain
the "background", assuming that the material has
elasto-plastic properties. Torsional vibrations of
a cylindrical specimen are considered assuming that
the forces are applied only to the ends of the
specimen so that there are no forces on the surface.
A comparison of the theory with experiment indicates
that, in the case of pure aluminium, the material
begins to show plastic properties for stresses
considerably smaller than those required by the
St. Venant condition. Thus, by ascribing to the
specimen both relaxation and elasto-plastic properties
the temperature dependence of internal friction in
pure metals can be explained semi-quantitatively.
There are 7 Soviet references.

Card 2/3

67720

A Phenomenological Description of the Energy Dissipation in
an Oscillating Wire Specimen   SOV/126-7-3-16/44

ASSOCIATION: Kemerovskiy gosudarstvennyy pedagogicheskiy
         institut (Kemerovo State Pedagogical Institute)

SUBMITTED: July 17, 1958

Card 3/3

18.8200
18.1120

AUTHORS: Postnikov, V.S. and Lebedev, R. S.   SOV/126-8-1-14/25

TITLE: Influence of Plastic Deformation on Internal Friction of Iron-Tungsten Alloys

ABSTRACT: Although much work (Refs 4-46) has been done on the influence of work hardening on internal friction the nature of this effect remains, because of its complexity, far from clear. The present investigation aimed at elucidating the effect for binary alloys using the low-frequency torsional oscillation method described by A. Ya. Samoylova and V. S. Postnikov (Ref 46). The 300 mm long, 0.7 mm diameter, iron-tungsten (1.83 and 5% W) specimens based on armco iron were supplied by the Institut fiziki metallov i metallovedeniya (Metal Physics and Metallurgy Institute) of TsNIIChM. All measurements were effected at 10^{-3} mm Hg, specimens with 5, 15, 25, 30, 40, 60, 80 and 95% reduction being used. Internal friction as indicated by the logarithmic decrement divided by π, was measured with heating at about 3.5 degrees/min after previous annealing at 825°C for

Card 1/3

66894

SOV/126-8-1-14/25

Influence of Plastic Deformation on Internal Friction of Iron-
Tungsten Alloys

90 min.   The isothermal change in internal friction at
the same maximum oscillation amplitude was also determined.
All 1.83% W specimens were tested 7 months and all 5% W
specimens were tested 1 month after reduction. The
results show that internal friction of the plastically
deformed unannealed alloys is large (Figs 1,2) compared
with that of the same alloys after high-temperature
annealing (Figs 3,4) and depends largely on heating rate
and soaking time (Fig 6). The less the reduction the
more the internal-friction peak is displaced towards
higher temperatures (Figs 1,2), the peak-height depending
on reduction (Fig 5, curves 1 and 2). With isothermal
soaking at various temperatures internal friction
decreases exponentially with time (Fig 6). The activation-
energy of the "relaxation" depends on the tungsten content
and degree of previous plastic deformation, decreasing as
the latter rises. At high temperatures (about $840°C$)
internal friction is at a higher level for deformed than
for annealed specimens (curves 3 and 4 compared with
Card 2/3   curves 5 and 6 in Fig 5). The high-temperature internal-

USSR / Farm Animals. Silkworms.   Q-7

Abs Jour : Ref Zhur - Biol., No 10, 1958, No 45350

Author   : Postnikova, E. D.
Inst   : Not given
Title   : The Study of Feed Substitutes for the Larvae of the Mulberry-
            Feeding Silkworm in Their First Stages of Growth.

Orig Pub : Nauk. zap. Voroshilovgrads'k. derzh. ped. in-t, 1956, vyp.
            6, 54-65.

