AUTHOR: . Shermergor, T.D.

TITLE: On the Theory of Relaxation Phenomena in Solids (K teorii relaksa-
tsionnykh yavleniy v tverdykh telakh).

PERIODICAL: Dokl. 7-y Nauchn. konferentsii, posvyashch. 40-letiyu Velikoy
Oktyabr'sk. sots. revolyutsii. Nr 2. Tomsk, Tomskiy un-t, 1957,
pp 68-69

ABSTRACT: The author develops a theory of the relaxation phenomena in solids.
In considering a nonhomogeneous, isotropic, unbounded elastic body,
the author utilizes a method of the thermodynamics of unbalanced con-
ditions proposed by Leontovich and developed by Finkel'shteyn and
Fastov in application to stress relaxation. The computations provide
formulae for the elastic moduli, the latter being determined from the
combination of all periods of relaxation. The connection existing be-
tween the formulae obtained and a generalized form of Hooke's law is
discussed.
V. N.

Card 1/1

SHERMERGOR, T.D.

Thermodynamic theory of elastic aftereffect. Izv. vys. ucheb.zav.;
Fiz. no.1:78-85 '58.   (MIRA 11:6)

1.Sibirskiy metallurgicheskiy institut imeni S. Ordzhonikidze.
                    (Elasticity)

SHERMERGOR, T.D., kand.fiz.-mat nauk

Effect of relaxation processes on the curve of plastic flow
of metals. Izv. vys. ucheb. zav.; chern. met. no.3:111-118 Mr
'58.   (MIRA 11:5)

1.Sibirskiy metallurgicheskiy institut.
            (Deformations (Mechanics))
            (Metals, Effect of temperature on)

2.1(8)

AUTHOR: Shermergor, T.D.   SOV/155-58-5-25/37

TITLE: On the Thermodynamic Description of Processes Being not in
            the State of Equilibrium

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye
            nauki,1958,Nr 5,pp 147 - 150 (USSR)

ABSTRACT: The author shows that the usual relaxation relations

$$A = \overline{A} + \langle \phi , \dot{a} \rangle ,$$

where $\overline{A}$ is the value of the column matrix A corresponding
to the equilibrium, $\dot{a}$ a known function of time, $\phi \equiv$
$\equiv \exp(-St)F$, F a rectangular $(n + m - k) \times k$ - matrix ,
S a quadratic $(n + m - k) \times (n + m - k)$ - matrix and

$$\langle \phi , \dot{a} \rangle \equiv \int_0^t \phi (t - \tau)\dot{a}(\tau)d\tau$$

can be derived from the equation

$$J_i = L_{ik} X_k$$

Card 1/2

On the Thermodynamic Description of Processes   SOV/155-58-5-25/37
Being not in the State of Equilibrium

for stationary processes, where X_i are forces, J_i the currents
and $\|L_{ik}\|$ is a symmetric matrix according to Onsager. Some
examples are given.
There are 7 references, 6 of which are Soviet, and
1 American.

ASSOCIATION: Sibirskiy metallurgicheskiy institut (Siberian Metallurgical
Institute)

SUBMITTED: July 21, 1958

Card 2/2

AUTHOR: Shermergor, T. D.   SOV/126-6-6-16/25

TITLE: On the Theory of Relaxational Phenomena in Solid Bodies (K
         teorii relaksatsionnykh yavleniy v tverdykh telakh)

PERIODICAL: Fizika metallov i metallovedeniye, 1958, Vol 6, Nr 6,
         pp 1077-1080 (USSR)

ABSTRACT: Theoretical investigations of relaxation of stresses and
         deformations in solids are usually generalizations of Hooke's
         law or they use the Boltzmann theory of elastic after-effects
         or thermodynamics of non-equilibrium processes. The thermo-
         dynamic method is the most general. It was applied by the
         author to calculated stress tensor for a non-uniform isotro-
         pic unbounded solid. The author shows that, in general, the
         dynamic values of elastic moduli are determined by a spectrum
         of relaxation times. The paper is entirely theoretical. There
         are 8 Soviet references.

ASSOCIATION: Sibirskiy metallurgicheskiy institut im.S.Ordzhonikidze
         (Siberian Metallurgical Institute im. S. Ordzhonikidze)

Card 1/1

AUTHOR: Shermergor, T. D.   57-28-3-28/33

TITLE: On the Thermodynamic Theory of Relaxation Processes (K termo=
               dinamicheskoy teorii relaksatsionnykh protsessov)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 3, pp. 647-654
               (USSR)

ABSTRACT: A relation between the strain and deformation of a heterogeneous
               isotropic elastic body is found here. The investigation is per=
               formed according to reference 3 by Finkel'shteyn and Fastov, only
               the temperature is considered variable. The heterogeneous body
               is subdivided into so many N-domains that within each domain the
               medium may be considered homogeneous. For marking the instanta=
               neous deviation of the system-state from the equilibrium position
               the relaxation tensor $\xi_{ik\nu}$ for each domain is introduced. The

               equilibrium value of the relaxation tensor should be $\tilde{\xi}_{ik\nu}$. Then

Card 1/2 $\xi_{ik\nu} - \tilde{\xi}_{ik\nu} = \zeta_{ik\nu}$

On the Thermodynamic Theory of Relaxation Processes   57-28-3-28/33

has a simple physical meaning: it is the additional deformation
which must instantaneously be given to the investigated body-
element, in order to put it into the equilibrium state. The diffe=
rent elements are expressed by different relaxation tensors and
to each tensor corresponds its relaxation time. - The computation
of the strain- and of the deformation-tensor for a heterogeneous
isotropic body according to the method of the non-equilibrium
states of thermodynamics is performed. The equations (27) for
the strain- and the deformation-tensor are derived and compared
with Boltzmann's superposition principle for creeping and for
relaxation. It is shown that the formula (27) agrees with one
of the forms of Boltzmann's principle. On the other hand the
general form of Hooke's law follows from (27). Summarizing, the
author states that in the presence of the relaxation-time-spectrum
the general Hooke's law becomes too cumbersome (derivations of
N-th degree occurring, whereas the integral-relations of thermo-
dynamics (27) are considerably more convenient for the solution
of various problems.
There are 8 references, all of which are Soviet.

ASSOCIATION: Stalinsk. Sibirskiy metallurgicheskiy institut im. S. Ordzhonikidze
              (Stalinsk Siberian Metallurgical Institute imeni S. Ordzhonikidze)

SUBMITTED: June 8, 1957.

Card 2/2   1. Elastic shell—Thermodynamic properties   2. Elastic shell
             —Stresses

SHERMERGOR, T.D., kand. fiz.-mat. nauk, dotsent

Cyclic deformation of solids with elasticity-toughness properties.

(MIRA 12:7)

1.Sibirskiy metallurgicheskiy institut. Rekomendovana kafedroy
fiziki Sibirskogo metallurgicheskogo instituta.
(Deformation (Mechanics))
(Elasticity)

SOV/126-7-1-22/28

AUTHOR: Shermergor, T. D.

TITLE: Absorption of Energy by Steel in Plastic Compression
(Pogloshcheniye energii stal'yu pri plasticheskom szhatii)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1959, Vol 7, Nr 1,
pp 146-150 (USSR)

ABSTRACT: The latent energy of two types of steel has been experimentally
determined.   The specimens for compression were cylindrical:
17 mm diameter and 25 mm high,   20 mm diameter and 30 mm high,
and 13 mm diameter and 20 mm high.   The last were used for
control purposes.   Prior to testing, the specimens were
annealed in iron filings at 800°C for 3 hours.   A study
of microsections showed that no carburization of the surface
of the specimens had occurred.   Compression was carried out
in an Amsler press.   In order to avoid bending of the
specimen, a sleeve was used, which was lined with heat
insulators, and supporting plates made from steel 40KhN,
35 x 6 mm.   The surface of the supporting plates was
polished and the ends of the specimen ground.   Compression
was carried out in stages.   Deformation was carried out
statically at a rate of 5% per minute.   This made it
Card 1/5 possible for the flow curve to be taken down by means of

SOV/126-7-1-22/28

Absorption of Energy by Steel in Plastic Compression

simultaneous load and deformation readings.   The accuracy
was within   0.01 mm, which was confirmed by special control
experiments - simultaneous visual reading and photographing,
using a high sensitivity film at 0.01 sec   exposure.   The
temperature was taken by a copper-constantan thermocouple.
One end of the thermocouple was welded into the steel
supporting plate; whilst the cold junction was welded into
a 20 mm diameter steel specimen.   The voltage was trans-
mitted through a wire from the thermocouple to a mirror
galvanometer, which enabled the temperature to be registered
on a revolving drum (1 revolution - 7 minutes).   A typical
temperature curve is shown in Fig.1.   Here, the system is
heated, as a result of deformation, to a maximum, after which
it cools under load, and finally cools adiabatically as the
result of unloading (sharp drop of the curve).   Calibration
of the thermocouple by means of a metastatic thermometer has
shown that the points lie on a straight line.   The energy,
δE, absorbed in this stage was found as the difference
between the work of plastic deformation of this stage, δA,
and the heat given out, δQ.   The work δA was determined
Card 2/5   by planimetering the diagram of forces.   In the calculation

SOV/126-7-1-22/28

Absorption of Energy by Steel in Plastic Compression

of δQ the thermal capacity of the system was determined, as well as the rise in temperature due to plastic deformation. Special precautions were taken to prevent errors. The temperature calculation was carried out by a method suggested by M.A. Bol'shanina (Ref.7) and perfected by Benyakovskiy (Ref.8). The latter obtained the following formula for the differential temperature:

$$T = T_1 + (T_2 - T_3)\frac{S_1}{S_3} - \Delta T - T_e$$

where T_1 (see Fig.1) is the maximum temperature of the specimen towards the end of plastic deformation. The second term takes into account a correction for heat removal during deformation. This correction is proportional to the area S_1. $(T_2 - T_3)/S_3 = \alpha$ is a constant for the rate at which the temperature of the system and the medium evens out. The third term gives a correction for a possible unsteady galvanometer reading and an uneven heating of the system. The last term gives a correction for an elastic adiabatic heating. ΔT and T_e are calculated from

Card 3/5

SOV/126-7-1-22/28

Absorption of Energy by Steel in Plastic Compression

as a function of deformation are shown.   The dependence of
the entire absorbed energy on the work of deformation is
shown in Fig.3.   In Fig.4 the dependence of the entire absorbed
energy on true deformation is shown.   In Fig.5 the dependence
of the differential absorbed relative energy on true deform-
ation is shown.   The author concludes that at small degrees
of deformation, owing to the smallness of the entire absorbed
energy, relaxation processes do not play an important part.
Processes responsible for the hardening of material are most
important.   In the case of large deformations, however,
further deformation is accompanied by intense relaxation
processes which level out the processes of hardening, and the
absorbed energy decreases.   There are 5 figures and 11
references, of which 8 are Soviet, 2 English and 1 Japanese.

