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E193/E383

18.7100

AUTHORS: Ivanov, V.I. and Osipov, K.A. (Moscow)

TITLE: Recrystallization of Technical Titanium During Rapid Heating by Passage of Electric Current

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo. 1960, Nr 3, pp 79 - 82 (USSR)

ABSTRACT: In spite of the deleterious effects of oxygen and some other gases on the properties of titanium it is not often that under industrial conditions this metal is annealed in vacuum or in a protective atmosphere, the modern tendency being to anneal titanium in air and reduce the degree of oxygen absorption and scale formation by reducing to minimum the time at elevated temperatures. This is most conveniently achieved by the application of high-frequency induction or electrical resistance heating and the object of the investigation described in the present paper was to study the characteristic features of the recrystallization process taking place under these conditions as well as the effect of various factors (annealing temperature, heating and cooling rates) on the properties of so annealed titanium. The experiments were

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carried out on specimens measuring 2 x 8 x 150 mm. cold-rolled to 60% reduction in thickness after a preliminary vacuum annealing at 780 °C. An alternating current (2 500 cps) was used for heating, the rate of heating achieved in this way varying between 20 and 1 000 °C/sec. The temperature and time intervals of the primary recrystallization were determined by hardness measurements and the beginning and the end of recrystallization were pin-pointed by metallographic examination. The results were compared with those obtained on identical specimens vacuum-annealed for half-an-hour at various temperatures. It was found that when electrical resistance heating was employed the recrystallization range was displaced towards higher temperatures, thus, for instance, when the rate of heating of 100 °C/sec was employed, the temperatures of the beginning and end of recrystallization (t_n and t_k) were respectively 140 and 100 °C higher than in the case of the furnace (vacuum) annealed

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material. With increasing rate of heating v this difference increased, as is shown in Figure 2, where t_n and t_k are plotted against v (^{o}C/sec). The rate of heating had no effect on hardness (Brinell) of [illegible] which never exceeded 160 kg/mm^2.

[illegible] a loop inductor [illegible] to attain the temperature 800 825 or 650 800 °C in 10 or 3.5 sec respectively. The mechanical properties and the degree of oxidation of specimens annealed by this method were compared with those of similar specimens annealed in the furnace (10 min at

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700 °C followed by cooling in air). It was found that the UTS of titanium was the same, irrespective of the method of annealing but the ductility of metal annealed by rapid heating was slightly higher and its grain size was approximately 1.5 times smaller; in spite of higher temperature attained the degree of oxidation of the rapidly heated specimens was several times lower than that of the furnace-annealed material. In addition to these advantages the technique of rapid annealing by means of electrical heating opens wide possibilities of mechanization and automation of the process of annealing of cold-worked titanium. There are 3 figures, 1 table and 2 Soviet references.

ASSOCIATION: Institut metallurgii Akademii nauk SSSR (Institute of Metallurgy of the Ac.Sc., USSR)

SUBMITTED: December 29, 1959

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S/180/60/000/005/016/033
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AUTHORS: Osipov, K.A., and Sotnichenko, A.L. (Moscow) 18

TITLE: The Stress-Dependence of the Activation Energy for Creep of α-Titanium

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1960, No.5, pp.146-148

TEXT: Activation energy for creep appears in all basic equations describing the kinetics of this process. However, these equations could be used only if the activation energy within a given temperature interval were independent of other parameters, or if the laws governing its variation were known. The applied stress is one of the factors which may affect the magnitude of the activation energy for creep, and since contradictory conclusions have been reached by various workers regarding the relationship between these two variables, the present investigation was undertaken to obtain more experimental evidence. Creep curves were constructed for α-titanium (99.97% purity), tested in vacuum at various temperatures between 18 and 600 °C, under the applied stress in the 10-35 kg/mm^2 range. The test pieces

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(gauge length 22 mm, diameter 3 mm), prepared from cast and forged material, were subjected to preliminary vacuum annealing at 800 °C for 100 h. Tests, in which the applied stress of 20-35 kg/mm^2 had been used, were carried out in a narrow temperature range (18-190 °C) so as to minimize the risk of the activation energy being affected by temperature. From the experimental creep curves the rate, ε (%/min) of steady creep was determined and graphs ln ε versus 1/T, where T is the absolute temperature, were plotted All these graphs were straight lines, those obtained for stresses of 25, 30 and 35 kg/mm^2 being practically parallel to each other. Contrary to the findings of some other workers, the extrapolated ln ε versus 1/T graphs did not intersect at one point. The relationship between ln ε and the applied stress, σ, was hyperbolic for the test temperature of 50 °C ($\varepsilon = A s H \gamma \sigma$), and tended to become linear ($\varepsilon = C e \gamma \sigma$) at 250 °C. The activation energy, ΔH for creep at each of the

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applied stresses used in the present investigation, was calculated from the slope of the $\ln \varepsilon$ versus $1/T$ graphs. With σ increasing from 10 to 25 kg/mm^2, ΔH decreased at a gradually diminishing rate and reached constant value of 11.55 kcal/g-atom at the stress of 25 kg/mm^2.

Acknowledgements are made to V A Tverezovskiy, who participated in this work.

There are 3 figures, 1 table and 5 Soviet references.

SUBMITTED: April 5, 1960

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S/180/60/000/005/019/033
E111/E135

AUTHORS: Ivanov, V.I., and Osipov, K.A. (Moscow)

TITLE: Investigation of the Main Factors in the Recrystallization of Technical Iron in Rapid Electric Heating

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1960, No. 5, pp.161-166

TEXT: The authors have previously studied the influence of heating rate on the kinetics of the first stage of recrystallization (Ref.1). They now describe their results on the investigation of later stages of primary recrystallization under isothermal conditions after rapid electric heating. Rings 50 mm in diameter and 1 mm wall thickness made of 99.76% pure technical iron with 55% cold deformation were used. A large (0.25-0.35 mm) grain was produced before cold deformation. Heating was effected by induction (2500 cps), the average heating rate at 550-700 °C being 500 °C/sec. When the required temperature had been reached power was automatically reduced, giving isothermal heating at that temperature. Recording and limitation of temperature were

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as described in earlier work (Ref 1) For hardness measurements, X-ray and metallographic investigation, the parts of the specimen close to the thermocouple position were used. Recrystallization isotherms, i.e. plots of recrystallized initial grain volumes against time in seconds, for heating at 500 °C/sec are shown in Fig 1 (curves 1-4, 8 and 9 after deformation, 5, 6 and 7 after tempering at 450 °C): time for developing primary recrystallization falls with rising annealing temperature. The logarithm of time to reach a given degree of recrystallization was found (Fig 2) to be linearly related to reciprocal of absolute temperature, enabling the activation energy of the process to be calculated. It is shown in Fig 3 in relation to degree of recrystallization The true (curves 1 and 3) and average (curves 2 and 4) rates of recrystallization are shown in Fig 4 as functions of degree of recrystallization (curves 1, 2 after deformation, 3 and 4 after tempering) all show maxima most pronounced in curve 1. The continual growth both of the number

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and size of grains at times up to 5 seconds at 630 °C is shown in Fig 5. Fig 6 shows the linear fall with rising reciprocal of absolute temperature of the rates of nucleation (N) and growth (G) of recrystallization grains (curves 1 and 2 after deformation and after tempering, respectively). Preliminary tempering leads to a reduction in both N and G for annealing temperatures below 600 °C but has no effect at higher temperatures. The authors discuss the kinetics of the process in terms of N and G and also the activation energies and the coefficient in the exponential time - reciprocal absolute temperature relation (values are tabulated).
There are 6 figures, 1 table and 5 Soviet references.

SUBMITTED: April 1, 1960

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OSIPOV, K.A.; SOTNICHENKO, A.L.

Limiting activation energy values of the steady creep of α-Fe and α-Ti under tensile stress in vacu. Dokl. AN SSSR 134 no.2: 333-336 S '60. (MIRA 13:9)

1. Institut metallurgii im. A.A. Baykova Akademii nauk SSSR. Predstavleno akad. G.V. Kurdyumovym.
(Creep of metals) (Iron) (Titanium)

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E073/E535

AUTHORS: Osipov, K. A. and Tyan' De-Chen (Moscow)

TITLE: Theoretical and Experimental Investigation of the Activation Energies of Creep in Solid Solutions of Metals

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1961, No.2, pp.88-94

TEXT: In earlier work (Ref.1) Osipov presented in detail the hypothesis on the limit and variable values of the activation energy of various processes in solid metals. According to this hypothesis, for many processes which may occur in solid metals, including plastic deformation, the activated state of the atoms may represent a limit critical state of their thermodynamic instability in the crystal. In particular cases this state corresponds for instance to the transition of the solid phase into the liquid state or of a low temperature modification into a high temperature modification. A particular case of the activated state can also be the critical state of elastic stability of the crystal lattice if it can be distinguished from the two first states and if its energy criteria can be defined. Depending on the

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conditions, the particular cases of the activated state may occur separately or in combination. According to this hypothesis, the experimental values of the activation energy, for instance of the steady state creep of pure metals, ΔH, can be expressed by

$$\Delta H = qn \qquad (1)$$

where q - activation heat of the process of formation of foci of thermodynamic instability in the crystal or of foci of "local fusion" in the case of metals without polymorphous transformations in the solid state; $n \gg 1$ represents the number of simultaneously activated atoms in the focus (creep). For a number of pure metals, the values of q have been given in the earlier mentioned paper (Ref.1). This hypothesis has been further extended to continuous and limited solid solutions of metals with any number of components. According to the evolved hypothesis, the value q can be considered as the limit value of the activation energy of numerous processes which may take place in solid solutions of various metals. The values of q were calculated for the solid