Abstract : The larvae of period I of growth were fed the leaves of kul-
            baba /Leontodon7, orache, Siberian accacia, wild current,
            Tatar and American maple. These substitutes, however, were
            considerably reducing the output of cocoons and prolonging the
            development of silkworms. The most suitable substitute was
            found to be kul'baba. In oak-feeding silkworm which was
            reared entirely on birch leaves, a great loss of cocoons
            was observed. In the 2nd generation of certain experimental

Card 1/2

60

AUTHOR: Postnikov, V. S.   SOV/126-6-3-20/32

TITLE: On the Problem of Damping Oscillations of a Cylindrical
         Specimen (K voprosu zatukhaniya kolebaniy
         tsilindricheskogo obraztsa)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 6, Nr 3,
            pp 522-533 (USSR)

ABSTRACT: The problem of damping of oscillations of cylindrical
          specimens is investigated from the point of view of the
          phenomenological theory of oscillations of media with
          plastic properties. The free oscillations are investi-
          gated of a cylindrical specimen which is rigidly clamped
          on one end and carries on the other end the torsion
          producing device. It is assumed that the moment of
          inertia I of the torsion producing device is many times
          larger than the moment of inertia I_0 of the specimens,
          so that the latter can be disregarded. Small oscillations
          are considered for which the cross section distortions
          can be neglected and it can be assumed that the displace-
          ment of these cross sections is zero. In the first
          paragraph the torsional oscillations are considered for
Card 1/4 an elastic-viscous rod. For this case the theoretical

SOV/126-6-3-20/32
On the Problem of Damping Oscillations of a Cylindrical Specimen

results show that an aluminium specimen, which would be
assumed as being elastic-plastic, should not oscillate
at room temperature, a conclusion which is in direct
contradiction to experimental results. With increasing
temperature the viscosity coefficient decreases rapidly
and conditions may arise for which oscillations are
theoretically possible (fulfilment of the inequality 27);
however, this contradicts experiment since with
increasing temperature the damping of oscillations
increases rapidly. Thus, the assumption that metallic
specimens represent an elastic-viscous medium is not
borne out by experimental results. In the second para-
graph the oscillations of a rod in the process of
relaxation are considered. In this case the analysis
of the theoretically determined logarithmic decrement
δ_m (Eq.62, p 532), for instance for pure aluminium, in
the case of sliding along the grain leads to the following
conclusions:
1. The logarithmic decrement δ_o (for the basic frequency)
increases with increasing temperature from a minimum
Card 2/4 value (at 25^oC) to a maximum value (at 285^oC) and,

SOV/126-6-3-20/32

On the Problem of Damping Oscillations of a Cylindrical Specimen

following that, drops to zero (294°C); the magnitude of the harmonics will also increase with increasing temperature.

2. Individual harmonics are not damped equally; the higher harmonics are damped more slowly than the lower ones. However, this does not change the values in view of the fact that scattering of the energy caused by the harmonics represents only a fraction of a percent of the energy dissipated by the oscillation of the rod.

Thus, the assumption that metallic specimens represent a relaxation medium is to some degree borne out by experiment but there is no satisfactory quantitative agreement with experimental results, particularly at low and at elevated temperatures. To some extent this is understandable since it was assumed that a single relaxation time applies to the sliding along the grains, and also other relaxation phenomena were ignored. However, even if the various relaxation phenomena (except the migration of the atoms in the stress field, Refs 6-14) and the existence of a time spectrum of relaxation for the

Card 3/4   sliding along the grain boundaries are taken into

SOV/126-6-3-20/32

On the Problem of Damping Oscillations of a Cylindrical Specimen

consideration, the sharp increase in the internal friction at elevated temperatures cannot be explained. The first attempt at elucidating this sharp increase of the internal friction at elevated temperatures was made in an earlier paper of the author (Ref 6) and a more detailed investigation of this problem will be the subject of later work. There are 18 references, 10 of which are Soviet, 6 English, 1 German, 1 French.

ASSOCIATION: Kemerovskiy gosudarstvennyy pedagogicheskiy institut (Kemerovo State Pedagogic Institute)

AVAILABLE: November 19, 1956

1. Cylindrical bodies--Oscillations   2. Oscillations--Control
3. Oscillations--Temperature factors   4. Oscillations--Theory

Card 4/4

POSTNIKOV, V. S

reports presented at Conference on
Relaxation Phenomena in Pure Metals and Alloys
(Inter-vuz) 2-4 Apr 1958. Moscow Inst. of Steel.