ASSOCIATION: Sibirskiy metallurgicheskiy institut (Siberian Metallurgical
           Institute)
SUBMITTED: March 13, 1957 (initially) and
           April 15, 1957 (after shortening)

Card 5/5

SHERMERGOR, T.D. (Stalinsk)

Dispersion correlations for elasticity and pliability. PMTF
no.1:96-102 My-Je '60.   (MIRA 14:8)
                        (Elasticity)

SHERMERGOR, T.D. (Stalinsk)

Relations between certain types of deformation. PMTF no.2:150-152
60.   (MIRA 14:6)
                        (Deformations (Mechanics))

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24.4100

S/139/60/000/03/034/045
E073/E335

AUTHOR: Shermergor, T.D.

TITLE: Calculation of the Distribution Function of Relaxation
Constants for Elastic-viscous Bodies

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika,
1960, No 3, pp 185 - 194 (USSR)

ABSTRACT: For calculating the distribution spectrum the author
starts off from the thermodynamic equation of non-
equilibrium mechanical processes, based on an earlier
paper of the author (Ref 3). Disregarding temperature
changes, this equation can be written thus (Refs 4,5):

$$\sigma_{ik} = \bar{\sigma}_{ik} + L\psi_{ik\ell m} * \dot{\varepsilon}_{\ell m} \qquad (1')$$

$$\varepsilon_{ik} = \bar{\varepsilon}_{ik} - L\psi'_{ik\ell m} * \sigma_{\ell m} \qquad (1'')$$

where σ_{ik} and ε_{ik} are respectively the stress and
strain tensors $\bar{\sigma}_{ik}$ and $\bar{\varepsilon}_{ik}$ are their equilibrium
values and $\psi_{ik\ell m}(s)$ and $\psi_{ik\ell m}(s')$ are the tensors of

Card1/2

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S/126/60/009/02/001/033
E031/E335

AUTHOR: Shermergor, T.D.

TITLE: The Calculation of the Distribution Functions of Relaxation
            Times for Elastic After-effect 26

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 2,
            pp 161 – 168 (USSR)

ABSTRACT: Relaxation relations governing the relation of stress and
            deformation tensors obtained with the aid of irreversible
            thermodynamic processes are extended to the continuous
            relaxation spectrum. Expressions are deduced by which
            the distribution functions of relaxation times can be
            calculated from the experimental curves $\sigma(t)$ and
            $\varepsilon(t)$ for a number of time dependencies. In the elastic
            deformation of real bodies relaxation processes can have
            different intensities and so real bodies possess
            relaxation spectra. To find the relation between the
            characteristics of the spectrum and the mechanical
            properties expressions for the stress and deformation
            tensors which are obtained with the aid of irreversible
            thermodynamics/are used, the variation of temperature
            processes
Card1/4   being ignored. These expressions are generalized and

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S/126/60/009/02/001/033
E031/E335

The Calculation of the Distribution Functions of Relaxation Times
for Elastic After-effect

the passage to the limit is made. Further generalisation
to the case of a continuous spectrum introduces distri-
bution   functions for the relaxation times and
relaxation frequencies, in terms of which the above
tensors can be expressed. Before calculating the
distribution tensors for the relaxation frequencies, it
is shown that distribution tensors corresponding to the
stress tensor and the deformation tensor are not independent,
by considering the loading due to an impulse. The
relations obtained are illustrated for the case of a standard
linear body. The calculation of the distribution tensors
for the relaxation frequencies is illustrated by examples
in the first of which the tensor for the velocity of
deformation has an exponential form:

$$\dot{\varepsilon}_{\alpha}(t) = \varepsilon^{o}_{\alpha} \exp(pt) \ .$$

Card2/4

66020

S/126/60/009/02/001/033
E031/E335

The Calculation of the Distribution Functions of Relaxation Times
for Elastic After-effect

In the second example the velocity of deformation is
constant in the interval $(0, t_1)$, after which the
deformation is fixed:

$$\dot{\varepsilon}_{ik}(t) = \dot{\varepsilon}_{ik}^0 \left[1(t) - 1(t - t_1)\right] \qquad (29)$$

(where $1(t)$ is the unit step function) .
The distribution tensor for relaxation frequencies
can be determined from relaxation curves, which are
obtained experimentally but it must be remembered
that expressions derived are valid only for small
deformations, not taking the system beyond the elastic
limit. The corresponding cases to those above, when
the tensor for the velocity of stress (giving the
retardation spectrum) is taken instead of the tensor
for the velocity of deformation, are briefly considered.

Card3/4

16.7300   11 03, 1342

18200   2808, 4016

89699

S/139/61/000/001/007/018
E030/E435

AUTHOR: Shermergor, T.D.

TITLE: Calculation of the Distribution Function of Relaxation Constants in Terms of the Real Part of the Complex Elasticity for Visco-Elastic Solids

PERIODICAL: Izvestiya vysshikh uchebny zavedeniy, Fizika, 1961, No.1, pp.77-83

TEXT: A method is developed for calculating the distribution of relaxation times of visco-elastic solids from the frequency dependence of the real part of the elastic modulus.   As an example, the distribution is assumed to be

$$\frac{1}{2}(\text{th}\,\alpha x + 1)$$

where α and ω_0 are parameters and $x \equiv \ln\frac{\omega}{\omega_0}$, ω being the radian frequency.   This simplified distribution gives very good agreement with experimental results of Ke Tin-Suya on poly-crystalline aluminium, as shown in Fig.1 where the abscissa is χ where χ equals (χ_0 + x) and also equals

$$\ln\frac{\omega}{2\pi}\,a\,e^{U/RT}$$

Card 1/4

89699

Calculation of the Distribution ... S/139/61/000/001/007/018
E030/E435

The value of χ_0 giving the best fit to the data is 10.6.
U is the activation energy and T the absolute temperature. In
the general case, the relaxation spectrum is obtained by Fourier
decomposition from the modulus M at a radian frequency ω as
follows. The real modulus is given as

$$M'(\omega) - M^0 = \int_0^\infty \frac{\omega^2}{s^2 + \omega^2} \psi(s) \, ds \qquad (2)$$

where the form of $\psi(s)$ must be found. The value of $\frac{dH(x)}{dx}$
is calculated, called P(x), and transformed to

$$\bar{P}(u) = \bar{G}(u)\bar{F}(u) \qquad (8)$$

where

$$G(u) = \frac{1}{2} \int_{-\infty}^\infty \frac{e^{iut}}{ch^2 t} \, dt \qquad (9)$$

Card 2/4

Calculation of the Distribution ...   S/139/61/000/001/007/018
E030/E435

and the function $\overline{F}(u)$ so determined is then transformed back to $F(y)$. $F(y)$ gives the required distribution since it is shown that

$$H(x) = \int_{-\infty}^{\infty} K(x-y)F(y)dy \qquad (5)$$

where

$$K(x-y) \equiv \frac{1}{2}(th\{x-y\} + 1)$$

By taking first and second moments of the redistribution function $F(y)$, it is shown that the first moment is zero and the second is

$$\frac{\pi^2}{12} (\frac{1}{\alpha^2} - 1)$$

and it is also seen that $\omega_o = s_o$. Curves of the relaxation constant distribution for polycrystalline aluminium are evaluated and plotted. There are 2 figures and 7 references: 6 Soviet and 1 non-Soviet.

Card 3/4

30

AUTHORS: Meshkov, S.I., Shermergor, T.D. (Voronezh)

TITLE: On the temperature dependence of the internal friction
             of a torsional pendulum

PERIODICAL: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki,
             no.6, 1962, 98-104

TEXT: Assuming small oscillations, distortion of transverse
sections of the pendulum column as it twists can be neglected.
The equation for the oscillations is solved by using the integral
Laplace transform.   The form of the solution depends on the
character of the roots of a cubic equation the discriminant of
which can be written in the form

$$D_n = q_n^2 + m_n^3 .$$

Damped oscillations occur if D_n is greater than zero.   The
cases m_n greater than zero and m_n less than zero are considered.
If $D_n < 0$ the motion of the pendulum is aperiodic.   The
temperature dependence of internal friction is measured by the
tangent of the angle of phase shift between the stress and the
deformation.   It is shown that the expressions for the tangent
calculated from a rheological model and from the above solution
Card 1/2

On the temperature ...

