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On the Effect of Heating and Cooling Rates (cont.)

heating (~50°C/hr) to a temperature of 1000 - 1200°C, the intensity of the TR and the magnetic characteristics of the steel were quite high; similar TR and properties were obtained at greater rates of heating only within certain narrow temperature intervals which varied for different smeltings. It is noted that the rate of cooling has little effect upon the properties of a steel; however, rapid cooling of specimens results in considerable specific losses during subsequent aging of steel at a temperature of 100°. Optimal soaking time or the optimal rate of drawing was established for the maximum annealing temperature in continuous and intermittent furnaces. The mechanism of the formation of the TR is also discussed.

A.B.

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SOV/137-58-11-23401

Translation from: Referativnyy zhurnal. Metallurgiya, 1958, Nr 11, p 222 (USSR)

AUTHORS: Druzhinin, V.V., Kudryavtsev, I.P.

TITLE: On the Dispersion of the Recrystallization Texture in Cold-rolled Electrical Steel (O rasseyanii tekstury rekristallizatsii v kholodnokatanoy elektrotekhnicheskoy stali)

PERIODICAL: Metallovedeniye i termoobrabotka. Moscow, Metallurgizdat, 1958, pp 88-94

ABSTRACT: Optical methods were employed in studying the degree of completeness of recrystallization texture (DPRT) in production batches of steels E310 and E330. It was established that the DPRT affects the magnetic properties of steel. Specimens possessing high magnetic-induction characteristics exhibited a high DPRT in the planes (110) [100], the [100] plane in the plane of rolling deviating from the direction of rolling by $\pm 5^{\circ}$; specimens with poor magnetic properties exhibited a (100) [100] texture rotated by $\pm 10\text{-}15^{\circ}$ within the plane of rolling.

A.B.

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APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

AUTHORS: Druzhinin, V. V. and Kurennykh, L. K. SOV/126-6-1-4/33

TITLE: On the Influence of Scale on the Magnetic Properties of Hot Rolled Electrical Steel (K voprosu o vliyanii okaliny na magnitnyye svoystva goryachekatanoy elektrotekhnicheskoy stali)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958 Vol.6, No.1 pp 40-45 (USSR)

ABSTRACT: The increase of the specific loss for an induction of 10 000 Gauss is insignificant (a few percent), whilst at 15 000 Gauss it is appreciable (over 5 to 10%) and this phenomenon is explained by Spuner, T. (Ref.2) by the differing permeability of the scale in medium and strong magnetic fields. However, direct investigations of the magnetic properties in such steel have not been carried out and, therefore, this was done by the authors of this paper. The authors have chosen sheets of unpickled dynamo and transformer steel after the normal process of rolling and annealing at 850°C; from each sheet strips of 250 x30 mm weighing about 1 kg were cut. After testing the mechanical properties, the scale was removed by pickling in a 20% sulphuric acid solution to

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On the Influence of Scale on the Magnetic Properties of Hot Rolled Electrical Steel

which common salt was added which stopped almost entirely the dissolution of the metal itself (less than 2 grams). The specific gravity of the pickled and the unpickled steel as well as of the scale and also the Si contents of the respective steels are entered in Table 1. The magnetisation curves without scale, with scale and of the scale itself are graphed in Fig.1 for dynamo steel and in Fig.2 for transformer steel. Fig.3 gives the hysteresis loop for dynamo steel without and with scale;

the change of the total specific losses and the hysteresis losses during pickling of electrical steel are entered for four specimens (Si contents 1 to 4%) for 10 000 and 15 000 Gauss in Table 2. Table 3 contains data on the thickness and the specific electric resistance of the scale of electrical steel (1 and 4% Si). The obtained results lead to the following conclusions:

1) In the investigated sheets of hot rolled dynamo and transformer steel the decrease in the specific weight due to the presence of scale is 0.06 g/cm^3, the specific weight of the scale itself is 7.0 g/cm^3 for dynamo steel

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On the Influence of Scale on the Magnetic Properties of Hot Rolled Electrical Steel

and 6.0 g/cm^3 for transformer steel.
2) The permeability of the scale in weak magnetic fields (up to 0.2-0.3 AT/cm) approaches that of steel, whilst in medium and strong fields the permeability of the scale is considerably lower than that of steel. The B_{300} of the scale amounts to 14 000 Gauss for dynamo steel and 9 000 Gauss for transformer steel.
3) Reduction of the full specific losses due to pickling is insignificant at 10 000 Gauss (0.10 W/kg for dynamo steel and 0.05 W/kg for transformer steel) and is due predominantly to a reduction in the eddy current losses. The reduction of the full specific losses at 15 000 Gauss is greater, 0.5 to 0.8 W/kg for dynamo steel and 0.2 to 0.4 W/kg for transformer steel and is due to a reduction in the hysteresis losses as well as to a reduction of the eddy current losses. The reduction in the hysteresis losses as a result of pickling is caused

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On the Influence of Scale on the Magnetic Properties of Hot Rolled Electrical Steel

by the reduction of the maximum magnetising field and not by reduction in the coercive force.
There are 3 figures, 3 tables and 6 references, 5 of which are Soviet, 1 English.

ASSOCIATION: Verkh-Isetskiy metallurgicheskiy zavod
(Verkh-Isetskiy Metallurgical Works)

SUBMITTED: November 1, 1956.

Card 4/4 1. Steel--Scale 2. Steel--Magnetic properties

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

SOV/110-58-7-7/21

AUTHOR: Druzhinin, V.V., Cand. of Phys.Math.Sci., Zubov, Yu.Ye., Engineer, Kozhurov, A.A., Engineer and Professor Yanus, R.I.

TITLE: An apparatus for measuring the specific losses and magnetic induction of whole sheets of electrical steel (Apparat dlya izmereniya udel'nykh poter' i magnitnoy induktsii elektrotekhnicheskoy stali na tselykh listakh)

PERIODICAL: Vestnik Elektropromyshlennosti, 1958, Nr 7, pp 24-28 (USSR)

ABSTRACT: At present the principal method of determining specific losses and magnetic induction in electrical sheet steel is by the Epstein apparatus, which suffers from a number of disadvantages. The losses of the steel may be increased by work-hardening when the strips are cut or reduced by stress relief. The method is rather unreal because the strips are much narrower than those used in practice and finally the tests waste a good deal of material. Therefore, in recent years attempts have been made in the USSR and abroad to develop accurate and quick methods of testing whole sheets of steel. It is a

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requirement of standard GOST-802-54 that one sheet shall be taken from each ton of steel but not less than 4 sheets per batch. It is, therefore, more convenient to test sheets four at a time rather than singly, and equipment has been designed accordingly. If there are more than four sheets to be tested the quality of the steel is evaluated with a coercivity meter. The coercive force is determined on all the test sheets since it is proportional to the hysteresis loss. For final evaluation of the quality of the steel, four sheets are taken, two of which have the minimum and two the maximum coercive force as specified in standard GOST-802-54 for the Epstein apparatus. The construction of the apparatus is then described. It is intended for sheets of 1200 x
Card 2/5 750 mm. The length of 1200 is what remains from the

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An apparatus for measuring the specific losses and magnetic induction of whole sheets of electrical steel

standard sheet after two pieces have been cut off for the standard mechanical tests. The sheets are mounted in two solenoids, arranged one above the other as shown in Fig 1. The solenoids are 40 mm shorter than the sheets. At the ends of the solenoids there are armatures which form a closed magnetic circuit with the sheets. To ensure good magnetic contact, each armature consists of twelve sections pressed on by springs. A general view of the apparatus is shown in Fig 2. As butt joints are used there is no need to press the sheets flat. Each solenoid has 600 measuring and magnetising turns uniformly distributed over the length. The specific losses are measured by an absolute watt-meter method using a special low-power-factor wattmeter. The formula used for calculating the losses is explained and the significance of the various connections is considered. The estimated errors of the method are discussed in some detail. The distribution of magnetic induction along a sheet is plotted in Fig 3 and the influence of insulation between

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An apparatus for measuring the specific losses and magnetic induction of whole sheets of electrical steel

sheets on the specific losses in steel are given in Table 1. It is considered that the accuracy of the determination of losses in the apparatus is about the same as in the Epstein apparatus. Comparative tests were made between the Epstein apparatus and the new one, with the results given in Table 2. Values are sometimes somewhat lower with the Epstein apparatus, apparently because of the relief of stresses in the steel on cutting. The way in which the equipment is used at the steelworks is described. The extent of the differences between the losses determined in the old and new apparatus on 450 samples is given in Fig 3. On 95% of the samples agreement was within 3% at 10 kilogauss. The agreement rd 4/5 was not quite so good at 15 kilogauss. Certain

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An apparatus for measuring the specific losses and magnetic induction of whole sheets of electrical steel

difficulties may be met in testing hot-rolled steel because the anisotropy of the magnetic properties varies. This is not so important with cold-rolled steel because the magnetic properties are guaranteed only in the direction of rolling. The complete testing time is 5 - 7 minutes. On the basis of six months' experience the method is recommended for general use. There are 3 tables and 3 figures.

Card 5/5

SUBMITTED: January 18, 1958.

1. Steel--Testing equipment 2. Electrical equipment--Design
3. Solenoids--Applications

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

SOV/110-59-5-11/25

AUTHOR: Druzhinin, V.V., Candidate of Physical Mathematical Sciences

TITLE: On the Procedure for Determining the Specific Loss of Cold-Rolled Transformer Steel (O metodike opredeleniya udel'nykh poter' kholodnokatanoy transformatornoy stali)

PERIODICAL: Vestnik elektropromyshlennosti, 1959, Nr 5, pp 41-43 (USSR)

ABSTRACT: When the Epstein apparatus is used to determine iron loss in low-loss steel, the result is affected by work-hardening of the samples during cutting. The new standard GOST 802-58 requires that before samples of cold-rolled steel are tested on the Epstein apparatus they should be heat-treated at a temperature of 750 to 800°C for two hours in a suitable atmosphere. It is assumed that the reduction in loss that occurs is due only to relief of work-hardening produced during cutting of the specimens. This article shows that there are also structural changes in the steel during the heat-treatment and that they contribute to the reduction in the losses. The reductions due to relief of work-hardening and those due to other structural changes were separated in the

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On the Procedure for Determining the Specific Loss of Cold-Rolled Transformer Steel

following way. Samples were cut for the Epstein test and their losses determined. Then they were heat-treated at 750°C for two hours and the losses re-determined. Next strips about 1 mm wide were cut off each edge and the losses determined a third time with due allowance for the change in weight. The difference between the first and second loss-determinations is the total reduction in losses caused by heat-treatment; the difference between the third and second determinations is the increase in the losses caused by work-hardening during shearing of the edges. It will be seen from the results of measurements on nine samples of cold-rolled steel given in table 1 that in samples with low losses (less than 0.7 W/kg) nearly all the change in loss on heat-treatment is due to removal of work-hardening. However, in sheets with losses greater than 0.7 W/kg the reduction in loss on heat-treatment may be two or three times that caused by work-hardening. This difference must be attributed to structural changes in the steel accompanied by reduced

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hysteresis loss and coercive force (see table 2). It is explained that these changes are principally associated with further decarbonisation of the samples and with the relief of remanent stresses left in the sheet after heat-treatment. The presence of remanent stress in the sheets may be demonstrated by cutting them along the direction of rolling, which sometimes reduces the losses and coercive force as will be seen from the results given in table 3 which also give loss results on narrow specimens. It is concluded that Epstein test results on annealed samples of cold-rolled steel can give very misleading results and that it is best to make loss-determinations on whole sheets. There are 3 tables and 1 Soviet reference.