SOV-3-58-9-25/36

~~gave information on the application of the thermodynamics of non-balanced conditions.~~ V.S. Postnikov (Kemerovskiy peda-gogicheskiy institut - Kemerovo Pedagogical Institute) dealt in his report with questions of the internal friction of plastic deformed metals and alloys under increased tempera-tures. G.S. Pisarenko and ,V.V. Khil'chevskiy (Kiyev Poly-technic Institute and Institute of Metallo-Ceramics and Special Alloys UkrSSR AS) told the conference about a method of experimental examination of the energy dissipation in materials. A.A. Sazonova and K.F. Starodubov (Dnepropetrovsk Metallurgical Institute) reported on studies into the in-fluence of annealing temperature after hardening, and iso-thermic hardening during the subsiding of oscillations in silicon spring steel. The report of M.F. Alekseyenko, Yu.V. Piguzov and L.S. Fedotova (Moscow Institute of Steel and the All-Union Institute of Aircraft Materials) was dedicated to the annealing friability of high-chromium steels and its in-fluence on internal friction. S.N. Polyakov (Institute of Ferrous Metallurgy UkrSSR AS) spoke on the influence of manganese and molybdenum on the solubility of carbon in alpha-iron and on the kinetics of the separation of carbon, by in-ternal friction, from a solid solution containing

~~Card 2/4~~

Vest. Vysshey Shkoly, 9, 72-73, 1958
(Piguzov, Yu. V.)

Postnikov, V.S.

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

Abs Jour : Ref Zhur - Fizike, No 3, 1957, No 6798

Author   : Postnikov, V.S., Belyayev, M.N.
Inst   : Kemerovskiy Pedagogical Institute, USSR
Title   : Internal Friction of Plastically Deformed Copper and Aluminum

Orig Pub : Fiz. metallov i metallovedeniye, 1956, 2, No 3, 504-508

Abstract : The low-frequency low-amplitude torsion oscillation method was
           used to investigate the change of internal friction in copper
           and aluminum as a function of the temperature (up to 640°)
           and of the time of isothermal soaking after a plastic de-
           formation. The activation heats (6100 cal/mol for copper and
           5900 cal/mol for aluminum), required to restore the internal
           friction of plastically deformed metals in isothermal
           soaking to the value of internal friction of the underformed
           metal, were determined. The value of the activation heat
           indicates that the restoration of the internal friction in
           the above experiments results from relaxation rather than
           from recrystallization.
Card   : 1/1

ORLOV, V.P.; POSTNIKOV, V.V.; SHIROBOKOV, M.Ya.

Evaluation of oxygen content of germanium and silicon films
obtained by vacuum spray coating. Zhur.fiz.khim. 39 no.10:2573-
2576 O '65.   (MIRA 18:12)

1. Gor'kovskiy issledovatel'skiy fiziko-tekhnicheskiy institut.
Submitted June 20, 1964.

Postnikov   V S.

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

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6798

Author   : Postnikov, V.S., Bolyayev, M.M.
Inst   : Komorovskiy Pedagogical Institute, USSR
Title   : Internal Friction of Plastically Deformed Copper and Aluminum

Orig Pub : Fiz. metallov i metallovedeniye, 1956, 2, No 3, 504-508

Abstract : The low-frequency low-amplitude torsion oscillation method was
used to investigate the change of internal friction in copper
and aluminum as a function of the temperature (up to 640°)
and of the time of isothermal soaking after a plastic de-
formation. The activation heats (5100 cal/mol for copper and
5900 cal/mol for aluminum), required to restore the internal
friction of plastically deformed metals in isothermal
soaking to the value of internal friction of the underformed
metal, were determined. The value of the activation heat
indicates that the restoration of the internal friction in
the above experiments results from relaxation rather than
from recrystallization.

Card   : 1/1

Internal friction of some pure metals as a function of tem-
perature. V. S. Postnik...

transformation in the temp. range used show a hysteresis
of the internal friction ...
which depend ...
having ... have a lower level of internal ... ener-
given temp. than metals melting ...
re ... of friction increase.   ) D. Cat .

MT

POSTNIKOV, V.S.

Dependence on temperature of the internal friction in certain
pure metals. Fiz.met.i metalloved. 4 no.2:344-351 '57.
(MLRA 10:8)

1.Kemerovskiy gosudarstvennyy pedagogicheskiy institut.
(Friction) (Metals--Testing) (Thermal analysis)

POSTNIKOV, V.V.