S/207/62/000/006/016/025
E031/E492

almost completely coincide, so that for the analysis of
experimental data the rheological model can be used.   Both methods
give the same value of the temperature at which the oscillations
cease to be periodic and become aperiodic.   This temperature
depends on both the physical properties of the material of the
pendulum and on the geometry of the system.   There are 2 figures.

SUBMITTED: May 3, 1962

Card 2/2

SHERMERGOR, T.D.; MESHKOV, S.I.

Description of the background of internal friction during
torsional vibrations. Fiz. met. i metalloved. 13 no.6:817-822
Je '62.   (MIRA 15:7)

1. Voronezhskiy tekhnologicheskiy institut.
                        (Internal friction)

ACCESSION NR: AR4042232   8/0124/64/000/006/V033/V033

SOURCE: Ref. zh. Mekhanika, Abs. 6V245

AUTHOR: Shermergor, T. D.

TITLE: Temperature relaxation in solid bodies

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

TOPIC TAGS: absorption coefficient, temperature relaxation, irreversible process,
irreversible process thermodynamics, heat conduction equation

TRANSLATION: Gives a comparison of two calculation methods of absorption coef-
ficient, one of which is based on thermodynamics of irreversible processes, and the
other – on the use of heat-conduction equation. Considers propagation of a flat
longitudinal wave in an unlimited isotropic medium, in which the only relaxation
mechanism is thermal conduction. It is found that for high frequencies the wave is
isothermal, and for small – adiabatic; the propagation speed of these waves is
determined. Gives a comparison of considered temperature relaxation with behavior

Card 1/2

ACCESSION NR: AR4042232

of a standard linear body, expressions for adiabatic modulus of manifold compres-
sion, and relaxation time, caused by relaxation of heat flow in a longitudinal
wave. Expressions for internal friction, coefficient of absorption, and its
temperature part at low frequencies are obtained. For usual sonic and ultrasonic
frequencies the longitudinal wave can be considered adiabatic. A general expression
is given for stress tensors in the case when, in the considered frequency range,
there can also occur other relaxation processes (defects of moduli and relaxation
times determine the relaxation mechanism, which is not caused by thermal conduction).

SUB CODE: TD, ME   ENCL: 00

Card 2/2

ACCESSION NR: AR4043999   S/0058/64/000/006/E041/E041

SOURCE: Ref. zh. Fizika, Abs. 6E307

AUTHOR: Shermergor, T. D.

TITLE: The phenomenological theory of internal friction

CITEE SOURCE: Sb. Relaksats. yavleniya v met. i splavakh. M., Metallurgizdat, 1963, 33-39

TOPIC TAGS: internal friction, thermodynamic theory, irreversible process, nonequilibrium stress tensor, deformation, isotropic medium

TRANSLATION: On the basis of the thermodynamic theory of irreversible processes there is obtained an expression for the nonequilibrium stress tensor during small deformations of a uniform isotropic medium. It is proposed that in the medium is active only one relaxation mechanism (diffusion, grain-boundary, dislocation, etc.). The obtained expression is generalized for the case of a heterogeneous medium (for simplicity, calculations are given only for the stress deviator). There is given a calculation of the relaxation-time spectrum.

SUB CODE: SS, TD   ENCL: 00

Card 1/1

SHERMERGOR, T.D.

Third all-Union interuniversity conference on relaxation
phenomena in metals and alloys. Izv. vys. ucheb. zav; fiz.
no.1:176 '63.   (MIRA 16:5)

1. Voronezhskiy gosudarstvennyy universitet.
                        (Metals—Congresses)

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

High-temperature internal friction in the case of longitudinal os-
cillations. PMTF no.3:20-25 My-Je '63.   (MIRA 16:9)
            (Thermodynamics) (Irreversible processes)

L 13001-65   EWT(m)/EWP(w)/EWA(d)/EWP(t)/EWP(b)   JD   S/0058/64/000/007/E033/E033
ACCESSION NR: AR4046008

SOURCE: Ref. zh. Fizika, Abs. 7E246

AUTHORS: Shermergor, T. D.; Meshkov, S. I.

TITLE: Phenomenological description of high-temperature internal friction

CITED SOURCE: Sb. Relaksats. yavleniya v. met. i splavakh. M.,
Metallurgizdat, 1963, 46-52

TOPIC TAGS: internal friction, shear stress, shear resistance,
torsion, stress relaxation, model theory

TRANSLATION: A physical analysis of the models used for a pheno-
menological description of high-temperature internal friction (IF)
is presented. Rheological models are considered and it is shown
that in spite of their simplicity and clarity, they cannot be recom-

Card 1/2

L 13001-65
ACCESSION NR: AR4046008   0

mended for the calculation of the temperature dependence of IF. It
is found that in order to describe IF in a region situated suffi-
ciently far from the point of transition to aperiodicity, use can
be made of a rheological model; at higher temperatures it becomes
necessary to solve the boundary problem on the basis of the general
equation for the stress tensor. The IF background is due to relaxa-
tion of the shear stresses, while the relaxation of the body stress-
es produces only an IF peak. The shear deformations take place
under both torsional and longitudinal or flexural oscillations, so
that the IF background should appear also in these types of damped
oscillations.

SUB CODE: SS, MM   ENCL: 00

Card   2/2

MESHKOV, S. I. (Voronezh); POSTNIKOV, V. S. (Voronezh); 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:')

L 17117-65   EWT(m)/EWP(b)/EWP(t)   SSD/ASD(m)-3/AFWL   JD

ACCESSION NR: AP5000643   S/0181/64/006/012/3502/3508

AUTHOR: Turkov, S K.; Shermergor, T. D.

TITLE: Internal friction in the interaction between impurity atoms and edge dislocations

SOURCE: Fizika tverdogo tela, v. 6, no. 12, 1964, 3502-3508

TOPIC TAGS: dislocation study, dislocation motion, internal friction, impurity movement, edge dislocation

ABSTRACT: The authors calculate the internal friction due to the diffusion of impurity atoms in the stress field of an edge dislocation that executes harmonic oscillations in the slip plane under the influence of an external force. An oscillation amplitude averaged over the dislocation length is used to simplify the calculations, and inertial forces are neglected. The frequency and concentration dependences of the internal friction due to this mechanism are investigated and no limitation is imposed on the impurity concentration. The results show that the dependence of the internal friction on the impurity concentration and on the free length of the dislocation is more complicated than obtained by

Card 1/2

L 17117-65
ACCESSION NR: AP5000643

J. O. Kessler (Phys. Rev. v. 106, 654, 1957). At large impurity concentrations the internal friction is inversely proportional to the concentration and does not depend on the free dislocation length. In the case of low concentrations and for high frequencies the results are close to those of Kessler. At very high frequencies, account must be taken of the inertial forces. Orig. art. has: 3 figures and 28 formulas.

ASSOCIATION: Voronezhskiy politekhnicheskiy institute (Voronezh Polytechnic Institute).

SUBMITTED: 21Apr64   ENCL: 0?

SUB CODE: SS   NR REF SOV: 002   OTHER: 004

Card 2/2

DARINSKIY, B.M.; SHERMERGOR, T.D.

Temperature relaxation in cubic structure polycrystals. Fiz.met.
i metalloved. 18 no.5:645-653 N '64. (MIRA 18:4)

1. Voronezhskiy politekhnicheskiy institut.

L 7082-66   EWT(m)/T/EWP(t)/EWP(b)/EWA(c)   JD

ACC NR: AP5027274   SOURCE CODE: UR/0207/65/000/005/0084/0089

AUTHORS: Darinskiy, B. M. (Voronezh); Shermergor, T. D. (Voronezh)

ORG: none

TITLE: On the theory of diffusion relaxation in polycrystals

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 5, 1965, 84-89

TOPIC TAGS: solid state, polycrystal, diffusion relaxation, crystal

ABSTRACT: This paper is an extension of the theory of diffusion relaxation in poly-
crystals, first proposed by K. Ziner (Sb. "Uprugost' i neuprugost' metallov" Izd.
inostr. lit., 1954). The authors present an exact calculation of the intensity of
the relaxation process in polycrystals of arbitrary crystallographic symmetry by
taking into account pair correlation of K. Ziner between crystal nuclei. Calcula-
tions are based on the set of equations which describe an elastic-diffusion system

$$\nabla_l D_{lk} \nabla_k c - \frac{\partial c}{\partial t} - \frac{V_0}{RT} \nabla_l c D_{lk}{}^\circ \nabla_k b_{lm} u_{lm} = -q \qquad (1.1)$$

$$\nabla_k \lambda_{lklm} u_{lm} - \nabla_k b_{lk} c = -f_i \qquad (1.2)$$

$$c = n/N, \qquad b_{lk} = \partial \sigma_{lk}/\partial c = \lambda_{lklm}\gamma_{lm}, \qquad \gamma_{lm} = \partial \varepsilon_{lm}/\partial c \qquad (1.3)$$

$$D_{lk} = D_{lk}{}^\circ \left(1 + \frac{\beta V_0}{RT} c\right), \qquad \beta = \lambda_{lklm}\gamma_{lk}\gamma_{lm}, \qquad \varepsilon_{lm} = \tfrac{1}{2}(u_{lm} + u_{ml}).$$

Card 1/2

L 7082-66

ACC NR: AP5027274

Here c is the concentration of impurity atoms, n and N the number of impurity atoms and total atoms per unit volume respectively, D_{ik} - coefficient of diffusion, D_{ik}^o its value at $c \to 0$, b_{ik} and γ_{ik} - concentration tension and deformation tensors respectively, V_o - the molar volume, R - the gas constant $u_{ik} = u_{i,k}$ - distortion tensor, u - the displacement vector, ε_{ik} - deformation tensor, q - strength of impurity atoms source, and f - force density. The authors derive expressions for: a) the degree of relaxation (first order approximation), b) complete defects in the moduli for overall compression and shear, and c) the time relaxation distribution function. The derived expressions are applied to the system Fe - C containing 4.5% at 1250C. The calculations for this system yield the degree of relaxation $\frac{\Delta\mu}{\mu} =$ 1.5 x 10^{-3} and D = 3.2 x 10^{-6} sec/cm^2. For crystallites of $\sim$ 10^{-3} cm diameter, the peak of inner friction corresponds to a frequency of $\sim$ 1 cycle/sec. A derivation for ascending diffusion for a nonhomogeneous anisotropic medium is appended. Orig. art. has: 42 equations.