SUBMITTED: 6th October 1958

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

18(3), 18(7), 24(6)
AUTHOR: Druzhinin, V. V.

SOV/126-7-2-18/39

TITLE: Anisotropy in the Brittleness of Silicon Sheet Steel (Ob anizotropii khrupkosti listovoy kremnistoy stali)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1959, Vol 6, Nr 2, pp 278-283 (USSR)

ABSTRACT: Silicon embrittles steel. Its action is enhanced by the influence of the carbide phase (Refs 1-3) and of temper brittleness (Ref 4). As the crystals of steel used for electrical purposes are more or less orientated, then, owing to anisotropy in the mechanical properties of monocrystals of siliceous ferrite, there must also exist anisotropy in brittleness. No data regarding such anisotropy in brittleness for the above steel are available. Steel for electrical purposes is hot-, as well as cold-rolled. The orientation of crystals of hot-rolled steel is weakly preferential, and that of cold-rolled, strongly preferential. As the determination of the crystallographic texture of hot-rolled steel presents considerable difficulties, the author used an indirect, magnetometric method. The texture of steel can be judged from the nature of the mechanical moment curves obtained for a

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disc-shaped specimen. If the curve takes the shape of that shown in Fig 1, then the crystals of ordered orientation will be orientated as shown in Fig 2. If the mechanical moment curve is similar to that shown in Fig 3, then the orientation of crystals will be as shown in Fig 4. The first type of texture is expressed as (100), [110], and the second as (110), [100]. At a (100), [110] - type of texture, the [110] grain diagonals of textured crystals are situated along, and at right angles to, the rolling direction; at a (110), [100] - type of texture, the [001] axes are disposed along the rolling direction, and the [110] axes at right angles to it. The texture of hot-rolled dynamo steel is more pronounced than that of transformer steel, and is more complex. The harmonics A_2 and A_4 can be used to evaluate any change in texture. For example, the amplitude of A_2 for a (100), [110] -type of texture must be zero, and A_4 must have a positive value. As A_4 decreases and A_2 increases, the texture will increasingly tend to change to the (110), [100] type. The

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Anisotropy in the Brittleness of Silicon Sheet Steel

texture, which in hot-rolled dynamo steel attains approximately 25%, can be quantitatively evaluated from the mechanical moment curves. In cold-rolled transformer steel the crystals having a preferred orientation of the type (100), [100] occupy 70-90% by volume of the total number of crystals. Sheets of steel from industrial batches were used for the investigation. Where required, discs for the determination of the crystallographic texture were cut out from the same sheets. In the case of cold-rolled steel, part of the investigation was carried out on monocrystals specimens. In Table 1, data on the dependence of brittle anisotropy on crystallographic texture in specimens of hot-rolled dynamo steel are given. In Table 2, data on brittle anisotropy in specimens of hot-rolled transformer steel are given. In Table 3 data on the number of bends (through 90°) for transformer steel specimens cut out along the rolling direction at right angles to it, with and without carbide inclusions, are given. In Table 4, data on the brittle anisotropy in polycrystalline specimens of cold rolled steel are given. In Table 5, data on the brittle anisotropy in specimens of cold-rolled transformer steel are given. As a result of the above experiments, the author has arrived at

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Anisotropy in the Brittleness of Silicon Sheet Steel

the following conclusions:
1. An anisotropy in brittleness exists in cold-rolled, as well as in hot-rolled, steel.
2. In hot-rolled dynamo steel, a direct relationship exists between the anisotropy in brittleness and the texture of the steel. For specimens having a (110), [100] - type of texture, the number of bends through 90° possible along the direction of rolling is twice that at right angles to it.
3. The number of bends possible for cold-rolled transformer steel specimens, cut out at angles of 0 and 55° to the direction of rolling, is 2.5 - 4 times greater than for specimens cut out at right angles to the direction of rolling. The difference in the number of bends for specimens, cut out at angles of 55 and 90° to the direction of rolling, is proportional to the distances between the cleavage planes. There are 4 figures, 5 tables and 5 Soviet references.

ASSOCIATION: Verkh-Isetskiy metallurgicheskiy zavod (Verkh-Isetskiy Metallurgical Plant)

SUBMITTED: December 9, 1957

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

DRUZHININ, V.V.

Anisotropy of brittleness in sheet silicon steel. Fiz.met. i metalloved. 7 no.2:278-283 F '59. (MIRA 12:6)

1. Verkh-Isetskiy metallurgicheskiy zavod.
(Sheet steel--Testing)
(Steel--Brittleness)

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67668
SOV/126-8-6-16/24

18.1141

AUTHORS: Doroshek, S.I. and Druzhinin, V.V.

TITLE: Components of Core Losses and Magnetic Permeability of Dynamo Steel Alloyed with Phosphorus

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 8, Nr 6, pp 892-895 (USSR)

ABSTRACT: In Soviet-made dynamo steels conforming to GOST 802-58 (types E 11, E 12, E 13, E 21 and E 22) hysteresis accounts for most of the core losses. Doroshek has shown that alloying with phosphorus is known to reduce core losses by increasing grain size and resistivity and changes the gamma-range so that high-temperature treatment can be used (Ref 3). In the present investigations the components of the core losses of dynamo steel (1.8% Si, 0.03% C) containing 0.03, 0.06, 0.12 or 0.36% P were studied. 0.5 mm thick sheets made by forging and hot rolling from 35 kg induction-melted billets, as at the Verkh-Isetskiy works, were used. 250x 30 x 0.5 mm plates, assembled in kg packets were vacuum annealed at 850, 950, 1050 or 1150°C for 4 hours and then cooled in the furnace and tested. Coercive force is shown as functions of phosphorus content in Fig 1 for annealing temperatures of

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Components of Core Losses and Magnetic Permeability of Dynamo Steel Alloyed with Phosphorus

850, 950 and 1150°C (curves 1, 2 and 3 respectively); each curve falls with increasing P-content, the slopes of curve 3 being appreciably less than those of the others; for a given P-content the coercive force decreases with increasing temperatures. The number of grams per mm^2, resistivity, total core losses and its components are shown in Table 1 for 0.03% P steel annealed at 850, 950 and 1150°C. Tables 2 and 3 give corresponding data for different P-contents and annealing temperatures of 850 and 1150°C respectively. Increasing phosphorus content lowers the hysteresis losses on account of increasing grain size, and eddy-current losses on account of increasing resistivity. Fig 2 and 3 show, respectively, the initial and maximal magnetic permeabilities as functions of phosphorus content, for 850, 950, 1050 and 1150°C annealing temperatures (curves 1, 2, 3 and 4, respectively): both permeabilities rise with increasing phosphorus content; in Fig 3 curve 4 lies below curve 3, but otherwise permeability at a given P-content increases with increasing annealing temperature. There are

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SOV/126-8-6-16/24

Components of Core Losses and Magnetic Permeability of Dynamo Steel Alloyed with Phosphorus

3 figures, 3 tables and 9 Soviet references.

ASSOCIATION: Ural'skiy nauchno-issledovatel'skiy institut chernykh metallov (Ural Scientific Research Institute for Ferrous Metals)
Verkh-Isetskiy metallurgicheskiy zavod (Verkh-Isetskiy Metallurgical Works)

SUBMITTED: June 17, 1959

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

SOV/32-25-4-20/71

25(6), 24(3)
AUTHOR: Druzhinin, V. V.

TITLE: The Form of Samples for the Determination of Magnetic Characteristics of Electrotechnical Steel (O forme obraztsov dlya opredeleniya magnitnykh kharakteristik elektrotekhnicheskoy stali)

PERIODICAL: Zavodskaya Laboratoriya, 1959, Vol 25, Nr 4, pp 429-433 (USSR)

ABSTRACT: For tests of specific losses (SL) on narrow metal strips which are carried out to judge the SL on whole plates according to GOST 802-58 for steels E 310, E 320, E 330, and E 370, a second tempering of the narrow strips is added. Problems in connection with this standard method for tests of electrotechnical steels are described in the present article. In the chapter on the form of samples for steels destined for the manufacture of large magnet conductors it is pointed out that, on one hand, an increase in the SL is caused by the cold hardening (of the cutting process) in cutting the plates into narrow strips, and on the other hand, a decrease in the SL is caused by the slackening of the elastic residual tensions of first order. The larger the distance resulting from cutting, the more will the SL values

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The Form of Samples for the Determination of Magnetic Characteristics of Electrotechnical Steel

change (Table 1). The second tempering of the cut metal strips prescribed by GOST 802-58 causes a decrease in the losses with reference to the cold hardening of the borders, as well as an additional decarbonization and a slackening of residual tensions (as compared with the whole piece of sheet metal). The increase in the losses by cold hardening is 0.05-0.08 watt/kg, while the decrease in the losses by the hardening attains 0.15-0.18 watt/kg (Table 2, values for 8 types of steel), while a second tempering of the whole plates (at 750-800°) practically does not reduce the SL (Table 3, values for sheet metal and metal strips of 6 types of steel). On account of this the SL values for electrotechnical steels to be used for large magnet conductors must absolutely be determined on whole plates. Equally good conditions as are obtained with the apparatus according to Epstein can be obtained by the magnetization of four metal sheets which are superposed between two solenoids and are joined with each other at the ends (Fig 1). The determinations of the SL and of the magnetic induction (according to § 37 in GOST 802-58) are at present carried out on metal sheets as a whole or cut in two halves, by the Verkh-Isetskiy metallurgicheskiy zavod (Verkh-

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

The Form of Samples for the Determination of Magnetic Characteristics of Electrotechnical Steel

Isetskiy Metallurgical Works). Table 4 indicates values of the magnetic induction on ring samples of two steel types destined for small magnet conductors, after one stamping and a second tempering in different agents. The difference of the values of magnetic induction at hardening in different agents is 20-30%. The values of permeability of a transformer steel before and after a second tempering (at 600-750°) in an oxidizing agent differ by 2-3 times (Table 5, values for 3 steel types). It is recommended to establish the magnetizing curves of the steel types (Fig 2, E 46) E 45, E 46, E 47, E 48 and E370 at a sample arrangement in lap joint. There are 2 figures, 5 tables, and 2 Soviet references.