Clinical aspects of pulmonary paragonimiasis. Med.paraz. i paraz.
bol. 25 no.4:303-305 O-D '56.   (MIRA 10:1)
(LUNG DISEASES,
paragonimiasis (Rus))
(TREMATODE INFECTIONS,
paragonimiasis of lungs (Rus))

17(12)

SOV/177-58-5-24/30

AUTHOR: Postnikov, V.V., Lieutenant-Colonel of the Medical
              Corps

TITLE: A Case of Intolerance of Penicillin With a General
              Serious Reaction (Sluchay neperenosimosti penitsil-
              lina s obshchey tyazhëloy reaktsiey)

PERIODICAL: Voyenno-meditsinskiy zhurnal, 1958, Nr 5, pp 84-85
              (USSR)

ABSTRACT: A great many physicians, including D.V. Khovanskiy
              and S.A. Yakuner, have discussed the serious and
              even fatal complications caused by the administra-
              tion of penicillin. In this article, the author
              describes a serious general reaction to penicillin.
              Based on a case history, he concludes that immunity
              to penicillin may be one of the manifestations of
              an allergized organism, which had already formerly
              displayed a perverted reaction to the introduction
              of medicines or other allergens.

Card 1/1

L 36397-66   EWT(m)/T/EWP(t)/ETI   IJP(c)   JD

ACC NR: AP6018783   SOURCE CODE: UR/0070/66/011/003/0479/0480

AUTHOR: Loginova, R. G.; Kuznetsov, V. P.; Ovsyannikov, M. I.; Postnikov, V. V.

ORG: Gor'kiy Physicotechnical Institute (Gor'kovskiy fiziko-tekhnicheskiy institut)

TITLE: Properties of epitaxial layers of silicon grown by vacuum sublimation

SOURCE: Kristallografiya, v. 11, no. 3, 1966, 479-480

TOPIC TAGS: single crystal, epitaxial growing, vacuum sublimation, temperature depen-
dence, Hall constant, specific resistance, current carrier

ABSTRACT: Hall coefficients and specific resistivity measurements as functions of the
concentration and mobility of current carriers were studied in single crystal Si films
at temperatures ranging from 77° to 450°K. The thin films (50 to 200 µ) were produc-
ed by vacuum sublimation ($2 \cdot 10^{-7}$ mm Hg) on heated substrates (900° to 1200°C). Using
the above data, the transport coefficients for B and P impurities were calculated. The
films were n- and p-type, depending upon the source of the conductivity (B yielded p-
-type; P yielded n-type). The given temperature dependence for the concentration of
current carries in Si films was compared to the n- and p-type conductivity for publish-
ed data on Si single crystals. At equal impurity concentrations, the given Hall mobi-
lity of the current carriers in epitaxial films was close to the mobility measured in
Si single crystals for all temperatures (77°-450°K). Films of p-type conductivity had

UDC: 548.52 : 539.23

Card 1/2

POSTNIKOV, V.V.; SKOMOROVSKIY, Ya.Z.

Causes of damage to pipe in pipeline construction. Stroi. truboprov.
8 no.5:11-12 My '63.   (MIRA 16:5)

1. Trest Nefteprovodmontazh, Ufa (for Postnikov). 2. Vsesoyuznyy
nauchno-issledovatel'skiy institut po stroitel'stvu magistral'nykh
truboprovdov, Moskva (for Skomorovskiy).
                   (Pipelines--Design and construction)

POSTNIKOV, V.V.

Some problems of the assembly of structures at ground level.
Stroi. truboprov. 8 no.6:14-15 Je '63.   (MIRA 16:7)

1. Trest Nefteprovodmontazh, Ufa.
        (Pipelines--Buildings and structures)

POSTNIKOV, V.V.

Some problems of the assembly of structures at ground level.
Stroi. truboprov. 8 no.6:14-15   Je '63.   (MIRA 16:7)

1. Trest Nefteprovodmontazh, Ufa.
          (Pipelines—Buildings and structures)

S/0070/64/009/002/0300/0302

ACCESSION NR: AP4025002

AUTHOR: Postnikov, V. V.