SUB CODE: GC/ SUBM DATE: 13Dec64/ ORIG REF: 010/ OTH REF: 003

nw

Card 2/2

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

Temperature dependence of the damping ratio of a standard linear body.
Izv. AN SSSR. Mekh. no.5:103-106 S-O '65.   (MIRA 18:10)

L 3344-66   EWT(1)/EWT(m)/T/EWP(t)/EWP(b)/EWA(c)   IJP(c)   JD/JG/GG

ACCESSION NR: AP5017299   UR/0181/65/007/007/2064/2069

AUTHORS: Turkov, S. K.;   Shermergor, T. D.

TITLE: Internal friction in a face-centered cubic lattice, due to reorientation of bivacancies

SOURCE: Fizika tverdogo tela, v. 7, no. 7, 1965, 2064-2069

TOPIC TAGS: internal friction, crystal lattice structure, crystal vacancy

ABSTRACT: The purpose of the paper was to calculate theoretically the internal friction produced by the reorientation of bivacancies in an external field, and to investigate the peculiarities of the internal-friction peak produced by these bivacancies. The authors determine the kinetics of the internal friction due to the change in the concentration of the bivacancies having a specified orientation under the influence of applied external stresses. Is is shown that the width of the bivacancy internal-friction peak depends essentially on the orientation of the crystallographic axes relative to the ap-

Card   1/2

L 3344-66

ACCESSION NR: AP5017299

plied stress. The amount of lattice distortion is calculated to estimate the magnitude of the relaxation peak. It is shown that the reorientation of the bivacancies is characterized in general by two relaxation times, differing by a factor of approximately 1.5. The results are compared with experiment for copper, silver, and gold. It is concluded that to reconcile the experimental and theoretical data it is necessary to assume that during the quenching an appreciable part of the vacancies condenses into bivacancies. Orig. art. has: 20 formulas and 1 table.

ASSOCIATION: Voronezhskiy politekhnicheskiy institut (Voronezh Polytechnic Institute)

SUBMITTED: 18Jan65   ENCL: 00   SUB CODE: SS

NR REF SOV: 000   OTHER: 006

Card 2/2

TURKOV, S.K.; SHERMERGOR, T.D.

Effect of the stress tuning on the high-temperature background of internal friction. Fiz. tver. tela 7 no.10:2952-2957 O '65.
(MIRA 18:11)

1. Voronezhskiy politekhnicheskiy institut.

L 23677-66   EWT(m)/T/EWP(t)   IJP(c)   JD

ACC NR: AR6005218   SOURCE CODE: UR/0058/65/000/009/E057/E058

AUTHOR: Meshkov, I. S.; Shermergor, T. D.

TITLE: On the description of the internal friction in solid bodies with the aid of rheological models

SOURCE: Ref. zh. Fizika, Abs. 9E489

REF SOURCE: Izv. Voronezhsk. gos. ped. in-ta, v. 44, 1964, 116-123

TOPIC TAGS: internal friction, rheologic property, shear stress, relaxation process, elastic deformation, hydrostatic pressure

TRANSLATION: It is shown on the basis of an analysis of experimental results that to describe the relaxation of shear stresses it is necessary to use a rheological model of the Maxwellian type, and for bulk stresses the model of standard linear body (with a single relaxation time). Expressions are obtained for the internal friction (IF) and the dynamic moduli under shear and bulk deformations, and also for the case of a tension-compression deformation. In the latter case the form of the dependence, and consequently also the form of the dependence of IF, is determined by the ratio of the relaxation times, corresponding to the shear and to the hydrostatic compression. Certain generalizations are made for more complicated rheological models. V. Verner

SUB CODE: 20

Card 1/1 FV

L 26622-66   EWT(1)/EPF(n)-2/ETC(m)-6   IJP(c)   WW

ACC NR: AP5025371   SOURCE CODE: UR/0181/65/007/010/2952/2957

AUTHOR: Turkov, S. K.; Shermergor, T. D.

ORG: Voronezh Polytechnic Institute (Voronezhskiy politekhnicheskiy institut)

TITLE: The effect of stress distribution on high-temperature noise due to internal friction

SOURCE: Fizika tverdogo tela, v. 7, no. 10, 1965, 2952-2957

TOPIC TAGS: internal friction, metal, stress distribution, crystal vacancy

ABSTRACT: The high temperature element of internal friction of metals represents a series of peaks superposable on a curve growing monotonically with an increase in temperature. The high temperature noise caused by vacancy diffusion between block boundaries or crystal grains was calculated. Unlike the similar Escaig calculation the possibility of stress redistribution caused by the irregularity of diffusion currents is considered. This leads to a considerable increase in noise in the mean frequency ranges. With low frequencies of ω internal friction in both cases $\sim \frac{1}{a}$, with high frequencies $-\sim \frac{1}{\sqrt{\omega}}$. Orig. art. has:

Card 1/2

L 26622-66

ACC NR: AP5025371

2 fig. and 29 formulas.

SUB CODE: 20,11/ SUBM DATE: 12Apr65/ ORIG REF: 005/ OTH REF: 004

Card 2/2

L 41725-66   EWT(1)/EWT(m)/T/EWP(t)/ETI   IJP(c)   JD/JW/GG

SOURCE CODE: UR/0181/66/008/006/1670/1676

ACC NR: AP6018524

AUTHOR: Turkov, S. K.; Shermergor, T. D.

ORG: Voronezh Polytechnic Institute (Voronezhskiy politekhnicheskiy institut)

TITLE: Effect of screw dislocations on the internal friction of para-elastic bodies

SOURCE: Fizika tverdogo tela, v. 8, no. 6, 1966, 1670-1676

TOPIC TAGS: crystal dislocation phenomenon, internal friction, crystal vibration, elasticity theory, elastic modulus, crystal lattice distortion

ABSTRACT: In view of the fact that the mechanism of vibration-dislocation energy dissipation by the elastic-polarization cloud produced in para-elastic bodies, the authors calculate the internal friction due to the deceleration of vibrating screw dislocations by relaxation of their stress fields in a medium possessing properties of a standard linear body. It is assumed that the elastic polarization of the medium is the only effective damping mechanism. The screw dislocations are assumed to vibrate under the influence of periodic external stresses and the amplitudes of their oscillations are considerably smaller than the distances between the oscillation nodes. The relation between the internal friction of this type and the defect of the modulus of the medium or the amplitude of the applied stress is determined and it is shown that the ratio of the height of the dislocation peak to the peak of the dislocation-free body decreases both with increasing defect of the modulus of the medium, and with increasing amplitude of the applied stress. The results are found to be similar to

Card 1/2

S/081/62/000/018/048/059
B160/B186

AUTHORS: Vizel', A. O., Shermergorn, I. M., Tyulenev, S. S.

TITLE: Synthesis of polyethylene terephthalate

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 18, 1962, 503,
            abstract 18P62 (In collection: Materialy 1-y
            Konferentsii molodykh nauchn. rabotn. g. Kazani, 1959.
            Sekts. khim. Kazan', 1960, 27-34)

TEXT: Ways of reducing the amount of glycol brought into the reaction and
of replacing purified N_2 by commercially pure N_2 or air were investigated
in order to develop a technology for the production of polyethylene
terephthalate (PETP) using terephthalic acid dimethyl ester (DMT) as the
raw material. These investigations proved that the consumption of
ethylene glycol can be reduced (from three mols to two) by introducing the
DMT part at a time, and that it is possible to use commercially pure N_2
or air (instead of purified N_2), triphenyl phosphate (I) at the rate
of 0.4-3% of the DMT being used as the antioxidant. The relation of the

Card 1/2

Synthesis of polyethylene ...

S/081/62/000/018/048/059
B160/B186

reaction rate and quality of the product obtained to the amount of I introduced was studied (the optimum amount of I being 0.75% of the amount of DMT). A new solvent (40% phenol and 60% dichlorethane), which has good solvent ability at about 20°C, was found for determining the molecular weight of the PETP from the viscosity and for fractionation of the polymer. [Abstracter's note: Complete translation.]

Card 2/2

KUZNETSOV, Ye.V.; VIZEL', A.O.; SHERMERGORN, I.M.; TYULENEV, S.S.

Relation between the molecular weight of polyethylene terephthalate and the viscosity of its solutions in a mixture of phenol and dichloroethane. Vysokom. soed. 2 no.2:205-209 F '60.   (MIRA 13:11)

1. Kazanskiy khimiko-tekhnologicheskiy institut.
                (Terephthalic acid)

KUZNETSOV, Ye.V.; SHERMERGORN, I.M.; BELYAYEVA, V.A.