ASSOCIATION: Verkh-Isetskiy metallurgicheskiy zavod (Verkh-Isetskiy Metallurgical Works)

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DRUZHININ, V.V

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PHASE I BOOK EXPLOITATION SOV/5526

Vsesoyuznoye soveshchaniye po magnitnoy strukture ferromagnetikov, Krasnoyarsk, 1958.

Magnitnaya struktura ferromagnetikov; materialy Vsesoyuznogo soveshchaniya, 10 - 16 iyunya 1958 g., Krasnoyarsk (Magnetic Structure of Ferromagnetic Substances; Materials of the All-Union Conference on the Magnetic Structure of Ferromagnetic Substances, Held in Krasnoyarsk 10 - 16 June, 1958) Novosibirsk, Izd-vo Sibirskogo otd. AN SSSR, 1960. 249 p. Errata slip inserted. 1,500 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut fiziki Sibirskogo otdeleniya. Komissiya po magnetizmu pri Institute fiziki metallov OFMN.

Resp. Ed.: L. V. Kirenskiy, Doctor of Physical and Mathematical Sciences; Ed.: R. L. Dudnik; Tech. Ed.: A. F. Mazurova.

PURPOSE: This collection of articles is intended for researchers in ferromagnetism and for metal scientists.

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

Magnetic Structure (Cont.) SOV/5526

COVERAGE: The collection contains 38 scientific articles presented at the All-Union Conference on the Magnetic Structure of Ferromagnetic Substances, held in Krasnoyarsk in June 1958. The material contains data on the magnetic structure of ferromagnetic materials and on the dynamics of the structure in relation to magnetic field changes, elastic stresses, and temperature. According to the Foreword the study of ferromagnetic materials had a successful beginning in the Soviet Union in the 1930's, was subsequently discontinued for many years, and was resumed in the 1950's. No personalities are mentioned. References accompany individual articles.

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Magnetic Structure (Cont.) SOV/5526

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Magnetic Structure (Cont.) SOV/5526

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S/196/61/000/011/006/042
E194/E155

AUTHORS: Druzhinin, V.V., and Prasova, T.I.

TITLE: The use of powder patterns to investigate the magnetic properties of transformer steel

PERIODICAL: Referativnyy zhurnal, Elektrotekhnika i energetika, no.11, 1961, 2, abstract 11B 7. (Symposium "Magnetic structure of ferromagnetics", Novosibirsk, Sib. otd. AN SSSR, 1960, 29-32)

TEXT: Use of the powder pattern method to study transformer steel showed that in fine-grained sheet steel the domain size is 5-10 times smaller than in coarse-grained. The presence of non-metallic inclusions in the steel causes the formation of additional domains which retard the processes of magnetisation and demagnetisation, and also make the domains smaller and curve the boundaries between them. Irregularity of magnetisation was observed between the grains and within the grains and this may be one of the causes of increased eddy-current losses in coarse-grained electrical sheet steel.

Card 1/2

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The use of powder patterns to ...

S/196/61/000/011/006/042
E194/E155

7 literature references.

ASSOCIATION: Verkh-Isetskiy metallurgich. z-d
(Verkh-Iset' Metallurgical Plant)

[Abstractor's note: Complete translation.]

Card 2/2

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

18.8100
18.5110

69686
S/126/60/009/03/006/033
E111/E452

AUTHORS: Druzhinin, V.V. and Ignatova, G.V.

TITLE: Crystallographic Texture and Anisotropy of the Magnetic Properties of Hot-Rolled Dynamo Steel

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 3, pp 353-357 (USSR)

ABSTRACT: Druzhinin has previously shown that there is a considerable crystallographic texture in hot-rolled dynamo steel leading to appreciable magnetic anisotropy (Ref 1) which can be in either of two directions. In the present work, the authors have studied this effect in different sheets from packets rolled in various ways at the Verkh-Isetsk Metallurgical Works (two of the rolling procedures are shown in Fig 1 and 2; the third being different in that it did not involve doubling). Sheets were rolled to a thickness of 0.5 mm from 10.2 in eleven passes. For studying texture, 40 mm diameter discs were cut from each sheet and their moments determined magnetometrically with an inter-pole field of 3000 oersted. Magnetization was effected at various angles to the direction of rolling (Fig 3, 5 and 6 show

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S/126/60/009/03/006/033
E111/E452

Crystallographic Texture and Anisotropy of the Magnetic Properties of Hot Rolled Dynamo Steel

moment as a function of the angle for rolling by procedures 1, 2 and 3 respectively). Anisotropy of magnetic-induction was studied on 250 x 30 mm strips cut out at various angles to the direction of rolling; Fig 4 shows magnetic induction as a function of this angle. The authors conclude that crystallographic texture anisotropy is due to sheets being doubled during rolling. Rolling without reversing the texture type is {100} ⟨100⟩; with reversing it is mainly {110} ⟨100⟩ with some {100} ⟨110⟩. In sheets with a {100} ⟨110⟩ texture, best properties are obtained when magnetization is effected at 30 to 45° to direction of rolling; with the other texture, when magnetization is effected parallel to this direction. Differences in the crystallographic texture in rolling with and without reversing is associated with rolling conditions in two-high stands with a single driving shaft when the roll-pressure on the sheet is not at 90°. The authors suggest that further work is needed to elucidate the mechanism of the formation of different textures.

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69686
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E111/E452

Crystallographic Texture and Anisotropy of the Magnetic Properties of Hot Rolled Dynamo Steel

Experimental rolling of the steel was carried out by engineers A.V.Serebrennikov and A.G.Korsunskiy. There are 6 figures, 1 table and 2 Soviet references.

ASSOCIATION: Verkh-Isetskiy metallurgicheskiy zavod (Verkh-Isetsk Metallurgical Works)

SUBMITTED: July 11, 1959

Card 3/3

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

18.1141
18.8100

30212
S/126/60/009/04/003/033
E111/E435

AUTHORS: Druzhinin, V.V. and Mokrushina, N.I.

TITLE: Temperature Dependence of Hysteresis- and Eddy-Current Losses of Electrical Steel

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 4, pp 498-502 (USSR)

ABSTRACT: The operating range of magnetic cores has extended considerably not only towards higher temperatures (up to 400°C) but also towards lower temperatures (down to -100°C). Investigations on the temperature dependence of the coercive force, the specific losses, the permeability and the magnetic-temperature hysteresis of this steel have been described in earlier work (Ref 1 to 3). In this paper, the results are described of investigations of the temperature dependence of the individual components of the iron losses, namely: the hysteresis, eddy-current and additional losses. The experiments were carried out on ring specimens (6 cm outer dia, 4 cm inner dia, weighing 350 to 400 g) of hot-rolled electrical steel containing 1 and 3.5 to 4% Si, with various ratios of the hysteresis to eddy-current losses.

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80212
S/126/60/009/04/003/033
E111/E435

Temperature Dependences of Hysteresis- and Eddy-Current Losses of Electrical Steel

Each layer of the magnetizing and metering coils was insulated by means of glass-fibre tape and inside each layer the adjacent turns were not in contact. The total losses were measured by means of an "absolute" wattmeter method with an accuracy of 2 to 3%; the hysteresis losses were determined from the area of the static hysteresis loop, which was measured by a ballistic method; for determining the "calculated" eddy-current losses, the thickness of the rings was calculated by means of known formulae and the specific electric resistance determined. At various temperatures, this resistance was determined using known values of the temperature coefficient of the electric resistance. The measurement and calculation of the total hysteresis and eddy-current losses were made for B_{max} = 10000 gauss and f = 50 c/s. The additional losses were determined by subtracting the hysteresis- and eddy-current losses from the measured total losses. For obtaining differing ratios of the hysteresis-to-eddy current and additional losses, specimens of differing grain sizes and differing sheet

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80212
S/126/60/009/04/003/033
E111/E435

Temperature Dependences of Hysteresis- and Eddy-Current Losses of Electrical Steel

thicknesses (0.2 to 2 mm) were used; a total of 10 transformer and 8 dynamo steels were tested. The changes with temperature in the hysteresis- and eddy-current losses of dynamo and transformer steels differ to some extent for the range -80 to +250°C. The results obtained for dynamo-steel specimens, 0.5 mm thick, and for transformer-steel specimens, 0.35 mm thick, are graphed in Fig 1 and 3 respectively. In Fig 2, the relative variation of the individual losses (in percent of the respective 20°C value) are graphed as a function of the temperature for dynamo-steel sheet, 1 mm thick. The following conclusions are arrived at: 1) in dynamo steel (1.0 to 1.2% Si) the hysteresis losses drop by 10 to 15% and the eddy-current losses drop by 25 to 35% in the case that the temperature rises to 250°C; the decrease in the "additional" losses is 30 to 40%; 2) on decreasing the temperature of dynamo-steel specimens from room temperature to -80°C, the increase in the total losses is somewhat more pronounced (1.3 to 1.5 times) than in the case of heating

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80212
S/126/60/009/04/003/033
E111/E435

Temperature Dependences of Hysteresis- and Eddy-Current Losses of Electrical Steel

to 120°C; 3) for hot-rolled transformer steel, the variation of the hysteresis- and eddy-current losses for the temperature range -80 to +150°C is within the limits of accuracy of the investigations; further increase in the temperature of the specimens to 250°C brings about a drop in the total losses by 6 to 9%. There are 3 figures, 1 table and 9 Soviet references.

ASSOCIATION: Verkh-Isetskiy metallurgicheskiy zavod
(Verkh-Isetck Metallurgical Works)

SUBMITTED: July 11, 1959

Card 4/4

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

DRUZHININ, V.V., kand.fiz.-matem.nauk; ZYKOV, G.A., inzh.; NEKRASOVA, M.I.; inzh.

Repeated annealing of drop forgings made of E45 and E46. Vest. elektroprom. 31 no.5:41-43 My '60. (MIRA 13:8)
(Steel forgings)
(Steel--Heat treatment)

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

CHEREPANOV, V.I.; DRUZHININ, V.V.; KARGAPOLOV, Yu.A.; NIKIFOROV, A.Ye.

Effect of an electric field on the quadrupole lines in the spectrum of exciton absorption of light. Fiz.tver.tela 3 no.10:2987-2995 O '61. (MIRA 14:10)

1. Ural'skiy gosudarstvennyy universitet imeni A.M.Gor'kogo.
(Crystals—Spectra) (Excitons) (Electric fields)

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

KUDRYAVTSEV, I.P.; DRUZHININ, V.V.