TITLE: The role of the molecular composition of the flow of doping elements when obtaining films of germanium and silicon in vacuo

SOURCE: Kristallografiya, v. 9, no. 2, 1964, 300-302

TOPIC TAGS: doping, germanium, silicon, in vacuo, molecular composition, semi-conductor, diatomic molecule, tetratomic molecule, monatomic ion, defect, annealing, dissociation time, diffusion, autodiffusion, n-type semiconductor

ABSTRACT: The author believes that the properties of Ge and Si films obtained in vacuo depend fundamentally on the molecular composition of the flow of both impurity and fundamental components. To test this view he has measured dissociation times of diatomic and tetratomic molecules of impurities at 800 and 1200K. He has found that the dissociation time of donor molecules is greater than the time of formation of the film of Ge or Si during condensation (on the order of 1 sec). It is noted that the true dissociation energy of the impurity molecules adsorbed by Ge or Si will differ from the dissociation energy obtained for gaseous molecules.

Card 1/2

ACCESSION NR: AP4025002

In this case the dissociation time when the temperature of the substrate is on the order of 400C is comparable to the time of formation of the Ge or Si film during condensation. The preserved complexes will doubly affect the properties of the semiconductor film. They will change the electrical characteristics, as compared with monatomic ions, and they will produce a large number of defects. At temperatures of 400C for Ge and 900C for Si, when diffusion of impurities and autodiffusion of either Ge or Si are absent, annealing of such defects becomes impossible. It follows, then, that monatomic flow of the donor impurity at the same time it is condensing is a necessary condition for producing a completely doped layer of n-type Ge or Si. Orig. art. has: 1 table and 4 formulas.

ASSOCIATION: Gor'kovskiy issledovatel'skiy fiziko-tekhnicheskiy institut Gor'kovskogo gosudarstvennogo universiteta im. N. I. Lobachevskogo (Gorkiy Research Physicotechnical Institute, Gorkiy State University)

SUBMITTED: 13Jun63

SUB CODE: PH

DATE ACQ: 16Apr64

NO REF SOV: 002

ENCL: 00

OTHER: 005

Card 2/2

POSTNIKOV, V.V.

Rapid method for assemblying pipelines and compressor station
equipment. Stroi. truboprov. 10 no. 11:19-20 N '65.

(MIRA 18:12)

1. Trest Nefteprovodmontazh, Ufa.

L 64788-65   E/A(c)/E/T(1)/E/T(m)/E/P(i)/E/P(b)/T/E/P(t)   IJP(c)   GG/JD

ACCESSION NR: AP5018734   UR/0070/65/010/004/0585/0586
                                           549.522:539.23

AUTHORS: Postnikov, V.V.; Loginova, R.G.; Ovsyannikov, M.I.

TITLE: Application of the magnetic moment in ferromagnetic films to continuously rotating elements of computers

SOURCE: Kristallografiya, v. 10, no. 4, 1965, 585-586

TOPIC TAGS: germanium, etched crystal, crystal lattice dislocation

ABSTRACT: An estimate is made of the pressure and growth rate which should yield single-crystal silicon films. Using these estimates, layers of silicon on silicon were obtained at a pressure of less than 2×10^{-7} mm Hg and at growth rates of 3--20 μ/hr. The layers were obtained by evaporation of silicon from the solid state. The silicon samples were chemically polished. During growth the temperature of the substrate (1000--1250C) was kept constant. In the entire range of temperatures and growth rates single-crystal layers were obtained.

Card   1/2

L 64788-65

ACCESSION NR: AP5018734   6

Epitaxial layers of silicon were obtained at 1000C and a growth rate
of 20 μ/hr. The maximum thickness of the films which we obtained
was 50 μ. "V. M. Obolikshto took part in the work." Orig. art. has:
2 formulas and 1 figure.

ASSOCIATION: Gor'kovskiy issledovatel'skiy fiziko-tekhnicheskiy
institut (Gor'kiy Physicotechnical Research Institute)

SUBMITTED: 08Aug64   ENCL: 00   SUB CODE: SS

NR REF SOV: 002   OTHER: 004

Card 2/2

KONSTANTINOV, L.V.; YEFANOV, A.I.; POSTNIKOV, V.V.

Measurement of the frequency characteristics of an IRT-1000 type reactor by the oscillator method. Atom. energ. 15 no.4:332-334

(MIRA 16:10)

0 '63.