Synthesis of polyesters based on trivalent phosphorus acids by condensation polymerization at the interface. Trudy KKHTI no.30: 70-76 '62.

(MIRA 16:10)

KUZNETSOV, Ye.V.; VIZEL', A.O.; TYULENEV, S.S.; SHERMERGORN, I.M.

Stabilization of polyethylene terephthalate. Trudy KKHTI no.30:
82-88 '62.
(MIRA 16:10)

ACCESSION NO: AP4009146   S/0190/64/006/001/0031/0033

AUTHORS: Kuznetsov, Ye. V.; Gil', A. P.; Shermergorn, I. M.; Kuznetsova, S. F.

TITLE: Synthesis of polyesters and polyamides on the basis of nitrophthalic acids
by interfacial polycondensation

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 6, no. 1, 1964, 31-33

TOPIC TAGS: synthesis, polyester, polyamide, polycondensation, interfacial poly-
condensation, nitrophthalic acid, dichlorides of nitrophthalic acids, terephthalic
acid

ABSTRACT: Solutions containing 0.2 Mol/liter of dichlorides of terephthalic-,
nitroterephthalic-, 4-nitrophthalic-, and 3-nitrophthalic acids in n-xylene were
reacted with aqueous solutions of 2,2-di-(4-oxyphenyl)propane (OPP) or hexamethyl-
enediamine (HMD) of the same molar concentration in the presence of 0.45 Mol/liter
of NaOH. The synthesis was conducted in a flask, with 10 minutes of energetic
mechanical stirring. Following this, the obtained polyesters or polyamides were
separated by filtration, washed with water, and dried to constant weight. The
yield of the polyesters, obtained by the interaction of the dichlorides of nitro-
terephthalic and 4-nitrophthalic acids with OPP amounted to 86.8 and 36%, their

Card   1/2

ACCESSION NO: AP4009146

respective specific viscosities for 0.5% solutions in tricresol averaging 0.072
and 0.019. As to the polyamides synthesized from the dichlorides of nitrotereph-
thalic-, 4-nitrophthalic-, and 3-nitrophthalic acids with HMD, their yields amounted
to 88.0, 84.2, and 76.6%, with respective specific viscosities of 0.5% solutions in
concentrated sulfuric acid averaging 0.352, 0.280, and 0.223. The higher yields
and viscosities registered in the polyesters derived from the dichloride of nitro-
terephthalic acid as compared with the ones obtained on the basis of the dichloride
of 4-nitrophthalic acid is attributed by the authors to the fact that the latter
ingredient has its nitro group located in a meta-position in respect to the chloride
group. A similar trend, although on a less pronounced scale, was observed in poly-
condensation products of dichlorides of nitrophthalic acids with HMD. Orig. art.
has: 2 tables.

ASSOCIATION: Kazanskiy khimiko-tekhnologicheskiy institut im. S. M. Kirova (Kazan
Chemical-Technological Institute)

SUBMITTED: 07Jul62   DATE ACQ: 10Feb64   ENCL: 00

                            NO REF SOV: 006   OTHER: 003
SUB CODE: CH

Card   2/2

A   L 11522-66   EWT(m)/EWP(j)   RM
SOURCE CODE: UR/0190/65/007/012/2156/2159

ACC NR: AP6001872

AUTHORS: Shermergorn, I. M.; Kamardin, Yu. B.

ORG: Institute for Organic Chemistry, AN SSSR, Kazan' (Institut organicheskoy khimii AN SSSR)

TITLE: A study of interfacial esterification of polyvinyl alcohol

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 12, 1965, 2156-2159

TOPIC TAGS: esterification, polyvinyl alcohol, polymer, polymerization degree, reaction mechanism, chloride

ABSTRACT: The interphase esterification of polyvinyl alcohol with benzoyl chloride was studied. The effects of different organic solvents and different concentrations of benzoyl chloride on the degree of esterification were determined. The esterification was carried out by adding NaOH and benzoyl chloride (dissolved in an organic solvent) to an aqueous solution of polyvinyl alcohol, and by rapid stirring of the resultant mixture. The experimental results are presented in tables and graphs (see Fig. 1). It was found that substitution of KOH for NaOH had a negligible effect on the degree of esterification. The degree of esterification increased with the solubility of the polyvinyl benzoate in the organic solvent and with increase of the alkali concentration in the aqueous phase, but it was independent of the temperature and the duration of reaction. The experimental results are interpreted
UDC: 541.64+678.01:54+678.744

Card 1/2

L 11522-66

ACC NR: AP6001872
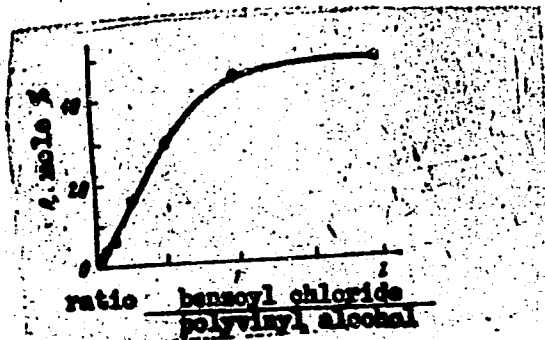
Fig. 1. Relation between the degree of esterification (A) of poly-
vinyl alcohol on the ratio of benzoyl chloride to polyvinyl
alcohol.

in terms of a diffusion-solubility mechanism. Orig. art. has: 3 tables and 1
graph.

SUB CODE: 11/ SUBM DATE: 01Feb65/ ORIG REF: 004/ OTH REF: 004

Card 2/2

L 8507-66   EWT(m)/EWP(j)   RM

ACC NR: AP5028489   SOURCE CODE: UR/0286/65/000/020/0066/0066

AUTHORS: Kuznetsov, Ye. V.; Shermergorn, I. M.; Vagapova, A. K.

ORG: none

TITLE: A method for obtaining polyphosphites. Class 39, No. 175655

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 20, 1965, 66

TOPIC TAGS: phosphorus compound, alkyl, aryl, phenol, xylene, nitrogen

ABSTRACT: This Author Certificate presents a method for obtaining polyphosphites by polycondensation of alkyl(aryl)dichlorophosphites and diphenols. To simplify the technique of obtaining the above compounds, polycondensation is conducted in a xylene solution. Nitrogen is constantly blown through the reacting mass during its polycondensation.

SUB CODE: 07/ SUBM DATE: 07Jun63

BVK,
Card 1/1   UDC: 678.673;678.85

ACC NR: AP6032906

SOURCE CODE: UR/0062/66/000/009/1654/1655

AUTHOR: Bel'skiy, V. Ye.; Yefremova, M. V.; Shermergorn, I. M.

ORG: Institute of Organic and Physical Chemistry im. A. Ye. Arbuzov, Academy of Sciences, SSSR (Institut organicheskoy i fizicheskoy khimii Akademii nauk SSSR)

TITLE: Kinetics of the hydrolysis of bis(chloromethyl)phosphinic acid esters

SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 9, 1966, 1654-1655

TOPIC TAGS: herbicide, bischloromethylphosphinic acid ester hydrolysis, hydrolysis kinetics, hydrolysis, chemical kinetics, ester, phosphinic acid, alkyl radical

ABSTRACT: Kinetics of the hydrolysis of the biologically active esters of bis(chloromethyl)phosphinic acid in water were studied at 75—95°C. The experimental values of the pseudomolecular reaction rate constants k are given in Table 1.

UDC: 541.127+542.938+661.718.1

Card 1/3

ACC NR: AP6032906

Table 1. Effect of radical R in the esters
$(CH_2Cl)_2P(O)OR$ on the rate of hydrolysis in
water at various temperatures

No.	R	$k \cdot 10^4$, sec^{-1}				
		95°	90°	84.6°	80°	75°
1	CH_3	28,9	21,8	14,3	9,31	6,13
2	C_2H_5	11,2	8,43	5,36	3,25	2,20
3	$n\text{-}C_3H_7$	7,66	5,21	3,36	2,23	—
4	$i\text{-}C_3H_7$	7,14	4,58	3,03	2,00	—
5	$n\text{-}C_4H_9$	6,13	3,96	—	1,75	1,08
6	$n\text{-}C_5H_{11}$	5,49	3,83	2,50	1,53	1,00
7	$i\text{-}C_4H_9$	1,73	1,23	0,766	0,474	—
8	$neo\text{-}C_6H_{11}$	0,666	0,449	0,300	—	—
9	phenyl	7,05	5,07	—	2,76	—
10	allyl	283	211	142	100	66,1

The results showed that the reaction rate of the hydrolysis depends
on the nature of the alcohol radical in the ester and for the
alkyl radicals in the acid it is determined by the steric factors.

Card 2/3

ACC NR: AP6032906

The temperature dependence of the hydrolysis is described by the Arrhenius equation with the parameters shown in Table 2.

[WA-50; CBE No. 12]

Table 2. Dependence of the activation E observed, and preexponential factor A on the nature of the radical R in the esters $(CH_2Cl)_2P(O)OR$

R	CH_3	C_2H_5	$n\text{-}C_3H_7$	$iso\text{-}C_3H_7$	$n\text{-}C_4H_9$
E kcal/m	21,2	21,8	21,9	21,7	22,0
lg A	8,03	8,02	7,89	7,73	7,84
R	$n\text{-}C_5H_{11}$	$i\text{-}C_4H_9$	$neo\text{-}C_5H_{11}$	phenyl	allyl
E kcal/m	22,0	22,7	20,6	16,0	19,5
lg A	7,81	7,74	6,04	4,32	8,04

SUB CODE: 07/ SUBM DATE: 14Feb66/ ORIG REF: 002/ OTH REF: 001

Card 3/3

SHERMERNITSKIY, V. V., TRUFYAKOV, V. I.