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solutions of the system Ni-Fe and also for the system Ni-Cr The values are entered in Table 1. These values were utilized for calculating the activation energy of creep of the solid solutions of Ni-Fe and Ni-Cr in accordance with Eq.(1). It was assumed that n does not depend on the concentration of the solid solution. The obtained values of ΔH are also listed in Table 1 (T'_s is the fusion temperature of the solid solution). Experimental values of the activation energy of creep of nickel and of its solid solutions were obtained from tensile tests in vacuum at 900 to 1200°C, applying a constant stress of $\sigma = 1.773$ kg/mm^2. These are given in Table 2. The conditions under which these values were obtained are described in some detail. In Fig.1 the experimental and theoretical values of ΔH are compared for Ni-Fe and Ni-Cr alloys (ΔH, kcal/mol. vs at.%). It can be seen from Fig.1a that for the Ni-Fe alloys there is good agreement between the theoretical values (curve 1) and the experimental values (curve 2). The test temperatures were 900 to 1100°C for the Ni-Fe system and 900-1200°C for the Ni-Cr system. Fig.2 shows the dependence of the heat of formation of the solid solution on the concentration for the Ni-Fe system in accordance

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with data given to the authors by W. Steiner and O. Krisement of Dusseldorf, Germany (continuous line - experimental curve). Comparing the graphs, Figs.1 and 2, it can be seen that for the Ni-Fe system the concentration dependence of the experimental values of the activation energy of steady state creep is qualitatively similar to the heat of formation of solid solutions. The creep of solid solutions of the systems Ni-Fe and Ni-Cr were studied under tension with a constant stress in vacuum of the order of 1×10^{-4} mm Hg in the temperature range 900 to 1200°C (±3°C) on a special test-rig described by Ye. M. Berlizov (Ref.3). Vacuum smelted alloys of high purity were forged and then annealed in vacuo for 40 to 48 hours at 1150°C. From these, specimens were produced and prior to creep tests they were annealed at 1200°C for 1 hour. Creep was investigated using a constant stress of 1.773 kg/mm^2. The investigations have shown that the creep curves for all the studied alloys had the well known typical shape. The steady state creep speed $\dot{\varepsilon}$ calculated from these curves represented a linear dependence in the coordinate system $1/T - \ln \dot{\varepsilon}$. This enabled calculating the activation energy of steady state creep ΔH in accordance with the well

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known formula

$$\dot{\varepsilon} = \dot{\varepsilon}_o e^{-\frac{\Delta H}{RT}} \qquad (17)$$

The composition of the studied alloys and the ΔH values obtained for these as well as the pre-exponential term $\dot{\varepsilon}_o$ %/min are given in Table 2. In Fig.3 the concentration dependences ΔH (kcal/mol) and $\ln\dot{\varepsilon}_o$ (%/min) are compared for alloys of this system (at.%). The dashed lines in the graphs 6, 2 indicate the limit of solubility of Cr in Ni at 1000 and 1200°C, respectively. The authors also studied the creep of solid solutions of the Ni-Fe and Ni-Cr systems by torsion, using a test-rig described by L. N. Bystrov et al. (Ref.5). The specimens were produced from the same materials as those given in Table 2 and the same heat treatment was used. The gauge length had a diameter of 2.5 mm and a length of 14 mm. The torsion tests were carried out with a constant torque M corresponding to a maximum tangential stress at the surface of the specimen of $\tau_s = 2.28$ kg/mm^2. M and τ_s are inter-related as follows:

$$\tau_s = \frac{3M}{2\pi a^3}$$

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where a is the radius of the gauge part of the specimens. The speed of steady state creep V was measured on the same specimen at various temperatures, 950 to 1150°C. It was established that V complies with the exponential law

$$V = V_o \exp\left(-\frac{\Delta H}{RT}\right)$$

where ΔH is the activation energy for creep in torsion, V_o is the pre-exponential coefficient. A typical graph of $\ln V_o$, °/sec vs. $1/T$ is shown in Fig.4 for an alloy of Ni +15 at.% Cr, τ_s = 2.28 kg/mm^2. The results are plotted in Fig.5 showing the concentration dependence of the activation energy of steady state creep (Figs. 5a and 5b), ΔH, kcal/mol vs. composition, at.%, and the pre-exponential factor $\ln V_o$, °/sec vs. composition, at.% for alloys of the systems Ni-Fe and Ni-Cr (torsion tests). The results obtained in the torsion tests confirm qualitatively the results obtained in tensile tests with a constant stress. Consequently, it can be stated that the method of torsion enables correct qualitative evaluation of the concentration dependence of

the energy parameters in creep studies. There are 3 tables, 5 figures and 5 references: 3 Soviet and 2 non-Soviet.

ASSOCIATION: Institut. metallurgii AN SSSR (Institute of Metallurgy, AS USSR)

SUBMITTED: July 8, 1960

Table 1

N_{Fe}	T_g, °K	φ, ккал/моль K	ΔH, ккал/моль K
Система Ni-Fe			
0.0	1728	22.60	65.0
0.1	1720	23.17	67.4
0.3	1710	23.68	69.1
0.5	1715	24.28	69.7
0.7	1743	24.48	70.3
0.9	1768	23.87	68.5
1.0	1812	23.60	67.7
Система Ni-Cr			
0.0	1728	22.60	65.0
0.1	1693	22.94	65.7
0.2	1683	22.84	65.4
0.3	1638	22.61	64.7
0.4	1620	22.41	64.3

Table 2

Таблица 2

Fe ат. %	ΔH ккал/моль	$\ln a_{Fe}$	Cr ат. %	ΔH ккал/моль	$\ln a_{Fe}$
Система Ni-Fe			Система Ni-Cr		
0.0	65.02	20.57	0.0	65.02	20.57
5.5	69.94	23.20	4.9	76.12	26.05
11.3	72.18	24.68	24.6	79.66	25.00
29.2	77.14	26.20	30.3	77.54	24.31
67.6	74.60	25.13	40.3	69.24	21.07
100.0	65.0*	—	48.1	84.70	26.80

* Из данных [4].

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OSIPOV, K.A (Moskva); SOTNICHENKO, A.L. (Moskva)

Creep of zirconium iodide in vacuum uder constant stress. Izv.AN SSSR.Otd.tekh.nauk.Met.i topl. no.5:83-85 S-O '61. (MIRA 14:10)
(Zirconium iodide) (Creep of metals)

OSIPOV, K.A.; TYAN' DE-CHEN

Studying by various methods the speed of plastic deformation of nickel-chromium alloys. Issl. po zharopr. splav. 7:317-318 '61. (MIRA 14:11)

(Nickel-chromium alloys--Testing) (Deformations (Mechanics))

IVANOV, V.I.; OSIPOV, K.A.

Limiting and variable values of the activation energy for the return of the thermoelectromotive force to cold-deformed pure iron. Issl. po zharopr. splav. 7:151-158 '61. (MIRA 14:11)
(Iron--Electric properties) (Activation analysis)

OSIPOV, K.A.; SOTNICHENKO, A.L.

Investigating the dependence of the activation energy of α-Fe creep on straining. Issl. po zharopr. splav. 7:29-33 '61.
(MIRA 14:11)

(Activation analysis) (Creep of metals)

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18.6200

AUTHORS: Osipov, K.A., and Sotnichenko, A.L.

TITLE: Investigating the dependence of the energy of activation of creep of α-Fe on stress

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam, v. 7, 1961, 29 - 77

TEXT: Using K.A. Osipov's hypothesis (Ref. 3: AN SSSR, 121, no. 4, 1958) on the limiting and alternating values of energy of activation, two limiting values were calculated for α-Fe: $q_{\alpha,\gamma}$ = 11.7 kcal/g atom and q = 22.2 kcal/g atom. The value of q corresponds to the limiting value of the energy of activation of slip in the crystal lattice which will be 'locally melted' at those points where this energy value is reached. It can also be shown that q corresponds to a slip stress of approximately 0.5 μ, i.e. to stress the value of which is of the same order as Frenkel's theoretical value. Tests were carried out in a ВПН-С2 (VPN-S2) machine in which the creep and long-term strength could be studied in vacuo under a con-

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stant stress Specimens of cast and forged iron (99.6 %) were given a preliminary anneal in vacuo (1.10^{-4} mm Hg) for 10 hours at 700°C; the temperature was then lowered to 450°C and the specimens were soaked there for 50 hours. The investigations were carried out in the temperature range 250-500°C, in which the modulus of normal elasticity changes very little, whereas at temperatures above 500°C it falls abruptly. The specimens had a total length of 60 mm, a working portion length of 22 mm and a diameter of the working portion of 3 mm. It was found that on increasing the stress from 1 to 30 kg/mm^2, the energy of activation becomes a decreasing curvilinear function of stress, changing from 66 to 20 kcal/g atom On increasing the stress from 30 to 35 kg/mm, the energy of activation remains constant, i.e. a limiting value of 20 kcal/g atom is obtained. At stresses of above 35 kg/mm^2, the specimens rupture on stressing The constant value obtained for the energy of activation is on the average 20.3 kcal/g atom, and is considerably greater than the theoretical value of $q_{\alpha,\gamma}$, this being in good agreement with the second theoretical value of q. The great divergence between the theoretical value of $q_{\alpha,\gamma}$ and the experimental value of 20.3 kcal/g

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atom indicates the possibility that the body-centered cubic lattice may transform into a face-centered cubic lattice during plastic tensile deformation. The calculated value of q/atom is close to that of the energy of vacancy formation and has the same order of value as the nuclear energy of dislocations per atomic plane. There are 7 figures, 1 table and 7 references: 5 Soviet-bloc and 2 non-Soviet-bloc. The reference to the English-language publication reads as follows: J.M. Silcox, Acta metallurgica, 7, 5, 1959.