Heterogeneity in the distribution of texture and internal stresses in the cross-section of a cold-rolled sheet of electrical steel. Fiz. met. i metalloved. 11 no. 5:752-758 My '61. (MIRA 14:5)

1. Ural'skiy politekhnicheskiy institut imeni S.M. Kirova i Verkh-Isetskiy metallurgicheskiy zavod.
(Steel—Metallography) (Sheet steel)

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

SHUBIN, G.N. [deceased]; DRUZHININ, V.V.; KOROLEVA, V.A.; PRASOVA, T.I.; SHERSTYUK, M.I.; KURENNYKH, L.K.

Effect of carbon on the magnetic properties of electrical steel. Stal' 21 no.5:445-448 My '61. (MIRA 14:5)

1. Verkh-Isetskiy metallurgicheskiy zavod.
(Steel—Magnetic properties)

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

DRUZHININ, Vladimir Vyacheslavovich; KAZARNOVSKIY, L.Sh., kand. tekhn. nauk, retsenzent; KROTOVA, L.I., red.; BUL'DYAYEV, N.A., tekhn. red.

[Magnetic properties of electrical steel]Magnitnye svoistva elektrotekhnicheskoi stali. Moskva, Gosenergoizdat, 1962. 319 p. (MIRA 15:11)
(Steel--Magnetic properties)
(Electric engineering--Materials)

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

DRUZHININ, V.V.; KAZADZHAN, L.B.; PRASOVA, T.I.

Dependence of additional losses for eddy currents on grain size in fine-grained electrical steel. Fiz. met. i metalloved. 13 no.4:635-636 Ap '62. (MIRA 16:5)

1. Verkh-Isetskiy metallurgicheskiy zavod.
(Steel--Electric properties) (Domain structure)

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

DRUZHININ, V.V.; KAZADZHAN, L.B.

Comparing the magnetic characteristics of electrical steel measured on entire sheets and Epstein strips. Fiz. met. i metalloved. 13 no.4:639-640 Ap '62. (MIRA 16:5)

1. Verkh-Isetskiy metallurgicheskiy zavod.
(Sheet metal—Magnetic properties)

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

S/048/62/026/002/021/032
B106/B112

AUTHORS: Druzhinin, V. V., and Prasova, T. I.

TITLE: Dependence of eddy current losses on magnetic structure of electrotechnical steel

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya. v. 26, no. 2, 1962, 276-279

TEXT: The dependence of the eddy current losses on the domain size in electrotechnical steels with different silicon content was experimentally examined. The anisotropy of the eddy current losses in textured cold-rolled steels with different magnetic texture was studied, too. Experiments were made with B = 10,000 gauss, f = 50 cps. The eddy losses were determined from the difference between the power-metrically measured overall losses and the hysteresis losses as determined from the static hysteresis loop. The after-effect losses were not taken into account since they are very low in finely grained silicon steel. With larger grain size the non-hysteresis losses were all counted to the eddy losses. The grain size in the specimens was different. Thus, the domain width is

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Dependence of eddy current...

the demagnetized state was determined in each case by the powder pattern method. The domain widths of crystallites of equal dimensions were determined at 15-20 grains; their average was taken as the result. Investigations with hot-rolled converter steel that an increase of the grain surface by 100 times entails an increase in domain width by 5 times; the eddy losses become about twice as high. Consequently there is a definite relationship between the eddy losses and the domain width of converter steel which has a relatively coarse granulation (50-5 grains per mm^2). Also dynamo steel (1000 grains per mm^2) showed a distinct dependence of the eddy losses on the domain width. In contrast to the statements of various publications this dependence is not linear in either case, but this may be due to the different conditions of pretreatment. The anisotropy of the eddy losses was found to be highly dependent on the magnetic texture of the steel. American cold-rolled steel differs from 3330 (E330) steel in a noticeable magnetic texture which manifests itself in the value of the saturation magnetostriction when the specimens are magnetized along the lamination. This difference leads also to a difference in the anisotropy of the eddy losses: the ratio $P_{\perp 90°}/P_{\parallel 0°}$

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is 2.5 for American steel, but only about 1.5 for E330 steel. Conclusions: Increasing grain size is a possible way of increasing the magnetic characteristics of electrotechnical steel. Such procedure will promote magnetization which will entail increase in permeability and decrease in coercive force. Broadening of the domains with increasing grain size leads to a decrease in the hysteresis losses and increase in eddy losses. The most favorable grain size is such at which the sum of hysteresis and eddy losses attains a minimum. K. M. Polivanov (Ref. 2: Izv. AN SSSR. Ser. fiz., 12, no. 2, 98 (1948)) is mentioned. There are 2 figures, 2 tables, and 7 references: 4 Soviet and 3 non-Soviet. The three references to English-language publications read as follows: Williams X., Shockley B., Kittel C., Phys. Rev., 80, 6 (1950); Pry R. H., Bean C. P., J. Appl. Phys., 29, no. 3, 532 (1958); Hu H., Wiener G., J. Appl. Phys., no. 4 (1959).

ASSOCIATION: Verkh-Isetskiy metallurgicheskiy zavod (Upper Iset' Metallurgical Plant)

Card 3/3

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

DRUZHININ, V.V., kand.fiziko-matematicheskikh nauk; KURENNYKH, L.K., inzh.

Comparison of the magnetization curves of electrical engineering steel obtained from a.c. and d.c. fields. Elektrichestvo no.4: 67-70 Ap '62. (MIRA 15:5)

1. Verkh-Isetskiy metallurgicheskiy zavod.
(Electric engineering--Materials)
(Steel--Magnetic properties)

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

DRUZHININ, V.V.

Measuring specific losses and the magnetic induction according to state standard 802-58 in entire and half sheets. Trudy inst. Kom. stand. mer i izm. prib no.64:81-84 '62. (MIRA 16:5)
(Sheet steel—Magnetic properties) (Magnetic measurements)

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

DUNAYEV, F.N.; KALININ, V.M.; DRUZHININ, V.V.

Longitudinal and transverse magnetostriction of iron-silicon steels. Fiz. met. i metalloved. 15 no.5:652-657 My '63. (MIRA 16:8)

1. Ural'skiy gosudarstvennyy universitet im. Gor'kogo i Verkh-Isetskiy metallurgicheskiy zavod.
(Iron-silicon alloys—Magnetic properties)

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

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L 33190-66 EWT(1)/EWT(m)/EWP(t)/ETI IJP(c) JD/AT

ACC NR: AR6016169 SOURCE CODE: UR/0058/65/000/011/D003/D003

AUTHORS: Druzhinin, V. V.; Kurushin, Yu. N.; Men', A. N.; Neysh, V. Ye.; Nikiforov, A. Ye.; Cherepanov, V. I.

TITLE: Contribution to the theory of energy spectra of paramagnetic ions in certain oxides

SOURCE: Ref. zh. Fizika, Abs. 11D16

REF SOURCE: Tr. Komis. po spektroskopii. AN SSSR, t. 3, vyp. 1, 1964, 514-519

TOPIC TAGS: paramagnetic ion, spectrum, ION ENERGY

ABSTRACT: Calculations are presented of the energy spectrum of a paramagnetic ion in a crystal with spinel structure in the approximation of the average intracrystalline field. It is shown that allowance for the field due to the second and farther neighbors can exert an appreciable influence on the interpretation of the spectra of such ions. Quantitative calculation results are presented for Cr^{3+} in $MgAl_2O_4$ and experimental data on this ion. [Translation of abstract]

SUB CODE: 20

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

BR

ACCESSION NR: AP4043396 S/0181/64/006/008/2547/2549

AUTHORS: Druzhinin, V. V.; Cherepanov, V. I.

TITLE: Use of the method of irreducible tensor operators and fractional parentage coefficients for the calculation of the energy spectrum of an ion in a crystal.

SOURCE: Fizika tverdogo tela, v. 6, no. 8, 1964, 2547-2549

TOPIC TAGS: crystal structure, irreducible tensor operator, Clebsch Gordan coefficient, fractional parentage coefficient, atomic spectrum, ionization spectrum

ABSTRACT: The ion is assumed to have a configuration nl^N and the approximation of a medium crystalline field (with account of interaction between terms) is employed. By expanding the energy of the ion in the crystalline field in spherical harmonics and by starting from the initial wave functions of the terms of the isolated ion,

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ACCESSION NR: AP4043396

the authors use a variant of perturbation theory for the near lying levels to show that the secular equation breaks up into a series of independent equations, signifying that only identical terms actually interact. A final expression is then derived for the ion energy in the crystalline field, in terms of Clebsch-Gordan coefficients, 6j-coefficients, and fractional parentage coefficients. The spectrum of an ion with configuration $3d^2$ in a field of cubic symmetry is calculated as an example. Applications to other cases will be considered in a separate article. Orig. art. has: 9 formulas.

ASSOCIATION: Ural'skiy gosudarstvenny*y universitet im. A. M. Gor'kogo, Sverdlovsk (Ural State University)

SUBMITTED: 25Mar64 ENCL: 00

SUB CODE: SS NR REF SOV: 007 OTHER: 010

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

KREPYSHEVA, L. B.; DRUZHININ, V. V.

Susceptibility to flake formation in lederburite-class steels.
Izv. vys. ucheb. zav.; chern. met 7 no. 4:129-132 '64. (MIRA 17:5)

1. Sibirskiy metallurgicheskiy institut.

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

ACC NR: AP6001686 SOURCE CODE: UR/0148/65/000/012/0112/0113

AUTHOR: Grdina, Yu. V.; Tarasko, D. I.; Druzhinin, V. V.

ORG: Siberian Metallurgical Institute (Sibirskiy metallurgicheskiy institut)

TITLE: High-temperature thermomechanical treatment of rail steel

SOURCE: IVUZ. Chernaya metallurgiya, no. 12, 1965, 112-113

TOPIC TAGS: rail steel, austenitic steel, heat treatment, cold working, tensile strength, plasticity, hardness, metal grain structure, fabricated structural metal

ABSTRACT: Thermomechanical treatment markedly improves the strength of metal while preserving or even improving its plastic properties. It is most effective for alloy steels with an 0.4-0.5% C content. But industry employs a broad variety of steels containing more than 0.5% C. Hence the authors investigated the possibility of applying high-temperature thermomechanical treatment (HTTMO) to rail steels containing 0.62-0.67% C. Billets measuring 20x30x200 mm were heated in an electric compartment-type furnace and deformed in a two-high rolling mill (one passage) at the rate of 5.7 m/sec and spray-cooled. After tempering at 200 or 400°C they were processed into specimens for tensile and impact tests. Findings: maximum hardness (H_B = 470-480) and tensile strength (σ_s = 180-190) are obtained in the case of HTTMO with subsequent tempering at 200°C. In certain regimes of HTTMO the area of fracture of the specimens fractured

Card 1/2 UDC: 669.14:621.78

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ACC NR: AP6001686

in the impact testing machine is extremely fine-grained; this is also revealed by microstructural examination. Apparently, the high tensile strength and hardness, combined with satisfactory plasticity and impact strength, are attributable to the fine-grained structure of the steel following THO. Thus, HTTMO can be used to toughen rail steel. It markedly enhances its strength while preserving its plasticity at the level characteristic of oil-quenched steel and nearly doubling its impact strength. These initial findings point to the need of expanding research in this field. Orig. art. has: 1 table, 2 figures.