Welding

Joining cross and longitudinal girders in all-welded bridges with lower roadway.   Avtom.
svar. 4, No. 4(19), 1951.

9.   Monthly List of Russian Accessions, Library of Congress, June 1952   1953, Uncl.

SHERMETEEVA, T. V.

USSR/Chemistry - Camphor

Feb 1947

      Chemistry - 4-Phenyl camphor

"Investigations in the Field of Phenyl Camphor and Its Derivatives: IV,
Some Derivatives of 4-   Phenyl Camphor," S. S. Nametkin, T. V. Shermeteeva,
8 pp

"Zhur Obshch Khim"   Vol XVII, No 2

A simplification of the previously published method of obtaining 4- phenyl
camphor, and new data on the synthesis and characteristics of the previously
described derivatives of this compound.

PA 15T51

"APPROVED FOR RELEASE: 08/09/2001   CIA-RDP86-00513R001549310004-4

SHERMET'YEV, M.P.

16(1);10(2)

PHASE I BOOK EXPLOITATION   SOV/2699

Akademiya nauk SSSR. Institut mekhaniki

Inzhenernyy sbornik, t. 25 (Engineering Symposium, Vol. 25) Moscow, Izd-vo
AN SSSR, 1959. 218 p. Errata slip inserted. 2,200 copies printed.

Ed.: A.A. Il'yushin; Ed. of Publishing House: D.M. Ioffe; Tech. Ed.:
Ye. V. Makuni.

PURPOSE: This book is intended for applied mathematicians, physicists and
engineers.

COVERAGE: The book is a collection of articles published by the Department of
Engineering Sciences of the Institut mekhaniki (Institute of Mechanics)of
the Academy of Sciences, USSR. The articles discuss various aspect of the
mechanics of materials and of fluid mechanics, such as stress and bending of
beams, shells, plates and reels, supersonic gas flow, vibrations, etc. The
problems are treated in a highly theoretical, i.e., mathematical, manner.
References are given at the end of each article.

S/130/61/000/010/002/004
A006/A101

AUTHORS: Rabinovich, D. M., Head of the rolling laboratory, Skakun, V. V.,
Head of the rail and structural mill shop, Shermeyster, M. S.,
Head of the department of heating devices

TITLE: Experiences in the production of high-wear-resistant rails

PERIODICAL: Metallurg, no. 10, 1961, 25-26

TEXT: In order to bring about full heat treatment of rails, including
both volumetric quenching and tempering, an experimental industrial unit was
constructed at the Nizhne-Tagil' Plant in 1960. The unit consists of a high-
speed section furnace and an oil quenching mechanism. The ten sections of the
furnace are arranged in a line at 1,600 mm distance from each other and are
covered with special drums containing water-cooled pipes to transport the rails
along the furnace. Each section consists of a metal frame with a special refrac-
tory-lined chamber. The rails are heated by 8 double-conduct short-flame
torches fuelled with coke gas, which are arranged alternatingly on both sides.
The rails are moved back and forth within the furnace. The quenching unit
consists of an oil tank over which a quenching traverse is fixed. The traverse

Card 1/3

Experiences in the production ...   S/130/61/000/010/002/004
                                                      A006/A101

is a metal structure with a built-in roller conveyer and a drive for lifting and
dropping the structure into the tank. The following technological process was
developed: the rails are supplied to the thermal span, placed onto the roll-
conveyer and supplied to the quenching furnace. They are then placed by special
guides between the beads of the upper conveyer roll. The rail moves along the
furnace during 9 - 11 minutes. After heating to 890 - 920°C, it is supplied at
30 m/min speed to the receiving roller-conveyer of the quenching traverse where
it is held in air for 30 - 60 sec. When a temperature of 820 - 860°C has been
reached the rail and the traverse are dipped into the quenching oil tank for
4 - 5 minutes. After the oil has dripped off, the finished rails are packed by
3 - 4 pieces and supplied to the isothermal furnace for tempering during 2 hours
at 480 - 520°C. The quality of such heat-treated rails is very high. Compara-
tive values for the properties of heat-treated and not heat-treated rails are
shown in the table below:

Card 2/3

Experiences in the production ...

Properties	Rails	
	heat-treated	not heat-treated
Yield limit, kg/mm^2	79.5	44.0
Ultimate strength, kg/mm^2	123.0	83.5
Relative elongation, %	11.0	11.7
Relative constriction, %	33.5	15.8
Toughness at + 20°C, kgm/cm^2	3.7	2.0
Hardness HPB	3.2	3.9
Deflection during tests on the ram, mm	26.0	43.0
Wear resistance (from losses in the specimen weight), g	0.720	1.746

The costs of heat-treated rails exceed those of conventional rails by a factor of 3. There are 2 figures and 1 table.

ASSOCIATION: Nizhne-Tagil'skiy metallurgicheskiy kombinat (Nizhne-Tagil' Metal-lurgical Combine)

Card 3/3

ARSEYEV, A.V.; GOLOVANOV, Yu.M.; SHERMEYSTER, M.Sh.

Burner for annealing tires. Sbor. rats. predl. vnedr. v
proizv. no.2:36 '61.   (MIRA 14:7)

1. Nizhne-Tagil'skiy metallurgicheskiy kombinat.
                        (Gas burners)

SHVETSOV, Ye.M.; SHERMEYSTER, M.S.

Redesign of triple-fired holding furnaces.   Metallurg 6
no.10:26-28 0 '61.   (MIRA 14:9)

1. Sortoprokatnyy tsekh Nizhne-Tagil'skogo metallurgiche-
skogo kombinata.
                 (Furances, Heating)

RABINOVICH, D.M.; SHAKUN, V.V.; SHERMEYSTER, M.S.

Manufacture of rails with improved wear resistance. Metallurg
6 no.10:25-26 O '61.   (MIRA 14:9)

1. Nizhe-Tagil'skiy metallurgicheskiy kombinat. 2. Nachal'nik
prokatnoy laboratorii Nizhne-Tagil'skogo metallurgicheskogo
kombinata (for Rabinovich). 3. Nachal'nik rel'sobalochnogo
stana Nizhne-Tagil'skogo metallurgicheskogo kombinata (for
Skakun). 4. Nachal'nik uchastka nagrevatel'nykh ustroystv
Nizhne-Tagil'skogo metallurgicheskogo kombinata (for Shermeyster).
          (Rolling (Metalwork)) (Railroads—Rails)

AKRAMOV, Z.M., kand. geogr. nauk; RAKITNIKOV, A.N., kand.
      geograf. nauk; ZAMKOV, O.K., kand. geograf. nauk;
      SHERMUKHAMEDOV, A.M. [deceased]; SAUSHKIN, Yu.G., doktor
      geograf. nauk, prof, otv. red.; DEGTYAR', V.I., red.;
      KHISAMOV, A.V., kand. geograf. nauk, red.;
      ASTAKHOV, A., red.; GOR'KOVAYA, Z.P., tekhn. red.

      [Agricultural geography of Samarkand and Bukhara Provinces]
      Geografiia sel'skogo khoziaistva Samarkandskoi i Bukharskoi
      oblasti. [By]Z.M.Akramov i dr. Tashkent, Izd-vo Akad. nauk
      UzSSR. Pt.2. 1961. 323 p. (Materialy Zeravshanskoi ekspedi-
      tsii SOPS AN UzSSR, no.1)   (MIRA 16:4)

      1. Akademiya nauk Uzbekskoy SSR. Tashkent. Otdel geografii.
      2. Nachal'nik Otdela sel'skogo khozyaystva Gosplana Uzbek-
      skoy SSR (for Degtyar').
          (Bukhara Province--Agricultural geography)
          (Samarkand Province--Agricultral geography)

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1941. 51 p. maps (Kirovskii oblastnoi nauchno -issledovatel'skii institut kraevedeniia .
Nauchno-populiarnaia seriia, vyp. 5) (44-10364)

QE755.R9S5

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by the USSR Geographical Soc.

SHERNIN, A.I., dots.; ZAMARAYEV, V.N., dots., red.; KREYS, I.G., tekhn.red.

[Programs of pedagogical institutes; general biology with principles of Darwinism for faculties of physical education] Programmy pedago-gicheskikh institutov; obshchaia biologiia s osnovami darvinizma dlia fakul'tetov fizicheskogo vospitaniia. [Moskva] Uchpedgiz, 1957 9 p.
                                                              (MIRA 11:3)

1. Russia (1917-   R.S.F.S.R.) Glavnoye upravleniye vysshikh i srednikh pedagogicheskikh uchebnykh zavedenii.
        (Biology--Study and teaching)

SHCHEKLEIN, S.L., doktor sel'skokhoz.nauk, nauchnyy red.; SHERNIN,
    A.I., kand.biolog.nauk; KARDAKOVA, Ye.A., red.; SKLYAROVA,
    Ye.I., tekhn.red.

[Nature in Kirov Province] Priroda Kirovskoi oblasti. Kirov,
Kirovskoe knizhnoe izd-vo, 1960. 251 p.

(MIRA 13:12)

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SHERNITSKIY, V. V., TRUFYAKOV, V. I.

Bridges, Iron and Steel

Joining cross and longitudinal girders in all welded bridges with lower roadway. Avtom. svar. 4 No. 4, (19) 1951.

SHERNOBRIVETS, V.Ie.