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AUTHORS: Ivanov, V I., and Osipov, K.A.

TITLE: Ultimate and varying activation energy of recovery of thermoelectromotive force of cold-worked pure iron

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam. v. 7, 1961,

TEXT: The results of an investigation of the recovery kinetics of the thermoelectromotive force (t.e.m.f.) of cold-worked iron are reported, and it is shown that an ultimate and variable activation energy exists for this process. The investigation was carried out on high purity iron (99.99 %) in the form of wire of 0.6 mm diameter having undergone degrees of cold plastic deformation of 80, 90 and 98 %. Prior to deformation, the wire was annealed in vacuum at 800°C for 3 hours. Plastic deformation was carried out at room temperature. Recovery of t.e.m.f. was studied on thermocouples consisting of an annealed and a deformed wire, the t.e.m.f. being measured on each thermocouple immediately after deformation, and after isothermal tempering at various temperatures. The tempering time

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was changed within the limits 30 - 3600 seconds. The specimens were heated at 2500°C/second by means of an electric current. The temperature was measured with an accuracy of ± 0.1°C. For measurement of t e m.f., a mirror galvanometer of scale sensitivity 7 x 10⁻⁸ v/mm was used. The measurements were carried out by two methods: 1) by compensation and 2) by the angle through which the galvanometer mirror turned. The specific t.e.m.f. in μv/degree was calculated by dividing the full measured value of t.e.m.f by the difference in temperatures between the junctions. The existence of an ultimate and variable energy of activation of recovery was confirmed. The energy of activation varies in relation to the degree of recovery from 1.[illegible] to 47.6 kcal/g atom. At degrees of recovery beyond the energy of activation remains practically constant and equal to increase in degree of recovery above [illegible] it rises steeply with increasing the degree of deformation from 80 to 90 % and [illegible] tion of additional elastic deformation during tempering. The ultimate energy of activation (12.25 kcal/g atom) does not change and remains close to the value of the theoretically calculated energy of activation (11.7 kcal/g atom). There are 6 figures. [illegible]

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Ultimate and varying activation ...

15 references; 7 Soviet-bloc and 8 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: R.M. Treco, J. Metals, sec. 2, 8, no. 10, 1956, I.N. Lomer and H.U. Rosenberg, Phil. Mag., 4, no. 10, 1959; A. Seeger, Phys and Chem. of Solids, 4, 3, 1958; C.W. Berghout, Acta Metallurgica 6, no. 10, 1958.

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D204/D303

18.1930

AUTHORS: Osipov, K.A., and Tien-Tieh Ch'eng

TITLE: Study of the rates of plastic deformation of Ni-Cr alloys by various methods

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam, v. 7, 1961, 317 - 318

TEXT: A continuation of previous work (Ref. 1: Izv. AN SSSR, OTN, no. 4, 1959; Ref. 2: ibid, no. 2, 1961) in which the authors measured the hardness of a number of solid solutions of Ni at elevated temperatures and showed that the diagonal of the test indentation d, varied with time t, according to $d = at^b$, where a and b are constants. It was also shown that

$$\ln V_d = \ln b + \frac{\ln a - \ln d}{b} \qquad (2)$$

where V_d - velocity of the plastic deformation (percent/min). In the present work the velocity of plastic deformation of Ni-Cr sys-

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S/180/61/000/005/012/015
E193/E383

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AUTHORS Osipov, K.A. and Sotnichenko, A.L. (Moscow)

TITLE: Creep of iodide zirconium in vacuum under a constant stress

PERIODICAL Akademiya nauk SSSR. Izvestiya Otdeleniye tekhnicheskikh nauk. Metallurgiya i toplivo no. 5, 1961, pp 83 -85

TEXT: In continuation of their earlier work (Ref. 1 - DAN SSSR, 1960 v. 134 no. 2, Ref. 2 - Filial VINITI AN SSSR - Peredovoy proizvodstvennyy i nauchno-tekhnicheskiy opyt 1959 No. P-59-68/6 and Ref. 3 - Problems of the theory of high-temperature strength of metals and alloys Pub by AN SSSR 1960) the present authors studied creep of zirconium tested in vacuum (10^{-5} mm Hg) at temperatures between 18 and 500 °C (i.e. in the α-Zr range) under a constant stress ranging from 10 - 30 kg/mm^2 Typical creep curves are shown in Fig. 1 where the strain (ε °) is plotted against time (τ, hours) graphs a, B and τ relating respectively to tests carried out

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Creep of iodide zirconium ....

under a stress of 10, 20 30 and 25 kg/mm^2, the test temperature being indicated by each curve The rate, $\dot{\varepsilon}$, of steady-state creep was calculated from these curves and it was found that the $\ell n\ \dot{\varepsilon}$ versus 1/T relationship was linear for any stress within the range employed in the present investigation and that contrary to some published reports, extrapolated $\ell n\ \dot{\varepsilon}$ versus 1/T graphs did not intersect at one point. In Fig. 3 $\ell n\ \dot{\varepsilon}$ is plotted against the applied stress (σ, kg/mm^2). Curves 1 (circles) and 2(triangles) relating to tests at 100 and 500 °C respectively. Finally, in Fig. 4, the activation energy (ΔH, kcal/g.atom) for steady-state creep of iodide zirconium is plotted against the applied stress (σ kg/mm^2) the broken line indicating the calculated limiting value of ΔH. It will be seen that, starting from σ = 25 kg/mm^2, ΔH remains constant at a level almost identical with the theoretical value obtained in the previous work (Ref. 3). The close agreement between the experimental and theoretical magnitude of ΔH was taken to

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S/180/61/000/006/016/020
E193/E383

AUTHORS: Ivanov, V.I., Osipov, K.A. and Sotnichenko, A.L. (Moscow)

TITLE: A study of the kinetics of the process of creep and recovery

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Metallurgiya i toplivo, no 6, 1961, 137-143

TEXT: The object of the present investigation was to study the relationship between the activation energy for creep of α-iron and the applied stress as well as the relationship between the activation energy for recovery of this metal and the degree of plastic deformation. Technical purity (99.76%) iron, preliminarily annealed in vacuum (10 hours at 700°C followed by 50 hours at 450°C), was used in creep tests carried out in vacuum (10^{-4} mm Hg) at 250 - 500°C under a constant stress ranging from 10-35 kg/mm^2. The ln $\dot{\epsilon}$ versus 1/T relationship, where $\dot{\epsilon}$ is the rate of creep and T - temperature, was linear over the entire range of the applied

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A study of the kinetics ... S/180/61/000/006/016/020
E193/E383

stresses studied. The variation of the activation energy for steady creep (ΔH) is demonstrated in Fig.2, where ΔH (kcal/g atom) is plotted against the applied stress σ (kg/mm^2). It will be seen that the limiting value of ΔH = 20 kcal/g·atom was attained at $\sigma \geq 30$ kg/mm^2. At $\sigma > 35$ kg/mm^2 fracture of the specimens took place in a very short time. The process of recovery was studied on both technical and high-purity iron (99.67 and 99.99%, respectively). The experimental wire specimens, 0.6 and 1.5 mm in diameter, preliminarily annealed in vacuum (3 hours at 800°C) were deformed plastically at room temperature to 80, 84, 94 and 98% reduction in area. The kinetics of recovery were studied by measurements of the thermo-emf of plastically-deformed against annealed material, which were taken immediately after deformation and during subsequent isothermal treatment at various temperatures. The value of $(1 - e/e_o)$, where e_o and e denote the specific thermo emf ($\mu V/^8C$)

Card 2/[redacted]

A study of the kinetics ...

before and after isothermal annealing, respectively, was taken as the measure of the degree of recovery attained. The results obtained for high-purity specimens, deformed to 94% reduction, are reproduced in Fig. 3, where $(1 - e/e_o)$ is plotted against time (τ, sec) at temperatures indicated by each curve. This relationship can be described by

$$1 - \frac{e}{e_o} = a + b \ln \tau$$

where a and b are temperature-dependent constants. In the next series of experiments the temperature dependence of $(1 - e/e_o)$ was determined. The results are reproduced in Fig. 4, where $(1 - e/e_o)$ is plotted against temperature (^oC) of the isothermal treatment of technical and high-purity iron (graphs a and б, respectively); Curves 1 - 4 in graphs a relate to specimens held at the temperature for

Card 3/[illegible]