SUB CODE: 11, 13/ SUBM DATE: 21Sep64/ ORIG REF: 003/ OTH REF: 002

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Card 2/2

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

L 05770-67 EWT(1) [illegible]

ACC NR: AR6031878 SOURCE CODE: UR/0058/66/000/006/E068/E068

43
B

AUTHOR: Druzhinin, V. V.; Cherepanov, V. I.

TITLE: Effect of an electric field on the dipole forbidden exciton phototransitions in a cubic crystal

SOURCE: Ref. zh. Fizika, Abs. 6E519

REF SOURCE: Uch. zap. Ural'skogo un-ta. Ser. fiz., vyp. 1, 1965, 155-162

TOPIC TAGS: electric field, cubic crystal, exciton, wave function, phototransition, crystal phototransition

ABSTRACT: Direct exciton phototransitions in crystals with the symmetry group O_h have been investigated. The effect of an electric field, considered as a disturbance, on the carrier wave function is taken into account. It is shown that it leads to Stark splitting and "deflagration" of electrodipole, electroquadrupole, and magnetodipole lines. For the calculation, the formalism of the Clebsen-Gordan coefficients was used. Both the splitting and the intensity of "deflagration" lines depend quadratically on the electric field; more intensive lines are those which are located near to the allowed lines. G. Shuster. [Translation of abstract]

SUB CODE: 20/

Card 1/1 egh

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

L 6331-66 EWT(1)/EWT(m)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD/GG

ACCESSION NR: AP5019873 UR/0181/65/007/008/2513/2518

AUTHOR: Druzhinin, V. V.; Cherepanov, V. I.; Levin, V. S.

TITLE: On the calculation of the energy spectrum of ions with configuration $3d^4$ in a classical field of cubic symmetry

SOURCE: Fizika tverdogo tela, v. 7, no. 8, 1965, 2513-2518

TOPIC TAGS: cubic crystal, crystal symmetry, spectral energy distribution, group theory, spin orbit interaction, matrix function, perturbation method, tensor

ABSTRACT: To calculate the energy spectrum, the authors select the wave functions of the zero-order approximation of the problem as the functions that diagonalize part of the perturbation operator for the medium crystalline field, which scheme is known to be equivalent to the scheme of the strong crystalline field. It is more convenient, however, to calculate the medium-field scheme because no Clebsch-Gordan coefficients are necessary for fractional parentage coefficients for the groups of point symmetry. The spin-orbit interaction energy is neglected. The interaction of the terms is taken into account. The matrix elements are calculated with the aid of formulas derived by means of the method of irreducible tensor operators. Orig. art. has: 13 formulas.

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

L 6331-66

ACCESSION NR: AP5019873

ASSOCIATION: Ural'skiy gosudarstvennyy universitet im. A. M. Gor'kogo, Sverdlovsk (Ural State University)

SUBMITTED: 28Dec64 ENCL: 00 SUB CODE: SS, NP

NR REF SOV: 003 OTHER: 007

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APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

AUTHOR: Druzhinin, V. V. 44,55

SOURCE CODE: UR/0181/65/007/012/3490/3497

ORG: Ural State University im. A. M. Gor'kiy, Sverdlovsk (Ural'skiy gosudarstvennyy universitet) 44,55 70 70 B

TITLE: Contribution to the calculation of the energy spectrum of ions with configuration $3d^N$ in a crystalline field of cubic symmetry

SOURCE: Fizika tverdogo tela, v. 7, no. 12, 1965, 3490-3497

TOPIC TAGS: ion energy, cubic crystal, spectral energy distribution, impurity level, crystal impurity, computer calculation

ABSTRACT: This is a continuation of earlier work by the author (FTT v. 7, 2513, 1965), where it was shown that to find the energy spectrum of an impurity ion it is necessary to determine the eigenvalues of the perturbation matrix whose elements determine the spectrum of the isolated ion. In the present article the author calculates, in the crystalline-field approximation, the energy levels of ions with configuration $3d^N$ ($N = 2, 3, 4, 5, 6, 7$) in a crystalline field of octahedral symmetry. The perturbation matrices were calculated by means of the

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formulas of the preceding paper for all the configurations, with account of all the 'interacting' terms. All the calculations were made with a BESM-2 electronic computer. The results are presented in the form of plots of the ion term splitting against the parameter Dq of the 'intracrystalline' field. It is shown that the results of the numerical calculations agree with the experimental data for optical spectra only if the positions of the terms are changed compared with those observed in the free ion. An account of all the 'interacting' terms leads to an appreciable change and to a complication of the spectral picture for impurity ions, compared with the previously obtained calculations. The theoretical deductions are found to be in good agreement with the experimental data. Author is grateful to V. I. Cherepanov for useful advice and A. Starkov for rapid and accurate programming of the problem. Orig. art. has: 6 figures.

SUB CODE: 20/ SUBM DATE: 08May65/ ORIG REF: 004/ OTH REF: 014

HW

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

L 26647-66 EWT(m)/EWA(d)/T/EWP(t) IJP(c) JD

ACC NR: AP5025334 SOURCE CODE: UR/0126/65/020/003/0458/0460

AUTHOR: Dunayev, F. N.; Druzhinin, V. V.; Malev, N. S.; Prasova, T. I.

ORG: Ural State University im. A. M. Gor'kiy (Ural'skiy gosuniversitet); Verkh-Isetskiy Metallurgical Plant (Verkh-Isetskiy metallurgicheskiy zavod)

TITLE: The effect of thermomechanical treatment on specific losses, on coercive force and on magnetostriction

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 3, 1965, 458-460

TOPIC TAGS: magnetostriction, steel, metal heat treatment, magnetic coercive force, plastic deformation/ E330 steel

ABSTRACT: The effect of thermomechanical treatment on the specific losses, coercive force, and magnetostriction of cold-rolled steel E330 has been studied, and the causes contributing to these changes have been investigated. The specific losses P10/50 were measured by means of a wattmeter. Repeated heating decreases P10/50, coercive force H_c, and magnetostriction γ_s. The higher the temperature of heating the greater the decrease. The cause of this change is basically due to the change of texture with temperature increase, since the energy ratio of the antisotropic form changes. The decrease of γ_s during thermochemical treatment

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L 26647-66

ACC NR: AP5025334

confirms the increase of magnetic texture, and thus is the direct cause of specific losses. The increase of P10/50, η_s and H_c is caused by the partial destruction of the magnetic texture as a result of plastic deformation of these samples which begins at this load capacity. At 800°C no decrease of P10/50 and η_s is observed as a result of thermochemical treatment. A load of 0.25 kg/mm^2 will cause some increase of these values, and therefore it must be the optimum load for this temperature. Orig. art. has: 2 fig. and 1 table.

SUB CODE:11,20/ SUBM DATE: 26Aug64/ ORIG REF: 011/ OTH REF: 001

Card 2/2

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

VEKSLER, A.Z., kand.fiz.-matem.nauk; DRUZHININ, V.V., kand.fiz.-matem.nauk

Standardized a.c. tests of electrical steel. Elektrotekhnika 36 no.2:32-34 F '65. (MIRA 18:4)

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

L 07510-67
ACC NR: AP6007599 (A) SOURCE CODE: UR/0256/66/000/002/0017/0022

AUTHOR: Druzhinin, V. V. (Lt. Gen.; Candidate of military sciences)

17
13

ORG: none

TITLE: Increase in the training of radio engineering specialists

SOURCE: Vestnik protivovozdushnoy oborony, no. 2, 1966, 17-22

TOPIC TAGS: armed force personnel, radio engineering, military training

ABSTRACT: This article concerns the training of the air defense radio engineering personnel. The author points out that the progress that has been made in personnel training has become possible because officers have persistently perfected their own training by independent study and by attending courses, but at the same time there are still units where due concern has not been shown concerning the use of all facilities for the systematic education of the troops. Since experience has shown that the formation of practical skills is most successfully accomplished when the troops act not mechanically but thoughtfully, the author proposes that an intelligent combination of planned studies with on-the-job training will have a favorable effect on the education of troops and their military preparedness. The organization and conduction of such studies should begin with the arrival of young troops and should be carried out systematically during the entire school year. It is also pointed out that in the interest of maintaining a high military readiness of troops it is necessary that the

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L 07540-67

ACC NR: AP6007599 O

troops master related specialties in order to ensure their interchangeability within each military detachment and also between detachments. One of the most important problems facing commanders in the new academic year is to activate work on the generalization, propagation, and introduction of advanced methods of teaching and educating the personnel and that this study and introduction of advanced methods is not voluntary but mandatory.

SUB CODE: 15 ~~ED~~,05/ 09 SUBM DATE: none

Card 2/2

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

L 05621-67 EWT(1) AT

ACC NR: AP6024493 SOURCE CODE: UR/0181/66/008/007/2228/2230

AUTHOR: Druzhinin, V. V.; Kazakov, A. A.

ORG: Ural State University im. A. M. Gor'kiy, Sverdlovsk (Ural'skiy gosudarstvennyy universitet)

TITLE: Calculation of the spin-Hamiltonian constants by the method of irreducible tensor operators

SOURCE: Fizika tverdogo tela, v. 8, no. 7, 1966, 2228-2230

TOPIC TAGS: Hamiltonian, spin orbit coupling, nuclear spin, perturbation theory, matrix element

ABSTRACT: The Hamiltonian of an impurity ion with configuration l^N is written in the form $H = H_0 + V_{cr} + V_{so} + V_{ss} + V_H$, where V_{so} and V_{ss} are the spin-orbit and spin-spin interaction operators. Unlike earlier derivations of the spin Hamiltonian, V_{so} and V_{ss} are not replaced by equivalent operators, making it possible to take more complete account of the contributions made to the spin-Hamiltonian constants in different approximations of perturbation theory. Expressions are derived for the matrix elements of these operators and for the corresponding irreducible tensor operators. Numerical calculations for the ion V^{3+} in Al_2O_3, obtained with the aid of these cal-

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ACC NR: AP6024493

culations are in good agreement with the experimental data. The authors thank V. I. Cherepanov and R. S. Dagis for a discussion. Orig. art. has: 1 figure and 7 formulas

SUB CODE: 20/ SUBM DATE: 23Jul65/ ORIG REF: 005/ OTH REF: 006

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

L 24285-66 EWT(m)/EWP(t) LIP(c) JD/JW/JG

ACC NR: AP6007006 SOURCE CODE: UR/0051/66/020/002/0330/0332

AUTHOR: Druzhinin, V. V.; Khaymenov, A. P.