Models received by the Russian fleet. Sudostroenie no.7:79-80
Jl '65.   (MIRA 18:8)

SHERNYAKIN, F.M.

Some uses of chromatography in qualitative and quantitative analysis of cations. F. M. Shernyakin (Pharm. Inst., Minister Health U.S.S.R., Moscow). Trudy Komissii po Anal. Khim., Akad. Nauk S.S.S.R., Inst. Geokhim. i Anal. Khim. 6, 268-76(1955); cf. C.A. 48, 3505g.—A survey with 23 references. Barilla Mayette

17(SOV/177-58-5-10/30

AUTHOR: Shernyakov, M.A., Lieutenent-Colonel of the Medical
               Corps

TITLE: The Effect of Systematic Morning Exercises on the
               Physical Development of Elderly Officers (Vliyaniye
               sistematicheskikh utrennykh uprazhneniy na fiziches-
               koye razvitiye ofitserov starshego vosrasta)

PERIODICAL: Voyenno-meditsinskiy zhurnal, 1958, Nr 5, pp 48 - 51
               (USSR)

ABSTRACT: The author deals with characteristics of the level and
               the dynamics of the physical development of elderly
               officers in connection with physical exercises in the
               morning. The article is based on examinations of
               393 officers over 42 years of age during the years
               1953/54. The author concluded that officers who
               systematically perform physical exercises in the
Card 1/2   morning are much better physically developed than

SOV/177-58-5-10/30

The Effect of Systematic Morning Exercises on the Physical Development of Elderly Officers

officers who do not occupy themselves with exercises. He suggests to work out a special plan for physical exercises for elderly officers in order to raise the level of their physical development. There are 3 tables.

Card 2/2

SHERNYAKOV, M.A.

Combined study on the state of health and physical development
of officers.   Voen.-med.zhur. no. 2:63-64 F '61.   (MIRA 14:2)
                        (MEDICINE, MILITARY)

SHERNYAKOV, M. A.

"Experience of developing tables for the individual evaluation of the physical development of officers" - p. 68

Voyenno Meditsinskiy Zhurnal, No. 3, 1962

SHEROBOKOV, M. Ya.

PROCESSES AND PROPERTIES INDEX

1300. Light scattering on a particle with a spin two. M. Ia. Sherobokov.
Zhur. Eksptl i Teoret. Fiz. 19, 473-80(1949) June (in Russian).

It is known that the effective cross section of certain particles for
light scattering, even when calculated in the first non-vanishing
approximation of the perturbation theory, grows indefinitely with
the frequency of light. In order to account for this difficulty,
Ginzburg, Zhur. Eksptl. i Teoret. Fiz. 13, 33(1943) and Heitler, et
al, Proc. Roy. Soc. (London) A, 176, 368(1940), suggested the idea
of excited spin states. Relativistic equations were found for
particles with higher spins. However, no close investigation of the
properties of such particles was made. In this respect only the work
of Ginzburg, Zhur. Eksptl. i Teoret. Fiz. 12, 425(1942), may be cited,
in which magnetic properties of a particle with a 3/2 spin are studied.
The interest of such studies lies not only in the possibility of
several variants of the theory, but also in the possible practical
use of the equations for such particles; thus, the spin of mesons
cannot be regarded as definitely established. The present work is an
investigation of the scattering of light on particles with a spin two

METALLURGICAL LITERATURE CLASSIFICATION

that are described by wave equations found by Fierz and Pauli, Helv. Phys. Acta 12, 3(1939); Proc. Roy. Soc. (London) A, 173, 211(1939). The rapid growth with increasing photon energy of the effective cross section for light scattering of a particle having a spin two can be explained by attributing to such a particle a kinetic moment of an order higher than that of a dipole.

SHERNYKH, G.A.

Effect of hydrogen sulfide and radon baths on the blood coagulability
in hypertension and atherosclerosis. Vop. kur., fizioter. i lech. fiz.
kul't. 29 no.4:312-316 Jl-Ag '64.   (MIRA 18:9)

1. Terapevticheskaya klinika (zav. - prof. N.I.Speranskiy) TSentral'nogo
instituta kurortologii i fizioterapii (dir. - kand. med. nauk G.N.Pospelo-
va), Moskva.

ACCESSION NR: AP4019829

AUTHORS: Kagan, M. S.; Lifshits, T. M.; Musatov, A. L.; Sheronov, A. A.

TITLE: Autoelectronic emission from high resistance germanium

SOURCE: Fizika tverdogo tela, v. 6, no. 3, 1964, 722-727

TOPIC TAGS: secondary emission, semiconductor property, EMU 3 electromagnetic amplifier, volt ampere characteristic, semiconductor resistance

ABSTRACT: Studies were made on both n- and p-type germanium at temperatures of 293 and 80K. The germanium was doped with gold and compensated with antimony. The gold concentration was $5 \cdot 10^{14}$ cm^{-3} and the antimony concentration was of the same order, but chosen in such a way that the sample had high resistance at the temperature of liquid nitrogen. Resistivities attained for n-type germanium at 80K were about 10^8 ohm cm, and for p-type 10^6 ohm cm. The volt-ampere characteristics of emission and the distribution of electrons according to energy are shown in Figs. 1 and 2 on the Enclosures. They exhibit no perceptible effect of "heating

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ACCESSION NR: AP4019829

up" the electrons in the emitter. A high density of autoemission current is connected with high electron concentration at the point, exceeding the body concentration in the massive part of the emitter by a factor of thousands. The authors found that when the sample was coated with cesium the work function of the point was reduced much more than the work function of the side of the sample, apparently because of different conditions of cesium absorption, possibly because of temperature differences at the point and in the massive part of the sample. It is noted that when the electron affinity is reduced to 1.6 ev the volt-ampere characteristics are strictly linear, and this fact should attest to the effect of heating of electrons during autoelectron emission from germanium. Orig. art. has: 6 figures and 1 table.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR, Moscow (Institute of Radio Engineering and Electronics AN SSSR)

SUBMITTED: 03Aug63

DATE ACQ: 31Mar64

NO REF SOV: 009

ENCL: 02

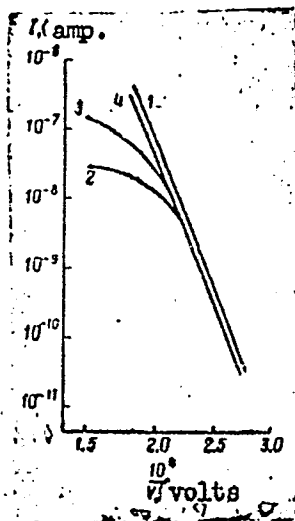OTHER: 002

SUB CODE: EC, NP

Card 2/4

ENCLOSURE: 01

Fig. 1. Volt-ampere characteristics of autoelectron emission from germanium.

Temperature: 1 - 293K; 2-4 - 80K; 1,2 - nonirradiated samples; 3 - weakly irradiated sample; 4 - strongly irradiated sample.

Card 3/4
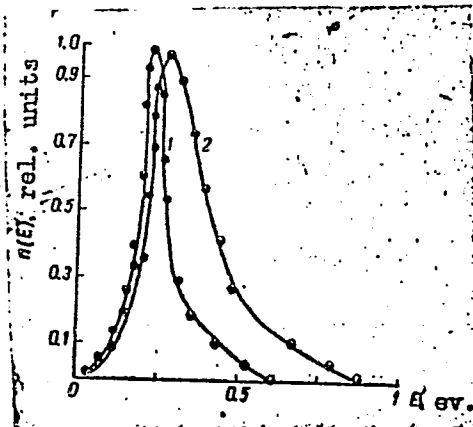
Fig. 2. Energy spectrum of emitted electrons

I: 1 - 2·10^{-9} amps; 2 - 7·10^{-9} amps.

Card 4/4

L 4964-66   EWA(k)/FBD/EWT(1)/EWT(m)/EEC(k)=2/T/EWP(t)/EWP(k)/EWP(b)/EWA(m)-2/EWA(h)

ACC NR: AP5027449   SOURCE CODE: UR/0181/65/007/011/3460/3461

SCTB/IJP(c) WG/JD/JG

AUTHOR: Basov, N. G.; Zakharov, Yu. P.; Nikitin, V. V.; Sheronov, A. A.

ORG: Physics Institute im. P. N. Lebedev, AN SSSR, Moscow (Fizicheskiy institut AN SSSR)

TITLE: Interaction between optically coupled GaAs diode lasers

SOURCE: Fizika tverdogo tela, v. 7, no. 11, 1965, 3460-3461

TOPIC TAGS: solid state laser, gallium arsenide laser, laser coupling, laser synchronization, laser beam, beam quenching

ABSTRACT: Two systems of optical coupling between p-n GaAs diode lasers—"longitudinal," in which laser beams coincide, and "transverse," in which they are perpendicular to each other—were investigated. In both cases, the diodes were prepared in the form of Fabry-Perot resonators and set up on the same substrate from 5 to 100 μ apart. The effectiveness of beam quenching for the transversely coupled lasers was 1%. The wavelength of the quenching laser emission was greater than that of the quenched and the beam entered the quenched laser laterally. Beam quenching in the longitudinally coupled system was observed only when the wavelength of the quenching emission was greater than that of the quenched. Similar effects were observed elsewhere.