1 800, 180 30 and 2.5 sec, respectively, Curves 1 - 5 in graphs 6 relating to a holding time of 3 600, 900, 180, 60 and 30 sec, respectively. These data were used to determine the activation energy for recovery of the metals studied. To this end, the temperatures T at which various degrees of recovery could be attained after various times τ were determined from curves in Fig. 4 These were used to construct curves reproduced in Fig. 5, where ln τ (τ, sec) is plotted against $\frac{1}{T} = 10^4$, the numbers given by each curve indicating the value of $(1 - e/e_o)$, graphs a and 6 relating to technical and high-purity specimens, respectively. Since all the curves reproduced in Fig. 5 were straight lines, it was possible to calculate the activation energy , ΔH , for recovery, from:

$$\ln \tau = A \exp [\Delta H/RT] \qquad (2)$$

A study of the kinetics

where R is the gas constant and
T is the temperature of the isothermal treatment (^{o}K)
The results are reproduced in Fig. 6, where ΔH (kcal/g atom) is plotted against $(1 - e/e_o)$ the circles (1) and triangles (2) relating respectively to high-purity and technical-grade iron. It will be seen that the activation energy for recovery is at its minimum at low values of $(1 - e/e_o)$, remaining practically constant up to $(1 - e/e_o) = 0.3$ and then increasing rapidly to reach $\Delta H = 47.6$ kcal/g.atom at $(1 - e/e_o) = 0.8$. Similar results were obtained for material deformed to 98% reduction which indicated that ΔH would not decrease even for more heavily deformed material. In the last series of experiments the effect of elastic deformation on the kinetics of recovery was studied. To this end $(1 - e/e_o)$ was determined for high purity specimens deformed to 94% reduction which were stressed in the elastic range during the isothermal annealing. The results are reproduced in Fig. 7.

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where $(1 - e/e_o)$ is plotted against the duration of treatment (~ sec) at temperatures indicated by each curve. Comparison of isotherms reproduced in Figs. 2 and 7 shows that the elastic strain superimposed on plastic deformation brings about a significant increase in the rate of recovery only when $(1 - e/e_o)$ exceeds 0.3. The results of calculation showed that for $(1 - e/e_o) = 0.2$, 0.3 or 0.4 the value of ΔH was 12.3, 14.0 and 18.2 kcal/g atom respectively, the corresponding value for specimens not stressed elastically being 12.2, 14.7 and 22.8 kcal/g.atom. This indicates that elastic deformation does not affect the limiting (minimum) value of ΔH. It was inferred from the results obtained that the activation energy for recovery is a function of several states of the crystal lattice, which vary not only with the degree of preliminary deformation but also with the degree of recovery attained. The dependence of the activation energy on the degree of recovery can be attributed to the following factors:

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A study of the kinetics ....

1) the presence in a deformed metal of volumes with different density of defects of various types;
2) variation of the density and distribution of defects during isothermal treatment;
3) different stability of different types of defects;
4) dependence of the activation energy for recovery on the nature of the defects and their density in elemental volumes in which they migrate.

There are 7 figures, 1 table and 11 references: 7 Soviet-bloc and 4 non-Soviet-bloc. The two English-language references quoted are: Ref. 3: H. Bross and A. Seeger - The Physics and Chemistry of Solids, 1958, v.4, no. 3, 161;
Ref. 8: Silcock, J.M., Acta metallurgica, 1959, v.7, no. 5.

SUBMITTED: January 10, 1961

Card 7/[redacted]

IVANOV, V.I.; OSIPOV, K.A.

Studying the kinetics of the growth of grains in high-purity α-iron. Dokl.AN SSSR 138 no.2:338-341 My '61. (MIRA 14:5)

1. Institut metallurgii im. A.A.Baykova Akademii nauk SSSR. Predstavleno akademikom G.V.Kurdyumovym.
(Iron crystals--Growth)

IVANOV, V.I. (Moskva); OSIPOV, K.A. (Moskva); SOTNICHENKO, A.L. (Moskva)

Investigating kinetics of creep and recovery processes. Izv. AN SSSR. Otd. tekh. nauk. Met. i topl. no.6:137-143 N-D '61. (MIRA 14:12)
(Creep of metals)

IVANOV, V.I.; OSIPOV, K.A.

Investigating the kinetics of thermoelectromotive force recovery in cold-deformed iron. Fiz. met. i metalloved 11 no.3:360-367 Mr '61. (MIRA 14:3)

1. Institut metallurgii AN SSSR.
(Activity coefficients)
(Thermoelectricity)

23832
S/020/61/138/002/015/024
B104/B207

18 7500 1555 1145

AUTHORS: Ivanov, V. I. and Osipov, K. A.

TITLE: A study of the grain growth in highly pure α-iron

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 138, no. , 1961, 338-341

TEXT: The iron investigated contained the following impurities: 0.001 % O, 0.001 % C, 0.002 % S, less than 0.002 % N and traces of Cu, Ni, and Si. Iron rods of 7.7 mm diameter were subjected to a preliminary treatment during which they were cold formed and, subsequently, subjected to a recrystallization annealing; the resulting grain size diameter was less than 0.2 mm. Grain growth was studied at electric heating and a mean rate of 200 degrees/sec. In the range of from 700 to 900°C, the rate of heating was reduced from 300 to 150 degrees/sec. After heating to a pre-determined temperature, the specimens were chilled in water, the interval between the end of heating and dipping of the sample into water being less than 0.02 seconds. The temperature conditions of heating were registered with a Cr-Al thermocouple, which was fixed in the middle of the sample, by means of a loop oscilloscope and a ballistic galvanometer. The results of

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A study of the grain growth in nighly.

measurement are graphically represented in Fig. 1. When heating at constant rate a, the rate of shifting of the grain boundaries G can be determined from the equation $G = \frac{1}{2} a dD/dt$, where $D = f(t)$ is the mean grain diameter. If a is not constant, $D = \psi(\tau)$ must always be determined (τ denotes the time). The lower part of Fig. 1 shows the temperature t as a function of time. The curve $t = \varphi(\tau)$ is determined from the oscillograms. The curve $D = \psi(\tau)$ is constructed, as shown in Fig. 1, by means of the experimentally determined curve $D = f(t)$. (Fig. 1б). According to the above equation, the values G = 128; 188; 210; 230; 300 and $354 \cdot 10^{-5}$ cm/sec are graphically obtained from this curve at temperatures of 735, 765, 790, 810, 865 and 890°C. In another experimental series, the specimens with 700 degrees/sec were heated to 810 ± 5°C and kept at this temperature for a varying length of time according to the individual specimen, e.g. for 0, 0.4, 1.0, 2.25, 3.0, 125, 275, 660, 900 and 1800 seconds. The respective grain diameters were: 43, 63, 87, 128, 141, 175, 194, 205, 210 and $240 \cdot 10^{-4}$ cm. The mean linear shifting rate of the grain boundaries was in the given periods of time 250, 200, 164, 87, 1.31, 0.63, 0.20, 0.10 and

Card 2/5

A study of the grain growth in highly...

$0.17 \cdot 10^{-5}$ cm/sec. The slowing down of the shifting rates of the grain boundaries is explained by the reduction of the radius of curvature of the grains and the increasing concentration of impurities at the grains. Owing to the high purity of iron, this state occurs only with very large grains. From the discussion of the results the authors conclude that the mechanism for the grain growth as suggested by Mott (Proc. Phys. Soc., 60, 391, (1948)) is very probable. Accordingly, the grain, when growing, melts at its boundaries and solidifies again with the boundary being shifted in outward direction. The authors' experimental data can be easily described by Feltham's equation (J. Inst. Metals, 86, (2) 92, (1957); Acta metallurg., 5, 97 (1957); Proc. Phys. Soc., B 69, 1173 (1956))

$$D^2 - D_o^2 = K_o \exp(-\Delta H/RT)\tau \qquad (1).$$

D and D_o are the mean values, the initial and the permanent diameter of the grains, τ the time at which τ is constant, K_o a constant coefficient, ΔH the activation energy, R, the gas constant, T, the absolute temperature. By means of (1) G may be represented by

$$G = \frac{1}{2}\frac{dD}{d\tau} \simeq \frac{1}{2}\frac{K_o}{D}\exp(-\Delta H/RT) \qquad (2).$$

Card 3/5

The results of the second experimental series are in good agreement with (2). Herefrom, 25.3 kcal/gram·atom is obtained as activation energy for the grain growth. In a preliminary study (Ref. 20 Izv. AN SSSR, Metallurgiya i toplivo, No. 2, (1960)). basing on the hypothesis on the activation energy of various processes in solids, the authors obtained theoretically an activation energy of 22.2 kcal/gram·atom. Finally, the fact is discussed that in the case of lead and iron ΔH and q are almost equally high (see Ref. 20). This is brought into relation with the melting and re-solidification of the grain boundaries. V. P. Fedotov supplied the pure iron for this study. There are 3 figures and 24 references: 11 Soviet-bloc and 13 non-Soviet-bloc.

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR (Institute of Metallurgy imeni A. A. Baykov, Academy of Sciences USSR)

PRESENTED: January 3, 1961, by G. V. Kurdyumov, Academician

SUBMITTED: December 10, 1960

IVANOV, V.I.; KARAMYSHEV, I.P.; OSIPOV, K.A.

Crystal growth in high purity alpha-iron during rapid electric heating.
Trudy Inst. met. no.11:71-77 '62. MIRA 15:
(Iron--Heat treatment) (Crystals--Growth)

OSIPOV, Kirill Afanas'yevich; GRUM-GRZHIMAYLO, N.V., doktor khim. nauk, otv. red.