ORG: none

TITLE: On the calculation of the spectrum of Sm^{2+} and SrF_2

SOURCE: Optika i spektroskopiya, v. 20, no. 2, 1966, 330-332

TOPIC TAGS: samarium, strontium compound, perturbation method, multiplet splitting, optic spectrum, crystal symmetry, epr spectrum

ABSTRACT: The spectrum was calculated in the approximation where the field inside the crystal is assumed weak, by determining the eigenvalues of the Hamiltonian of the impurity ion by perturbation theory. The energy differences between the components of the multiplet are evaluated in first order of perturbation theory, and the field is regarded as the sum of two fields, one with high symmetry (cubic or hexagonal) and one with low symmetry which is considered as a perturbation. In the particular case of Sm^{2+} in SrF_2, the Sm^{2+} ion is surrounded by eight F^- ions producing a field of cubic symmetry. The expansion coefficients for this case are evaluated and their ratio is found to be of the order of 3, as against 4 which has been obtained from EPR data for Sm^{2+} in CaF_2. The difference is attributed to the need for taking into account the j-j coupling and the need for including a second-order approximation. It is shown that the level energies in the crystal field depend on two parameters, $A_{40}(r^4)$ and $A_{60}(r^6)$, for which values -2770 cm^{-1} and +960 cm^{-1} are obtained. Orig. art. has: 12 formulas and 1 table.

SUB CODE: 20/ SUBM DATE: 09Mar65/ ORIG REF: 005/ OTH REF: 005

UDC: 535.33.001.1

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

ACC NR: AP7003226 SOURCE CODE: UR/0056/66/051/006/1856/1862

AUTHOR: Druzhinin, V. V.; Irkhin, Yu. P.

ORG: Ural State University (Ural'skiy gosudarstvennyy universitet); Institute of Physics of Metals, Academy of Sciences, SSSR (Institut fiziki metallov Akademii nauk SSSR)

TITLE: Spin Hamiltonian of exchange interaction in rare-earth metals

SOURCE: Zh eksper i teor fiz, v. 51, no. 6, 1966, 1856-1862

TOPIC TAGS: electron spin, rare earth metal, Hamiltonian, conduction electron, ELECTRON interaction, magnetization

ABSTRACT: This is a continuation of earlier work (ZhETF v. 50, 379, 1966) dealing with the exchange interaction of magnetic f-electrons with conduction electrons. In this paper, the spin Hamiltonian proposed earlier is analyzed further and analytic expressions are obtained for the various coefficients entering in the invariant of the spin Hamiltonian, whereas in the earlier paper an expression was obtained for only one of the coefficients. The method of irreducible tensor operators and a diagram technique are used to obtain simple analytic expressions for the tensors connected with different interactions of the non-Heisenberg type. Sums connected with the product of fractional-parentage coefficients are expressed in terms of tabulated reduced matrix elements. Certain distinguishing features of a number of rare-earth metals, due to the dependence of the coefficients of the obtained Hamiltonian on the

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ACC NR: AP7003226

number of the element, are discussed qualitatively. It is indicated in particular that the change in the direction of easy magnetization on going from Ho to Er can be attributed to the change in the sign of certain coefficients of the anisotropic exchange. A possible connection between the behavior of the rare-earth metals and the form of their Fermi surface is indicated. Orig. art. has: 1 figure, 16 formulas, and 1 table.

SUB CODE: 20/ SUBM DATE: 25Jun66/ ORIG REF: 005/ OTH REF: 003

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

L 44412-66 FSS-2/EWT(1) WR

ACC NR: AN6015189 (A,N) SOURCE CODE: UR/9008/66/000/123/0002/0002

54
B

AUTHOR: Druzhinin, V.

ORG: none

TITLE: Radar operator training

SOURCE: Krasnaya zvezda, 29 Mar 66, p. 2, col. 1-7

TOPIC TAGS: radar system, radar defense, radar interference, antiaircraft defense system, radar battlefield surveillance, radar reconnaissance

ABSTRACT: The author describes the mission of radio engineering troops of the anti-aircraft defense forces, and states that in recent years the range and altitude of space and nuclear weapons have increased considerably, and the means and methods of interfering with the operation of radar installations of the anti-aircraft defense forces are being developed intensively. Radio engineering troops therefore

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ACC NR: AN6015189 O

have an exceptionally difficult task to fulfill this year. The work of a radar operator is so important that the quality of his training and the time it requires should be the object of constant attention. In addition to theoretical knowledge, a radar operator should acquire practical experience and the ability to work in spite of numerous interferences. Visual aids such as regular training movies help to acquire experience. In some outstanding units, soldiers are sent to serve as trainees at radar stations where they acquire basic knowledge in six to eight weeks and take an examination for a rating in three to four months. Further training includes planning sessions, individual assignments and mastering minor repair skills. The objective is to have each man master a skill related to his basic specialty. Ideally, each member of a combat crew should be able to replace the other. Technical training of officers is particularly stressed by the author who unites that all officers in radio-engineering units should obtain the highest technical rating. [GC]

SUB CODE: 15, 05, 17/ SUBM DATE: none/

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

130-58-4-9/20

AUTHOR: Druzhinin, Ye.G.

TITLE: For Further Increase in the Durability of Open-hearth Furnace Bottoms (Za dal'neysheye povysheniye stoykosti podin martenovskikh pechey)

PERIODICAL: Metallurg, 1958, Nr 4, pp 14 - 16 (USSR).

ABSTRACT: At present, the life of the upper parts of Soviet open-hearth furnaces greatly exceeds that of the bottoms but comparatively little attention has been given to bottom life in the Soviet literature. This article, published to encourage further contributions on furnace bottom practice, deals with Nr 1 melting shop at the "Krasnyy Oktyabr'" Works, equipped with 140-ton, cold-charged furnaces. These furnaces are basic roofed and fired with natural gas with oil. Magnesite powder is used for fettling (manually) and for tapping-hole repairs and the article describes these repairs for various conditions. For bottom repairs, the metal and slag are blown out and heated first with a reduced quantity of oil and then without oil. Difficulties are encountered in bottom cleaning through the poor quality of the tubes used and the author recommends alloy-steel ones. After complete removal of metal and slag, repairs are effected with the aid of a machine while the furnace is fired at the full rate, the greatest difficulty and magnesite

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For Further Increase in the Durability of Open-hearth Furnace Bottoms

consumption being opposite the second charging doors. After the shaping of the tapping-hole with a special mix, it is closed and bottom heating is continued and then mill-scale is added (duration 30 - 40 min) instead of the open-hearth slag previously used. Following the removal of the slag from the furnace, the oil is cut off and the furnace is allowed to cool for 20 minutes and charging is started. The average total duration of a bottom repair is 8 hours and each furnace undergoes this 2 or 3 times a month. In some cases, a routine different from the above is followed.

ASSOCIATION: "Krasnyy Oktyabr" Works

Card 2/2

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

BRIL', R.Ya.; DOVGAL', S.A.; DRUZHININ, Ye.P.

Some problems of methodology in selecting different forms of energy for high-temperature industrial processes. Trudy LIKI no.51:135-148 '64. (MIRA 18:11)

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

DRUZHININ, Yu., starshina sverkhsrochnoy sluzhby

Call signs of the earth. Starsh.-serzh. no.6:10 Je '64.
(MIRA 17:7)

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

L 45070-66

ACC NR: AP6025982 (N) SOURCE CODE: UR/0310/66/000/007/0026/0026

AUTHOR: Druzhinin, Yu. (Deputy chief of marine supply service of Lena steamship line

14
B

ORG: none

TITLE: Operational experience with the 8NVD-36 engines of the Lena Steamship Lines

SOURCE: Rechnoy transport, no. 7, 1966, 26

TOPIC TAGS: *MARINE* engine, diesel engine, river diesel ship / 8NVD-36 diesel engine

ABSTRACT: One quarter of all Lena River Fleet diesel ships are powered by 8NVD-36 diesel engines. This type of engine has proved to be dependable, easy to operate by automatic controls, and does not require constant observation during operation. The time between the average engine overhaul depends on the durability of its sleeves. Generally, a 400-hp engine operating at 500 rpm shows 35% less durability than a 300-hp engine operating at 360 rpm. [SA]

SUB CODE: 13, 21/ SUBM DATE: none

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

L 11370-67 EWT(1) SWB
ACC NR: AT6036497 SOURCE CODE: UR/0000/66/000/000/0063/0064

AUTHOR: Benevolinskiy, V. N.; Druzhinin, Yu. P.; Klimenko, A. S.; Malyutina, T. S.; Sychkov, I. A. 32

ORG: none

TITLE: The effect of gamma irradiation and irradiation with protons with energies of 600 to 127 Mev on the radiosensitivity of yeast cells [Paper presented at the Conference on Problems of Space Medicine held in Moscow from 24 to 27 May 1966]

SOURCE: Konferentsiya po problemam kosmicheskoy meditsiny, 1966. Problemy kosmicheskoy meditsiny. (Problems of space medicine); materialy konferentsii, Moscow, 1966, 63-64

TOPIC TAGS: cosmic radiation biologic effect, proton radiation biologic effect, ionizing radiation biologic effect, relative biologic efficiency, life support system, space food, radiation induced mutuation, yeast

ABSTRACT: Yeast cells are a convenient object for space research because, in addition to serving as a model system, they may someday be used as a heterotrophic link in a spaceflight life-support system. The vulnerability of the cell division process in yeast cells irradiated in the quiescent state was studied. A water suspension of yeast was irradiated with 660-, 510-, 240- and 127-Mev protons from an OIYAI synchrocyclotron, and their RBE was determined in comparison with Co^{60} gamma rays (from an EGO-4 apparatus). Irradiation with 660-Mev protons was conducted through a polyethylene and lead filter. The activation method of dosimetry was used for 660-Mev protons, and the luminescent method for lower-energy pro-

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ACC NR: AT6036497

tons. Ionization chambers were used to monitor the flux. Experiments were conducted with diploid Saccharomyces vini yeast cells (Megri 130-13 strain) and haploid Saccharomyces cerevisiae yeast cells (strain 40-2587). Most of the studies were conducted with 660-Mev protons and the diploid strain. The following tests of yeast radiosensitivity were used: 1) inactivation of macrocolonies and of different types of microcolonies, 2) disruption of the cell division rate in the first five cycles after the beginning of irradiation, 3) dispersion of different types of microcolonies, 4) post-radiation recovery, and 5) lysis of cells. Dose-damage relationships in a range from 1-120 rad were established for each index. Experimental results indicate that the effect of proton irradiation is essentially the same as gamma irradiation: thus the RBE for protons in these experiments was close to one. Evaluation of these data considering the different linear energy losses of the types of radiation used made possible a preliminary estimate of the radiosensitivity of quiescent yeast cells in spaceflight conditions. This is necessary as yeast may be used as a back-up system for spaceflight life support, if the system of continuous cultivation of heterotrophs stops working. [W.A. No. 22; ATD Report 66-116]

SUB CODE: 06 / SUBM DATE: 00May66

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"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

L 11274-67 EWT(m) GD

ACC NR: AT6029628 SOURCE CODE: UR/0000/66/000/000/0145/0150

7

AUTHOR: Druzhinin, Yu. P.; Bonovolonskiy, V. N.