Card 1/2   090/0313

T 4964-66

ACC NR: AP5027449

(A. Fowler, J. Appl. Phys., 35, 2275, 1964; J. Appl. Phys. Lett., 3, 1, 1963). The low effectiveness of quenching in both cases was attributed to the difficulties experienced in accurately setting up both diodes on the same substrate. Improved (~20%) beam quenching was achieved by means of special diodes, each with two resonators, described elsewhere by the authors (FTT, 7, 3128, 1965). The quenching effect is poten- tially applicable in computer technology (high-speed optical keying). Orig. art. has: 1 figure.   [YK]

SUB CODE: EC/ SUBM DATE: 15Jun65/ ORIG REF: 001/ OTH REF: 003

ATD PRESS: 4/31/

Card 2/2

AUTHOR: Basov, N. G.; Zakharov, Yu. P.; Nikitin, V. V.; Sheronov, A. A.

TITLE: GaAs junction laser with a nonuniform distribution of injected current

SOURCE: Fizika tverdogo tela, v. 7, no. 10, 1965, 3128-3130

TOPIC TAGS: laser, junction laser, injection laser, semiconductor laser, GaAs, p n junction, injection current, coherent radiation, recombination radiation

ABSTRACT: The effect of an uneven distribution of the injection current along the p-n junction area of a GaAs laser diode on its emission was experimentally investigated. Diodes with a 2-mm overall cavity length and a 0.4-mm width were used in the experiments. The p-side of a standard laser with polished ends was cut perpendicular to diode's length down to the junction area (see Fig. 1 of Enclosure), resulting in two electrically separated cavity sections with a contact attached to each part. The coupling resistance between the diodes was large in comparison with the resistance of the contacts and the bulk resistance. The diode, cooled to the liquid nitrogen temperature, was excited by current pulses of 1-μsec duration. The lowest threshold current was required when injection current densities in both sections of the diodes were equal. The wavelength of coherent emission at the threshold current was larger

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L 3977-66
ACCESSION NR: AP5025404

by about 20 Å than the wavelength of emission during uneven excitation regime, i.e.,
when current $I_1 = I_2$. When I_2 was constant while I_1 was increased from 0 to 1 amp,
the frequency of laser emission at $\lambda \sim 8430$ Å was gradually shifted toward higher
frequencies by 50 cps. When I_1 was further increased, generation was achieved at
$\lambda \sim 8450$ Å while coherent emission at $\lambda \sim 8430$ Å decreased and finally disappeared.
At the same time the maximum of the line (half width ~ 30 Å) was shifted by ~ 2 Å
toward the longer wavelengths. A similar quenching effect at ~ 8430 Å was observed
in the direction perpendicular to the axis of the diode. It was determined that
when the injection current was sufficiently large in one section of the laser a large
increase in power output was obtained by simultaneously injecting current through
both contacts on the p-side of the diode. Since the slope of the power-current curve
of the dual diode structure increased approximately two times in comparison with that
of a single section diode, the use of the dual structure for modulation may be more
useful than that of a standard injection laser. Orig. art. has: 1 figure.   [CS]

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR, Moscow (Physics
Institute, AN SSSR)

SUBMITTED: 17May65   ENCL: 01   SUB CODE: EC, OP,
NO REF SOV: 001   OTHER: 002   ATD PRESS: 4118
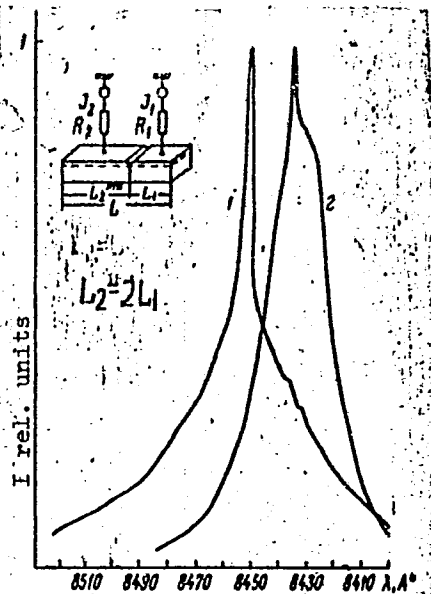
Card 2/3

L 3977-66

ENCLOSURE: 01

Fig. 1. Emission spectra near the threshold

1 - Current densities in both parts of the dual diode structure are equal, I - 19 amp; 2 - current densities in the two parts are not equal, $I_1 = 0_1$, $I_2 = 34$ amp.

Card 3/3

SOV/78-3-11-4/23

AUTHORS: Ptitsyn, B. V., Sheronov, L. N., Komlev, V. P.

TITLE: The Determination of the Solubility Products of Silver Citrate at Different Ionic Strength of the Solution (Opredeleniye proizvedeniye rastvorimosti tsitrata serebra pri raznoy ionnoy sile rastvora)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol 3, Nr 11, pp 2450-2452 (USSR)

ABSTRACT: In the present paper the optimum conditions for the production of silver citrate of the composition $Ag_3C_6H_5O_7$ were investigated, and the solubility products of silver citrate were determined by means of the radioactive indicator Ag^{110}. The solubility product of silver citrate was determined as function of the ionic strength of the solution at 25°C. Sodium citrate solution was added to a silver nitrate solution in order to produce silver citrate. This sequence of addition of reagents leads to crystalline silver citrate which precipitates easily. In the case of an inverse addition of silver nitrate to sodium citrate a fine dispersion is produced which can be scarcely filtered.

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SOV/78-3-11-4/23

The Determination of the Solubility Products of Silver Citrate at Different Ionic Strength of the Solution

The thermodynamic value of the solubility product of silver citrate was determined for solutions with an ionic strength of 0,002 - 0,103. In the case of an ionic strength of 0,002 of the solution the solubility of $Ag_3C_6H_5O_7$ amounts to $3,4.10^{-4}$ g-mol/l and the solubility product $k^c = (3,3 \pm 0,1).10^{-13}$.
In the case of an ionic strength of 0,103 of the solution the solubility amounts to $5,5.10^{-4}$ g-mol/l and $k^c = (2,4 \pm 0,3).10^{-12}$. These results show that the solubility product changes by almost the tenfold with the change of the ionic strength of the solution of 0,002 - 0,103.
Figure 1 shows the dependence of the negative logarithm of the solubility products of silver nitrate (pK) on the ionic strength of the solution.
There are 1 figure, 2 tables, and 4 references, 1 of which is Soviet.

SUBMITTED: April 10, 1957

Card 2/2

5(2)

AUTHORS: Sheronov, L. N., Ptitsyn, B. V.

TITLE: On a Citrate Complex of Zirconium (O kompleksnom tsitrate tsirkoniya)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 2, pp 367-371 (USSR)

ABSTRACT: Upon the interaction of 1 mole zirconium carbonate with 1.5 moles citric acid, which is semi-saturated with KOH, a complex potassium zirconyl citrate of the composition $K[ZrO(C_6H_5O_7)] \cdot 2.5H_2O$ is formed. The complex $K_3C_6H_5O_7 \cdot ZrC_6H_4O_7 \cdot 9.5H_2O$ described by Mandl (Ref 1) is not formed under these production conditions. In order to determine the coordination formula of the compound obtained the molecular electric conductivity and the molecular weight of this compound were determined. The molecular weight of potassium zirconyl citrate in aqueous solution shows values from 175-195. The molecular weight and the molecular electric conductivity show that, in aqueous solution, the compound dissociates into two ions:
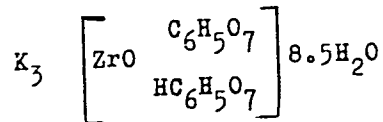
Card 1/2

SOV/78-4-2-20/40

On a Citrate Complex of Zirconium

$$K\left[ZrO(C_6H_5O_7)\right] \rightleftharpoons K^+ + \left[ZrO(C_6H_5O_7)\right]^-$$
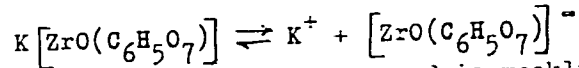
The aqueous solution of the compound is weakly acid. For the potassium zirconyl citrate complex produced by Mandl the following formula was suggested: $K\left[ZrO(C_6H_5O_7)\right] \cdot K_2HC_6H_5O_7 \cdot 8.5H_2O$

and the following coordination formula:

$$K_3 \left[ZrO \begin{array}{c} C_6H_5O_7 \\ HC_6H_5O_7 \end{array}\right] 8.5H_2O$$

There are 2 tables and 6 references, 2 of which are Soviet.

SUBMITTED: December 12, 1957

Card 2/2

PTITSYN, B.V.; SHIROKOV, L.N.

Complex niobium oxalate. Izv. Sib. otd. AN SSSR no.9:44-46 '61.
(MIRA 14:10)

1. Institut neorganicheskoy khimii Sibirskogo otdeleniya
AN SSSR, Novosibirsk.
(Niobium compounds)

PTITSYN, B.V.; SHERONOV, L.N.

     Complex zirconium oxalate. Izv. Sib. otd. AN SSSR no.10:80-
     83 '61.   (MIRA 14:12)

     1. Institut neorganicheskoy khimii Sibirskogo otdeleniya
     AN SSSR, Novosibirsk.
                  (Zirconium oxalates)

PTITSYN, B.V. [deceased]; SHERONOV, L.N.

Certain number of niobium complex compounds of relative stability.
Izv. SO AN SSSR no.3: Ser. khim. nauk no.1:68-71 '65.
(MIRA 18:8)

1. Institut neorganicheskoy khimii Sibirskogo otdeleniya AN
SSSR, Novosibirsk.

SHERONOV, V.A.,inzh.

110/35/6-10 kv. substations equipped with 31.5 and 40 Mv.-a. transformers without reactors. Elek.sta. 29 no.11:49-51 N '58.
(MIRA 11:12)

(Electric substations)