[Certain activated processes in hard metals and alloys]Nekotorye aktiviruemye protsessy v tverdykh metallakh i splavakh. Moskva, Izd-vo Akad. nauk SSSR, 1962. 130 p. (MIRA 16:1)
(Metallography) (Activity coefficients)

IVANOV, V.I. (Moskva); OSIPOV, K.A. (Moskva)

Effect of the rate of heating on the activation energy of iron and steel recrystallization. Izv. AN SSSR. Otd. tekh. nauk. Met. i topl. no.2:84-91 Mr-Ap '62. (MIRA 15:4)
(Activity coefficients) (Crystallization)

VOL, Abram Yevgen'yevich; AGEYEV, N.V., red.; ABRIKOSOV, N.Kh., doktor khim.nauk, red.; KORNILOV, I.I., doktor khim.nauk, red.; SAVITSKIY, Ye.M., doktor khim.nauk, red.; OSIPOV, K.A., doktor tekhn.nauk, red.; GUSEVA, L.N., kand.khim.nauk, red.; MIRGALOVSKAYA, M.S., kand.khim.nauk, red.; SHKLOVSKAYA, I.Yu., red.; MURASHOVA, N.Ya., tekhn.red.

[Structure and properties of binary metallic systems] Stroenie i svoistva dvoinykh metallicheskikh sistem. Pod rukovodstvom N.V. Ageeva. Moskva, Fizmatgiz. Vol.2. [Systems of vanadium, bismuth, hydrogen, tungsten, gadolinium, gallium, hafnium, germanium, holmium, dysprosium, europium, iron] Sistemy vanadiia, vismuta, vodoroda, vol'frama, gadoliniia, galliia, gafniia, germaniia, gol'miia, disprozilia, evropiia, zheleza. 1962. 982 p. (MIRA 15:5)

1. Chlen-korrespondent AN SSSR (for Ageyev).
(Alloys) (Systems (Chemistry)) (Phase rule and equilibrium)

S/279/63/000/001/020/023
E040/E451

AUTHORS: Osipov, K.A., Sotnichenko, A.L. (Moscow)

TITLE: Effect of oxidizing atmosphere and of stress variation on the creep and long-time strength of iron, titanium and carbon steel

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Metallurgiya i gornoye delo. no.1, 1963, 181-186

TEXT: The creep and long-time strength of technically pure iron (99.97%), α-Ti (99.97%) and У-8 (U-8) grade carbon steel were investigated under vacuum and in air under various loading conditions. Before tests, the iron and steel specimens were first annealed under a vacuum of 1×10^{-4} mm Hg for 10 hours at 800°C. Titanium specimens were similarly annealed for 240 hours. An analysis of the creep curves of the specimens tested at 600°C under a stress of 10 kg/mm^2 showed that the time-to-rupture of the titanium specimens tested in vacuum was reduced by about 2.5 times, that of the iron specimens was reduced by nearly 1.5 times and that of the U-8 steel was reduced by nearly 3 times compared with

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Effect of oxidizing ...

the corresponding values obtained in tests in air. Tests were also carried out at various temperatures between 430 and 515°C and the creep curves plotted at several test temperatures under vacuum and in air. A graph is also given of the logarithm of the steady-state creep of all the test specimens. Calculations were made of the creep activation energy under various test conditions employed. An oxidizing atmosphere lowers the steady-state creep activation energy of the U-8 carbon steel by 22 kcal/mol and a further reduction of the creep activation energy by 25 kcal/mol results from an increase of the stress and a decrease of the specimen cross-section area during tests. In the case of the iron specimens the effect of both these factors reduces the steady-state creep activation energy by 26 kcal/mol. On the other hand, an oxidizing atmosphere reduces the creep rate of titanium at temperatures below 600°C and increases it at temperatures exceeding 600°C. There are 4 figures and 3 tables.

SUBMITTED: September 13, 1962

Card 2/2

L 11291-63 EWP(q)/EWT(m)/BDS--AFFTC/ASD--JD

ACCESSION NR: AP3000917 S/0279/63/000/002/0146/0152

AUTHOR: Osipov, K. A. (Moscow); Miroshkina, Ye. M. (Moscow); Sotnichenko, A. L. (Moscow)

TITLE: Investigation of the creep of α- and β-modifications of Ti-Zr alloys

SOURCE: AN SSSR. Izv. otd. tekh. nauk. Metallurgiya i gornoye delo, no. 2, 1963, 146-152

TOPIC TAGS: titanium-zirconium alloys, α-alloys, β-alloys, creep, activation energy, creep mechanism

ABSTRACT: The creep behavior of α- and β-modifications of polycrystalline Ti-Zr alloys in a vacuum of about 1 x 10^{-4} mm Hg under a constant tensile stress has been studied in an effort to determine the mechanism of steady-stage creep. The alloys (25.15, 50.01, and 75.50 at% Zr, 0.006% max N, 0.03% max C and O_2, and 0.03% max Fe) were vacuum-arc melted, forged into rods, annealed for 24 hr at 800C and for 168 hr at 450C (alloy with 50 at% Zr) or at 550C (alloys with 25 and 76 at. % Zr). The α-modification alloys were tested at temperatures from

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L 11291-63
ACCESSION NR: AP3000917

20 to 200C under a stress of 30 to 70 kg/mm^2. The activation energy ΔH of the steady-stage creep, determined from ln ε -1/T curves (ε, rate of the steady-stage creep; T, absolute temperature), was found to be constant at stresses higher than 40-50 kg/mm^2 (depending on alloy compositions) and equal to 8100, 6900, and 8000 cal/mol for Zr contents of 25, 50, and 75 at%, respectively. These values are very close to the limiting values of activation energy calculated under the assumption that in α-Ti-Zr alloys the creep-induced activated state of atoms or ions corresponds to that of a local allotropic transformation. This leads to the conclusion that the creep of α-Ti-Zr alloys under high stresses is affected by a mechanism directly associated with a local allotropic transformation. Creep tests of the β-modification of Ti-Zr alloys were carried out under a constant tensile strength of 0.5 kg/mm^2. Analysis of the data obtained shows that the steady-stage creep of the β-modification of Ti-Zr alloys occurs through a mechanism directly associated with melting. Orig. art. has: 2 formulas, 6 figures, and 4 tables.

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Institute of Metallurgy)

SUBMITTED: 29Nov62 DATE ACQ: 12Jun63 ENCL: 00

SUB CODE: ML NO REF SOV: 012 OTHER: 002

Card 2/2

ACCESSION NR: AT4013923 S/2659/63/010/000/0027/0031

AUTHOR: Osipov, K. A.; Sotnichenko, A. L.

TITLE: Investigation of the limiting values of creep activation energy for titanium-zirconium alloys

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya po zharoprochny*m splavam, v. 10, 1963, 27-31

TOPIC TAGS: creep, creep activation, creep activation energy, titanium, zirconium, titanium zirconium alloy

ABSTRACT: The author previously proved that for set creep at high loads the activation energies of α-titanium and α-zirconium approach a constant limiting value. The present paper includes information on creep of polycrystalline alloys of the titanium-zirconium type. The samples were tested for creep at 25-200C and loads 08 30-70 kg/mm^2 on a VPN-S_2 machine after being hardened in a vacuum arc furnace. The set creep rate (% deformation/min.) was calculated from the curves obtained. The logarithm of the set creep rate was found to be inversely proportional to the temperature for all values of stress (see Fig. 1 in the Enclosure). Analysis of the results showed that in alloys of the titanium-zirconium type in the α-modification, the nature of the activated state during creep at high

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ACCESSION NR: AT4013923

ENCLOSURE: 01

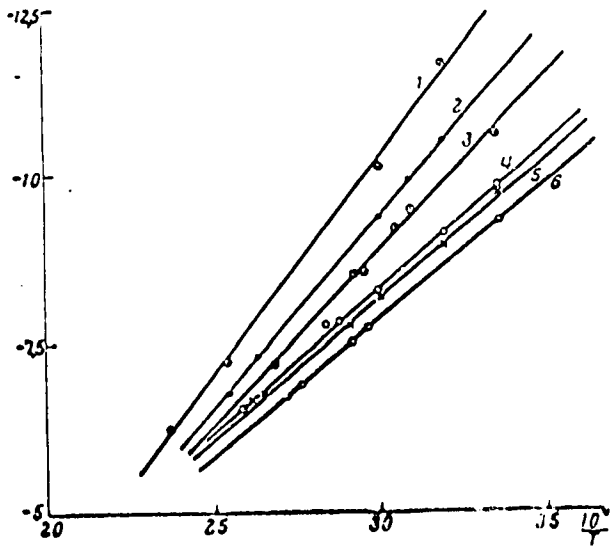

Fig. 1. Relationship between the logarithm of the set creep rate and temperature for the alloy Ti + 25 at % 2r. Stress (in kg/mm^2): 1-40, 2-45, 3-50, 4-60, 5-65, 6-70.

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ACCESSION NR: AT4013935 S/2659/63/010/000/0105/0109

AUTHOR: Osipov, K. A.; Miroshkina, Ye. M.; Sotnichenko, A. L.