ORG: none

TITLE: Rhythmic disruption of catabolic processes with small dose irradiation

SOURCE: Voprosy obshchoy radiobiologii (Problems of general radiobiology). Moscow, Atomizdat, 1966, 145-150

TOPIC TAGS: rat, radiation biochemical effect, particular radiation biologic effect, radiation hematologic effect, biologic metabolism

ABSTRACT: Literature studies suggest that proteolytic activity of the blood can be used to detect intracellular membrane damage produced by small dose irradiation. For a more detailed study of proteolytic activity experiments were staged on white rats X-irradiated in a wide range of doses: 0.75, 1.5, 3, 6, 12.5, 25 and 50 r at a dose rate of 12.75 r/min (first series) and 100, 200, 400, 800 and 1600 r at a dose rate of 59.5 r/min (second series). The proteolytic activity of the blood was determined before irradiation and following for 30 days. Blood (0.1 ml) was incubated with bovine serum (0.9 ml) for 3 hrs and then the level of amino nitrogen was determined according to E. W. Jemm and E. C. Corking's method using trichloracetic acid. Results of the first series show that the dynamics of blood proteolytic changes for all animals

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ACC NR: AT6029628

represent a distinct curve characterized by two peaks. These peaks appear on the 3rd and 7th days for a dose range of 0.75 to 6 r, and appear after 6 hrs and on the 3rd day for a dose range of 12.5 to 50 r. To determine whether the proteolytic phase changes follow a similar curve with larger doses and to determine the nature of blood form elements, additional experiments were staged on 5 dogs irradiated with single 300 or 500 r doses. In these cases, the peaks were found on the 7th and 20th days. No dose dependence was observed within this dose range, but the appearance of the peaks clearly depended on the degree of radiation sickness. Dynamics of blood form elements (erythrocytes and leukocytes) did not correlate with the proteolytic changes of the whole blood. These changes may be the result of fluctuations of proteolytic enzyme inhibitors on activators in the plasma or of proteolytic enzymes leaving the tissues. It appears that the proteolytic phase changes do reflect the rhythm of catabolic processes and are related to a certain degree to intracellular membrane damage. Orig. art. has: 2 figures.

SUB CODE: 06/ SUBM DATE: 23Apr66/ ORIG REF: 011/ OTH REF: 008

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

DRUZHININ, Yu.P.; BENEVOLENSKIY, V.N.

Proteolysis in the blood of rats exposed to ionizing radiations.
Radiobiologiia 4 no.3:384-387 '64. (MIRA 17:11)

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0"

"APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000411310010-0

DRUZHININ, Yu.P.; BENEVOLENSKIY, V.N.

Disturbances of proteolysis in the blood of dogs following exposure to ionizing radiations. Radiobiologiia 4 no.4:513-515 '64. (MIRA 17:11)

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DENEVOLENSKIY, V.N.; DRUZHININ, Yu.P.; ALEKSEYEVA, S.I.

Ultraweak chemiluminescence caused by the reaction of the native aqueous-saline extract of the rat liver with the supernatant from a boiled homogenate. Trudy MOIP. Otd. biol. 21:99-101 '65.
(MIRA 18:6)

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DRUZHININ, Yu.V., inzh.

Hydraulic device for the processing of valve pockets in the cover of the compressor cylinder. Khim.mashinostr. no.6:38 N-D '63. (MIRA 17:2)

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FISHER, P.N.; KEYL', I.A.; VOROB'YEVA, G.I.; SHVARSKROYN, B.M.; ALYAMOVSKAYA, T.S.; ZYBIN, S.Ye.; DRUZHININA, A.T.; SHILOV, Yu.P.

Growing yeast on hydrolysates from coniferous wood. Gidroliz. i lesokhim. prom. 16 no.5:7-12 '63. (MIRA 17:2)

1. Moskovskoye otdeleniye Gosudarstvennogo nauchno-issledovatel'skogo instituta gidrolizmoy i sul'fitno-spirtovoy promyshlennosti (for Fisher, Keyl', Vorob'yeva, Shvartskroyn, Alyamovskaya).
2. Ivdel'skiy gidrolizmyy zavod (for Zybin, Druzhinina, Shilov).

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BOBOREKO, E.A.; KALYUZHNYY, M.Ya.; CHAYKA, N.D.; ABRAMOVICH, M.M.; SHILOV, Yu.P.; DRUZHININA, A.T.; ZYBIN, S.Ye. [deceased]; BATIKOV, L.S.

Improving the process of yeast growing on wood hydrolyzates. Gidroliz. i lesokhim.prom. 17 no.8:22-25 '64. (MIRA 18:1)

1. Gosudarstvennyy nauchno-issledovatel'skiy institut gidroliznoy i sul'fitno-spirtovoy promyshlennosti, Leningrad (for Boboreko, Kalyuznyy, Chayka, Abramovich). 2. Ivdel'skiy gidroliznyy zavod (for Shilov, Druzhinina, Zybin, Batikov).

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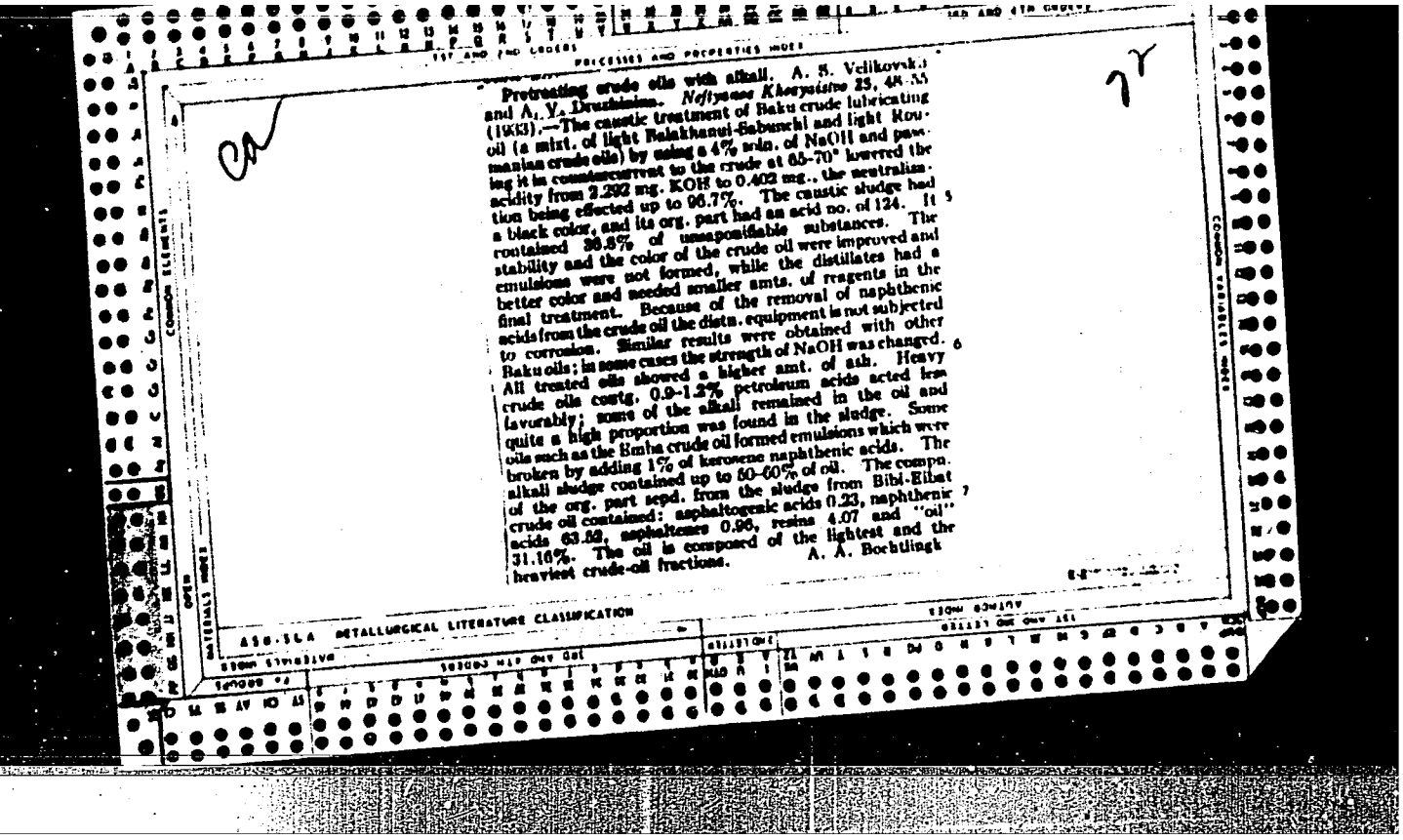

Pretreating crude oils with alkali. A. S. Velikovskii and A. Y. Druzhinina. *Neftyanoe Khozyaistvo* 25, 48-55 (1943).—The caustic treatment of Baku crude lubricating oil (a mixt. of light Balakhani-Sabunchi and light Kou-manian crude oils) by using a 4% soln. of NaOH and pass-ing it in countercurrent to the crude at 65-70° lowered the acidity from 2.292 mg. KOH to 0.402 mg., the neutralization being effected up to 96.7%. The caustic sludge had a black color, and its org. part had an acid no. of 124. It contained 36.8% of unsaponifiable substances. The stability and the color of the crude oil were improved and emulsions were not formed, while the distillates had a better color and needed smaller amts. of reagents in the final treatment. Because of the removal of naphthenic acids from the crude oil the distn. equipment is not subjected to corrosion. Similar results were obtained with other Baku oils; in some cases the strength of NaOH was changed. All treated oils showed a higher amt. of ash. Heavy crude oils contg. 0.9-1.2% petroleum acids acted less favorably; some of the alkali remained in the oil and quite a high proportion was found in the sludge. Some oils such as the Emba crude oil formed emulsions which were broken by adding 1% of kerosene naphthenic acids. The alkali sludge contained up to 50-60% of oil. The compn. of the org. part sepd. from the sludge from Bibi-Eibat crude oil contained: asphaltogenic acids 0.23, naphthenic acids 63.52, asphaltenes 0.96, resins 4.07 and "oil" 31.16%. The oil is composed of the lightest and the heaviest crude-oil fractions. A. A. Borshtlingk