TITLE: An investigation of the set creep of the β-modification [illegible] zirconium alloys

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam, v. 10, 1963, 105-109

TOPIC: [illegible] zirconium [illegible]

ABSTRACT: [illegible] investigating the creep [illegible] ways [illegible] The [illegible] 0.006%, carbon [illegible], oxygen [illegible] on a machine described by Borisov. [illegible] were 15 mm [illegible] part and a diameter of 14 and 2.5 mm, respectively, and were annealed in a vacuum before testing at 1000C for 24 hours. The tensile stress was constant at

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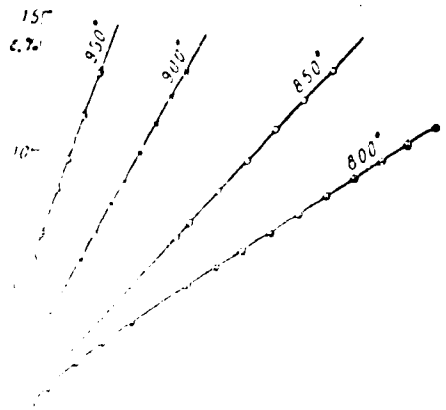
ENCLOSURE: 01



L 17594-65 EWT(m)/T/EWP(t)/EWP(b) ASD(m)-3 JD/MLK
ACCESSION NR AM4046727 BOOK EXPLOITATION S/ 3+1

Ivanov, Vadim Ivanovich; Osipov, Kirill Afanas'yevich

Recovery and recrystallization in metals at rapid heating (Vozrat i rekristallizatsiya v metallakh pri by*strom nagreve), Moscow, Izd-vo "Nauka", 1964, 184 p. illus., biblio. (At head of title: Akademiya nauk SSSR. Gosudarstvenny*y komitet po chernoy i tsvetnoy metallurgii pri Gosplane SSSR. Institut metallurgii im. A. A. Baykova)

TOPIC TAGS: metal recrystallization, metal return, metal grain structure

TABLE OF CONTENTS [abridged]:

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L 17594-65
ACCESSION NR AM4046727

SUB CODE: MM SUBMITTED: 06Feb64 NR REF SOV: 129

OTHER: 172

Card 2/2

ACCESSION NR: AP4029840 S/0279/64/000/002/0161/0163

AUTHOR: Osipov, K.A. (Moscow); Sotnichenko, A.L. (Moscow)

TITLE: Investigation of the creep of the β-modification of alloys of the titanium-zirconium system by torsion method

SOURCE: AN SSSR Izv. Metallurgiya i gornoye delo, no.2, 1964, 161-163

TOPIC TAGS: titanium based alloy, zirconium containing alloy, torsion method, creep

ABSTRACT: The authors state that in view of the importance of the energy parameters investigation of the concentration dependence of activation energy is of great interest in the action of other forms of applied stresses which are different from the tensile stresses. The results of the study are presented in tables and a graph. It was shown that in testing the tensile creep action, as well as tangent stresses, the same character of concentration dependence of activation energy of the established creep was observed. The quantitative discrepancy between the activation energy values can be explained by the difference of the stressed state in these two types of tests. Orig. art. has: 2 tables and 1 figure.

ASSOCIATION: none

Card 1/2

ACCESSION NR: AP4040991 S/0279/64/000/003/0161/0162

AUTHOR: Osipov, K. A. (Moscow); Sotnichenko, A. L. (Moscow)

TITLE: On the duration of tests for creep and rupture strength of metals and alloys

SOURCE: AN SSSR. Izvestiya. Metallurgiya i gornoye delo, no. 3, 1964, 161-162

TOPIC TAGS: zirconium creep test, aluminum creeptest, titanium zirconium alloy, alloy creep test, creep test duration, creep test, stress rupture test duration, stress rupture test, zirconium, aluminum

ABSTRACT: The effect of the duration of creep tests on the relationship between the rate of secondary stage creep ε and rupture life τ and the time reciprocal 1/T has been studied in the cases of zirconium iodide vacuum melted alloys of titanium with 50 and 76 at% Zr. and 99.99%-pure aluminum. All tests were conducted in a vacuum of $1 \cdot 10^{-4}$ mmHg under constant stress with a test time from 10 to 1500 hr. The test time for iodide zirconium vacuum annealed at 800C

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25(1,7) PHASE I BOOK EXPLOITATION SOV/2740

Osipov, Kim Aleksandrovich

Metodika resheniya zadach po rezaniyu metallov; predmet "Osnovy ucheniya o rezanii metallov i rezhushchiy instrument" (Methods of Solving Problems in Metal Cutting; for the Course, Fundamentals of the Study of Metal Cutting and the Cutting Tools) Moscow, 1958. 75 p. Errata slip inserted. 1,000 copies printed.

Sponsoring Agency: Vsesoyuznyy zaochnyy stankoinstrumental'nyy tekhnikum.

Reviewer: N. A. Nefedov, Engineer.

PURPOSE: This textbook is intended for students of correspondence tekhnikums specializing in metal cutting and tooling.

COVERAGE: This textbook deals with the principles of cutting regime calculation in metal machining. Problems are given for the calculation of cutting forces, power requirements, permissible cutting speeds, and proper machining time in lathe work, planing, milling, drilling, and other standard metal-working operations. Each chapter of the manual contains examples of solutions for the given set of problems. There are 6 references, all Soviet.

Card 1/3

TABLE OF CONTENTS:

Methods of Solving Problems (Cont.) SOV/2740

AVAILABLE: Library of Congress (TJ1230.083)

GO/fal
12-30-59

Card 3/3

YUKHIDOV, Mikhail Yefimovich; MANUYLOV, Leonid Konstantinovich; OSIPOV, Kim Aleksandrovich; KOVALEV, A.M., inzh., ved. red.; ESTERKIN, M.A., inzh., red.; SMIRNOV, B.M., tekhn. red.

[Highly efficient methods of slitting shafts]Vysokoproizvoditel'nye metody obrazovaniia shlitsev na valakh. Moskva, Filial Vses. in-ta nauchn. i tekhn. informatsii, 1958. 17 p. (Peredovoi nauchno-tekhnicheskii i proizvodstvennyi opyt. Tema 10, No.M-58-90/18) (MIRA 16:2)
(Metal cutting) (Shafting)

YUKHVID, M.Ye.; OSIPOV, K.A.

Using hard-alloy cutting tools in form planing of steel.
Stan.i instr. 29 no.11:29-31 N '58. (MIRA 11:11)
(Planing machines)

OSIPOV, K.A.

Investigating the process of machining slots on shafts by broaching and planing with multicut heads. Trudy Inst. mash. 1:101-119 '59. (MIRA 12:12)
(Metal cutting)

BELOV, V.S.; MANUYLOV, L.K.; OSIPOV, K.A.; CHERNIKOV, S.S.; ACHERKAN, N.S., prof., doktor tekhn. nauk, red.; PELEKH, M.A., tekhn. red.

[Modern methods of broaching used abroad; survey compiled on the basis of foreign periodical literature in the field of the manufacture of machinery] Sovremennye metody protiagivaniia za rubezhom; obzor sostavlen po materialam zarubezhnoi periodicheskoi literatury v oblasti mashinostroeniia. Pod red. N.S.Acherkana. Moskva, Vses. in-t nauchnoi tekhn. informatsii, 1961. 57 p. (MIRA 14:7)

(Broaching machines)

NEFEDOV, N.A., inzh.; OSIPOV, K.A., inzh.; ARSHINOV, V.A., kand. tekhn nauk, dots., retsenzent; EPSHTEYN, A.Yu., inzh., retsenzent; KUKIN, P.A., inzh., red.; SOKOLOVA, T.F., tekhn. red.

[Problems and examples of metal cutting and metal-cutting tools] Sbornik zadach i primerov po rezaniiu metallov i rezhushchemu instrumentu. Moskva, Mashgiz, 1962. 224 p. (MIRA 15:11)
(Metal cutting) (Metal-cutting tools)

ACC NR: AP7002406 SOURCE CODE: UR/0363/66/002/012/2234/2236

AUTHOR: Vishnyakov, B. A.; Osipov, K. A.; Otopkov, P. P.

ORG: Institute of Metallurgy im. A. A. Baykov, Academy of Sciences, SSSR (Institut metallurgii Akademii nauk SSSR)

TITLE: Study of the deposition of tin and silicon films from their organic compounds under the influence of an electron beam

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 2, no. 12, 1966, 2234-2236

TOPIC TAGS: tin, silicon, metal deposition, electron beam, silane, organotin compound

ABSTRACT: A recently developed method of depositing thin films by decomposing organic compounds subjected to electron bombardment was tested on tetraethyltin and tetrapropyltin (for depositing tin) and triethylvinylsilane (for depositing silicon), and the factors affecting the growth rate of the silicon film were studied. The decomposition of triethylvinylsilane molecules was studied in particular detail. It was found that the growth rate of the silicon film during 5 hr changed linearly with time. At substrate temperatures of 135-200°C, the growth rate also varied linearly with changing current density of the electron beam. The growth rate decreased with rising substrate temperature and was independent of the electron energy. A linear relationship was ob-

Card 1/2 UDC: 621.9-418

ACC NR: AP7002406

served between the vapor pressure in the chamber and the growth rate of the film. The electric resistance of silicon films obtained under various conditions was measured. Orig. art. has: 2 figures, 1 table and 4 formulas.

SUB CODE: 07,11/ SUBM DATE: 16Nov65/ OTH REF: 005

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ACC NR: AP7005892 SOURCE CODE: UR/0181/66/008/012/3706/3708

AUTHOR: Vishnyakov, B. A.; Osipov, K. A.

ORG: Institute of metallurgy im. A. A. Baykova AN SSSR (Institut metallurgii AN SSSR)

TITLE: Deposition of molybdenum carbide films from molybdenum hexacarbonyl under the action of the electron beam

SOURCE: Fizika tverdogo tela, v. 8, no. 12, 1966, 3706-3708

TOPIC TAGS: thin film, molybdenum carbide, ~~film, film~~-deposition, metal semiconductor, ~~vapor~~ vapor deposition, ~~film growth rate, film~~ electric resistance, vanadium ~~carbide~~

ABSTRACT: Molybdenum-carbide films, 1100—8800 Å thick, were made by vapor deposition of molybdenum hexacarbonyl molecules ($Mo(CO)_6$) on a quartz or a mica-coated glass substrate at -30, -25, -15, -5, +5 and +10°C, in a vacuum of $2 \cdot 10^{-6}$ mm Hg. A stream of $Mo(CO)_6$ molecules was directed onto the substrate simultaneously with the electron beam at a current density of 0.3—1.5 μamp/cm^2 and an accelerating voltage of 250—600 v The film

UDC: none

Card 1/2

OSIPOV, K.

Northwards. Grazhd.av. 16 no.1:15 Ja '59. (MIRA 12:3)
(Aeronautics, Commercial)

OSIPOV, Konstantin Georgiyevich; MOLYUKOV, G.A., vedushchiy red.; TROFIMOV, A.V., tekhn.red.

[Hydraulic power transmissions of drilling rigs] Turbo-peredachi burovykh ustanovok. Moskva, Gos.nauchno-tekhn. izd-vo neft. i gorno-toplivnoi lit-ry, 1960. 179 p. (MIRA 13:11)

(Oil well drilling rigs)

OSIPOV, K.D.; PASYNKOV, V.V.; REMEZ, G.A., red.; GOLOVANOVA, L.V., red.; KOCHETKOVA, N.A., red.; KUKOLEVA, T.V., red.

[Reference book on radio measuring devices] Spravochnik po radioizmeritel'nym priboram. Pod red. G.A.Remeza. Moskva, Sovetskoe radio. P.5. [Supplement] Dopolnitel'naia. 1964. 397 p. (MIRA 17:6)

OSIPOV, K.D.; PASYNKOV, V.V.; REMEZ, G.A., red.; MASHAROVA, V.G., red.; SMUROV, B.V., tekhn.red.

[Handbook on devices for radio measurements] Spravochnik po radioizmeritel'nym priboram. Pod red. G.A.Remeza. Moskva, Izd-vo "Sovetskoe radio." Pt.3. [Instruments for measuring the form of oscillations] Pribory dlia izmereniia formy kolebanii. 1959. 170 p. (MIRA 13:4)

(Electronic measurements)

OSIPOV, K. D.

"Vacuum-Tube Voltmeter", Popular Radio Library, No. 64, Editor-in-Chief, Academician A. I. Berg. Gosenergoizdat, Moscow-Leningrad, 56 pp, 1950.

OSIPOV, K.D.; MIKLASHEVSKIY, S.N., inzh., assistent

Plastic components for locomotive friction units. Zhel.dor.transp. 42 no.10:54-58 O '60. (MIRA 13:10)

1. Zamestitel' nachal'nika lokomotivnogo depo g.Gomel' (for Osipov). 2. Belorusskiy institut inzhenerov zheleznodorozhnogo transporta (for Miklashevskiy).
(Locomotives--Construction) (Plastics)

PHASE I BOOK EXPLOITATION SOV/4410

Osipov, Konstantin Dmitriyevich, and Vsevolod Vladimirovich Pasynkov

Spravochnik po radioizmeritel'nym priboram, chast' I: Pribory dlya izmereniya toka, napryazheniya, moshchnosti i parametrov elementov skhem (Handbook on Radio Measuring Instruments, Pt 1: Instruments for Measuring Current, Voltage, Power, and Parameters of Circuit Elements). Moscow, Izd-vo "Sovetskoye Radio," 1959. 220 p. Errata slip inserted. No. of copies printed not given.

Ed. (Title page): G.A. Remez; Ed. (Inside book): N.Ya. Arenberg; Tech. Ed.: B.V. Smurov.

PURPOSE: This handbook is intended for technical personnel engaged in designing, operating or repairing radio engineering or radio measuring equipment.

COVERAGE: This first part of the handbook contains information on radio measuring instruments of general application whose purpose is to measure the values of current, voltage, power, capacitance, inductance, circuit Q-factors, resistances and reactances. The description of each instrument consists of the following sections: purpose and field of application, basic technical characteristics,

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OSIPOV K. D.

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USSR/Radio - Literature Apr 51
Remote Control

"New Books"

"Radio" No 4, p 62

Lists 15 new brochures, none running over 72 pp and most having about 50 pp, published by DOSARM and Gosenergoizdat. Among the more interesting are: "Amateur Short-Wave Antennas" by V. N. Gusev, "The Cathode-Ray Oscillograph" by K. D. Osipov, and "Remote Radio Control" by V. N. Loginov. Latter gives basic principles

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USSR/Radio - Literature (Contd) Apr 51

on remote control and design of radio-controlled devices, and describes instrs and circuits used in telemech equipments.

181T104

OSIPOV, K.D.; PASYNKOV, V.V.; REMEZ, O.A., red.; SUKHANOV, Yu.I., red.; SMUROV, B.V., tekhn.red.

[Handbook on radio measuring devices] Spravochnik po radioizmeritel'nym priboram. Pod red. O.A.Remeza. Moskva, Izd-vo "Sovetskoe radio." Pt.4. [Special measuring devices and current sources] Spetsial'nye izmeritel'nye pribory i istochniki pitaniia. 1959. 152 p.
(Radio measurements) (Radar) (MIRA 13:5)

MIKLASHEVSKIY, Sergey Nikolayevich, inzh.; OSIPOV, Konstantin Dmitriyevich, inzh.; BERESTOVOY, Ye.I., inzh., red.; BOBROVA, Ye.N., tekhn. red.

[Use of nylon parts for locomotives] Primenenie kapronovykh detalei na parovozakh; opyt depo Gomel' Belorusskoi zheleznoi dorogi. Moskva, Vses. izdatel'sko-poligr. ob"edinenie M-va putei soobshcheniia, 1961. 50 p. (MIRA 14:8)
(White Russia—Locomotives) (Nylon)

PHASE I BOOK EXPLOITATION SOV/5569

Osipov, Konstantin Dmitriyevich, and Vsevolod Vladimirovich Pasynkov

Spravochnik po radioizmeritel'nym priboram. ch. 2: Pribory dlya izmereniya chastoty i izmeritel'nyye generatory (Manual on Radio Measuring Devices. pt. 2: Frequency-Measuring Devices and Measuring Generators) Moscow, Izd-vo "Sovetskoye radio," 1960. 203 p. No. of copies printed not given.

Ed. (Title page): G. A. Remez; Eds.: N. A. Kochetkova and Yu. I. Sukhanov; Tech. Ed.: B. V. Smurov.

PURPOSE : This manual is intended for technical personnal engaged in the development, operation, or maintenance of radio engineering and radio measuring equipment.

COVERAGE: This part of the manual contains information on resonance and heterodyne frequency meters and measuring oscillators (l-f oscillators, signal generators, and standard signal generators). The description of each instrument consists of the

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PHASE I BOOK EXPLOITATION SOV/4102

Osipov, Konstantin Dmitrovich, and V.V. Pasynkov

Spravochnik po radioizmeritel'nym priboram, ch 3: Pribory dlya izmereniya formy kolebaniy (Handbook on Radio Measuring Instruments, Pt 3: Instruments for Measuring Shape of Oscillations) Moscow, Izd-vo "Sovetskoye radio," 1959. 170 p. Errata slip inserted. No. of copies printed not given.

Ed. (Title page): G.A. Remez; Ed. (Inside book): V.G. Masharova; Tech. Ed.: B.V. Smurov.

PURPOSE: This handbook is intended for engineers and technicians engaged in the development, operation, and repair of radio equipment and radio measuring instruments.

COVERAGE: The handbook gives detailed information on electronic oscilloscopes, special oscillographic devices, spectrum and frequency response analyzers, modulation meters, nonlinear distortion measuring equipment, and measuring amplifiers. The book also gives in-

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formation on general purpose, serial production radio measuring instruments, and on instruments which, though out of production, are still widely used. The authors thank G.A. Remez, V.G. Dubenetskiy, and V.N. Sretenskiy. There are no references.

TABLE OF CONTENTS:

Handbook on Radio (Cont.)

PHASE I BOOK EXPLOITATION SOV/4217

Osipov, Konstantin Dmitriyevich, and V.V. Pasynkov

Spravochnik po radioizmeritel'nym priboram, chast' 4: Spetsial'nyye izmeritel'nyye pribory i istochniki pitaniya (Handbook on Radio Measuring Instruments, Pt. 4: Special Measuring Instruments and Electric Current Supply). Moscow, Izd-vo "Sovetskoye radio," 1959. 152 p. No. of copies printed not given.

Ed. (Title page): G.A. Remez; Ed. (Inside book): Yu.I. Sukhanov; Tech. Ed.: B.V. Smurov.

PURPOSE: This handbook is intended for technical personnel engaged in the development, operation, and repair of radio engineering equipment and radiometers.

COVERAGE: This volume is the fourth part of a 4-part work on radio measuring instruments. It covers instruments for measuring field strength and low h-f voltages, special and auxiliary meters for measuring at super high frequencies, electron tube testers, and electric current supplies of radio systems. The authors thank G.A. Remez, V.G. Dubenetskiy, and V.N. Sretenskiy. No references are given.

Card ~~1/6~~

OSIPOV, Konstantin Dmitriyevich; PASYNKOV, Vsevolod Vladimirovich; REMEZ, G.A., red.; ARENBERG, N.Ya., red.; SMUROV, B.V., tekhn.red.

[Handbook on radiomeasuring devices] Spravochnik po radioizmeritel'nym priboram. Moskva, Izd-vo "Sovetskoe radio." Pt.1. [Devices for measuring current, voltage, capacity, and parameters of the circuit elements] Pribory dlia izmereniia toka, napriazheniia, moshchnosti i parametrov elementov skhem. Pod red. G.A.Remeza. (MIRA 13:2) 1959. 220 p.
(Radio measurements--Equipment and supplies)

OSIPOV, K.G.

Transmitting power to turbodrills. Neft. khoz. 35 no.12:1-10 D '57.
(Oil well drilling) (MIRA 11:2)

OSIPOV, K.G.

Designing, manufacturing, and operating hydrodynamic transmissions for drives used in oil field equipment. [Izd.] LENINGRADSKII METALLICHESKII ZAVOD 52:126-135 '59. (MIRA 12:12)

(Oil hydraulic machinery)

SOV/93-58-10-4/19

11(0)

AUTHOR: Osipov, K. G. and Repnin, V. B.

TITLE: Industrial Testing of a Drilling Rig Drive Equipped With Turbine Transmissions (Promyshlennoye ispytaniye burovogo privoda s turboperedachami)

PERIODICAL: Neftyanoye khozyaystvo, 1958, Nr 10, pp 14-22 (USSR)

ABSTRACT: The No. 4 Drilling Department of the Tuymazaburneft' Trust in co-operation with the Giproneftemash Institute tested a five-diesel drilling rig drive equipped with turbine transmissions. The 5D-Tp drive with the Tp2-300 transmissions were assembled from standard parts of the Uralmash 5D drive. The experimental unit consisting of V2-300A diesel engines, PM-500, PM-700, and PM-1070 pneumatic clutches, U2-4-5 winches, and U8-3 pumps is shown in (Fig. 1). The data on one of the drives tested on a Giproneftemash bench are shown in (Fig. 2). The results of the industrial experiments in an injection well drilled with T12M2-10" and T12M3-10" turbodrills are shown in(Figs. 3-10). The data on the pumps are given in Tables 1-2. The test units were equipped with turbine transformers since drives with turbine clutches had been tested by the Giproneftemash Institute for the Grozneft' and Tatneft' Associations. The tests of the 5D-Tp drive and the Tp-2-300 transmissions were not exhaustive,

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nevertheless they confirmed the the theoretical assumptions on this subject presented in "Neftyanoye khozyaystvo", 1948, Nr 6, 1954, Nr 10, and 1957, Nr 12. The tests have shown that turbine transformers in drilling rig drives increase the mechanical rate of rig hoisting, the hydraulic power delivery to the pumps, and the drive efficiency in case of engine breakdown, and assure a complete and even diesel power output without engine control or synchronization. There are 10 figures and 2 tables.

OSIPOV, K.G., kand.tekhn.nauk

Fluid torque converter with reversible impeller vanes. Trudy Giprocneftemasha.Neftepromdelo no.1:13-17 '61. (MIRA 15:8)
(Oil well pumps)

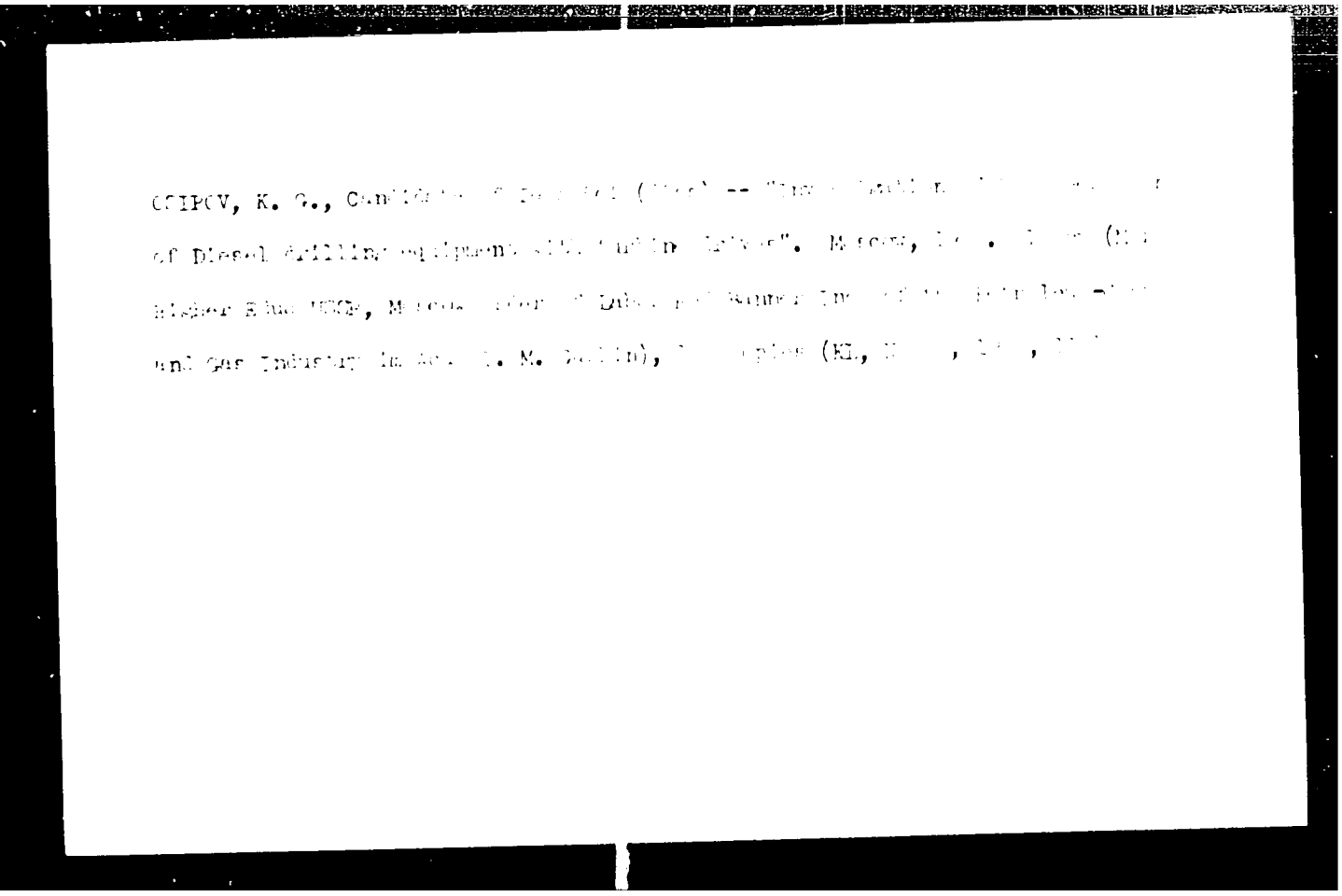
IL'SKIY, Aleksandr Lon_inovich, kand. tekhn.nauk. Prinimali uchastiye: SUD, I.I., kand. tekhn. nauk; OSIPOV, K.G., kand. tekhn. nauk; NIKOLICH, A.S., inzh.; SHKOL'NIKOV, E.M., kand. tekhn. nauk; SKLOVSKIY, G.O., inzh., retsenzent; PETROVA, Ye.A., veduchshiy red.; POLOSINA, A.S., tekhn. red.

[Calculation and design of drilling equipment and tools]Raschet i konstruirovanie burovogo oborudovaniia i instrumenta. Moskva, Gostoptekhizdat, 1962. 636 p. (MIRA 15:12)
(Boring machinery)

OSIPOV, K.G., kand.tekhn.nauk

Unit for measuring torques. Vest.mash. 40 no.4:30-31 Ap '60. (MIRA 13:6)

(Torque--Measurement)



OSIPOV, K.G.

Methods of increasing the tilization of drilling rig capacity. Neft.khoz. 32 no.10:1-5 O 54. (MLRA 7:11)
(Oil well drilling)

OSIPOV, K.G.

What kind of drive should be used in drilling apparatus. Neft.khoz.34 no.6:20-24 Je '56. (MLRA 9:9)
(Oil well drilling--Equipment and supplies)

OSIPOV, K.G., inzhener.

Selection of turbine transformers based on the degree of "transparancy." (MLRA 10:2)
Vest.mash. 37 no.1:25-28 Ja '57.
(Turbomachines)

OSIPOV, K.G.; REPNIN, V.B.

Industrial testing of drill drives with turbotransmissions.
Neft.khoz. 36 no.10:14-22 O '58. (MIRA 11:12)
(Oil well drilling--Equipment and supplies)