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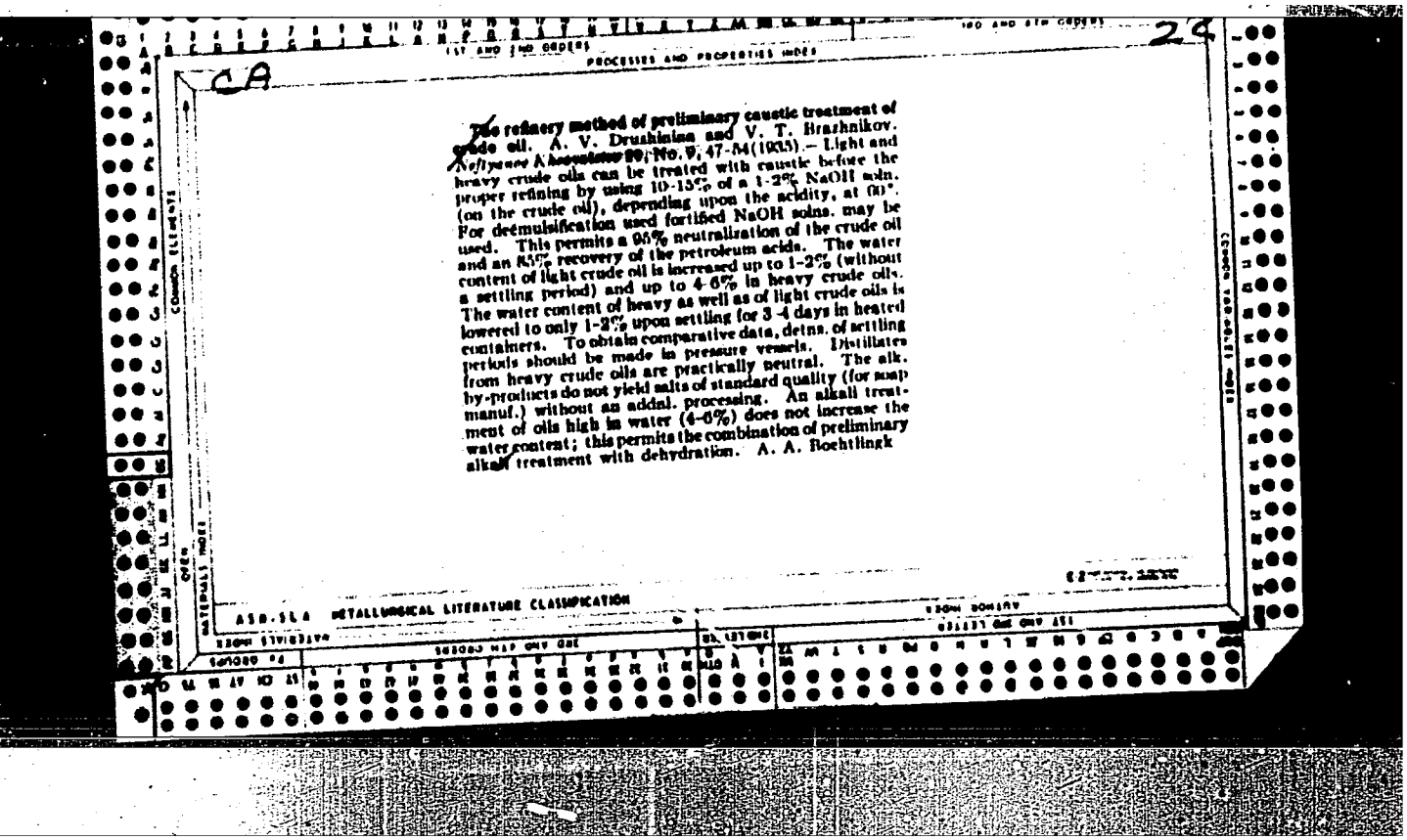

The refinery method of preliminary caustic treatment of crude oil. A. V. Druzhinina and V. T. Brazhnikov. *Neftyanoe Khozyaistvo* 33, No. 9, 47-54 (1955).— Light and heavy crude oils can be treated with caustic before the proper refining by using 10-15% of a 1-2% NaOH soln. (on the crude oil), depending upon the acidity, at 60°. For demulsification used fortified NaOH solns. may be used. This permits a 95% neutralization of the crude oil and an 85% recovery of the petroleum acids. The water content of light crude oil is increased up to 1-2% (without a settling period) and up to 4-6% in heavy crude oils. The water content of heavy as well as of light crude oils is lowered to only 1-2% upon settling for 3-4 days in heated containers. To obtain comparative data, detns. of settling periods should be made in pressure vessels. Distillates from heavy crude oils are practically neutral. The alk. by-products do not yield salts of standard quality (for soap manuf.) without an addnl. processing. An alkali treatment of oils high in water (4-6%) does not increase the water content; this permits the combination of preliminary alkali treatment with dehydration. A. A. Boehtlingk

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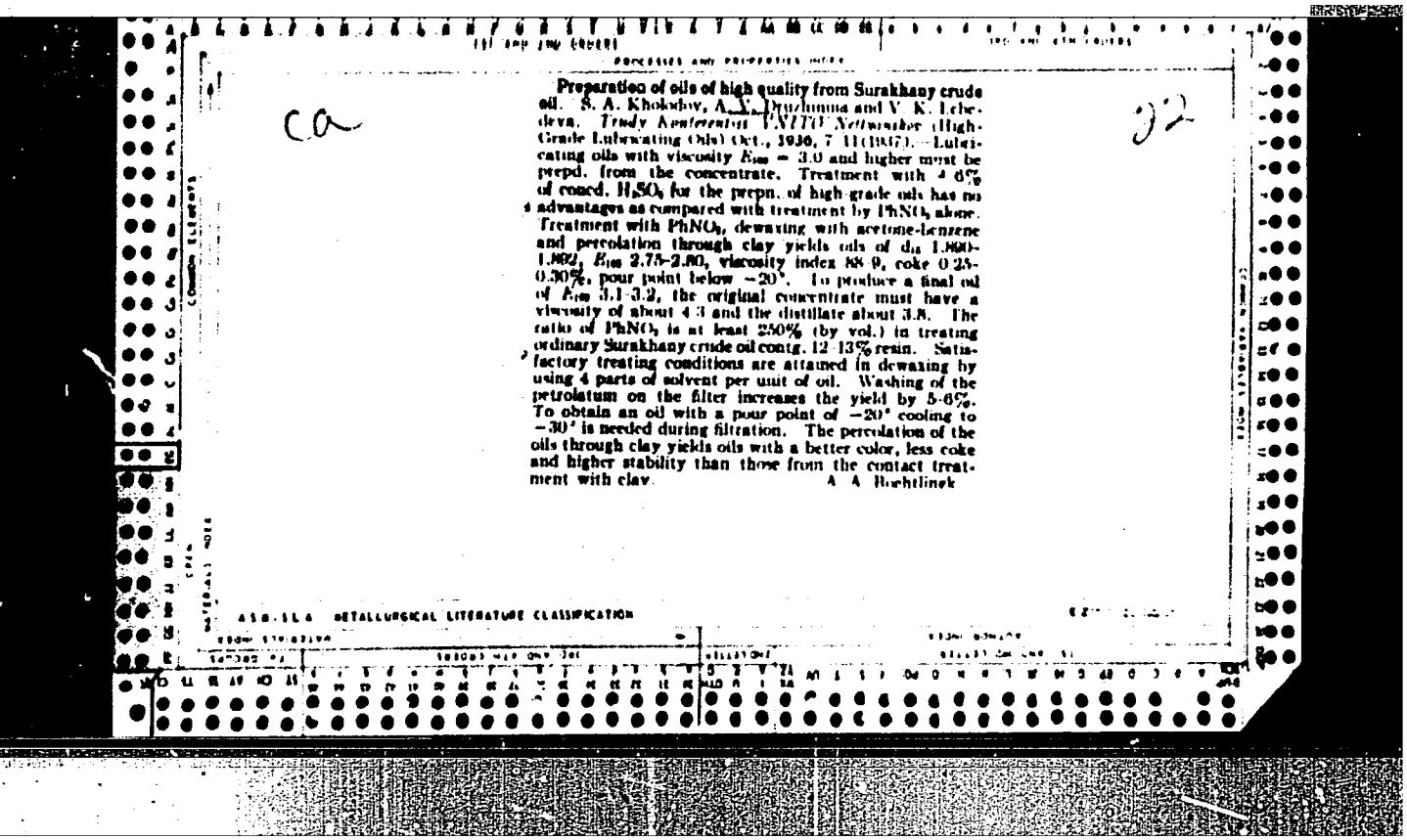

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Preparation of oils of high quality from Surakhany crude oil. S. A. Kholodov, A. V. Dyubinina and V. K. Lebedeva. *Trudy Konferentsii VNITO Neftyanikov* (High-Grade Lubricating Oils) Oct., 1930, 7 11(1937).—Lubricating oils with viscosity E_{50} = 3.0 and higher must be prepd. from the concentrate. Treatment with 4 6% of concd. H_2SO_4 for the prepn. of high-grade oils has no advantages as compared with treatment by $PhNO_2$ alone. Treatment with $PhNO_2$, dewaxing with acetone-benzene and percolation through clay yields oils of d_{15} 1.890-1.892, E_{50} 2.75-2.80, viscosity index 88-9, coke 0.25-0.30%, pour point below −20°. To produce a final oil of E_{50} 3.1-3.2, the original concentrate must have a viscosity of about 4.3 and the distillate about 3.8. The ratio of $PhNO_2$ is at least 250% (by vol.) in treating ordinary Surakhany crude oil contg. 12-13% resin. Satisfactory treating conditions are attained in dewaxing by using 4 parts of solvent per unit of oil. Washing of the petrolatum on the filter increases the yield by 5-6%. To obtain an oil with a pour point of −20° cooling to −30° is needed during filtration. The percolation of the oils through clay yields oils with a better color, less coke and higher stability than those from the contact treatment with clay. A. A. Boichtinek

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

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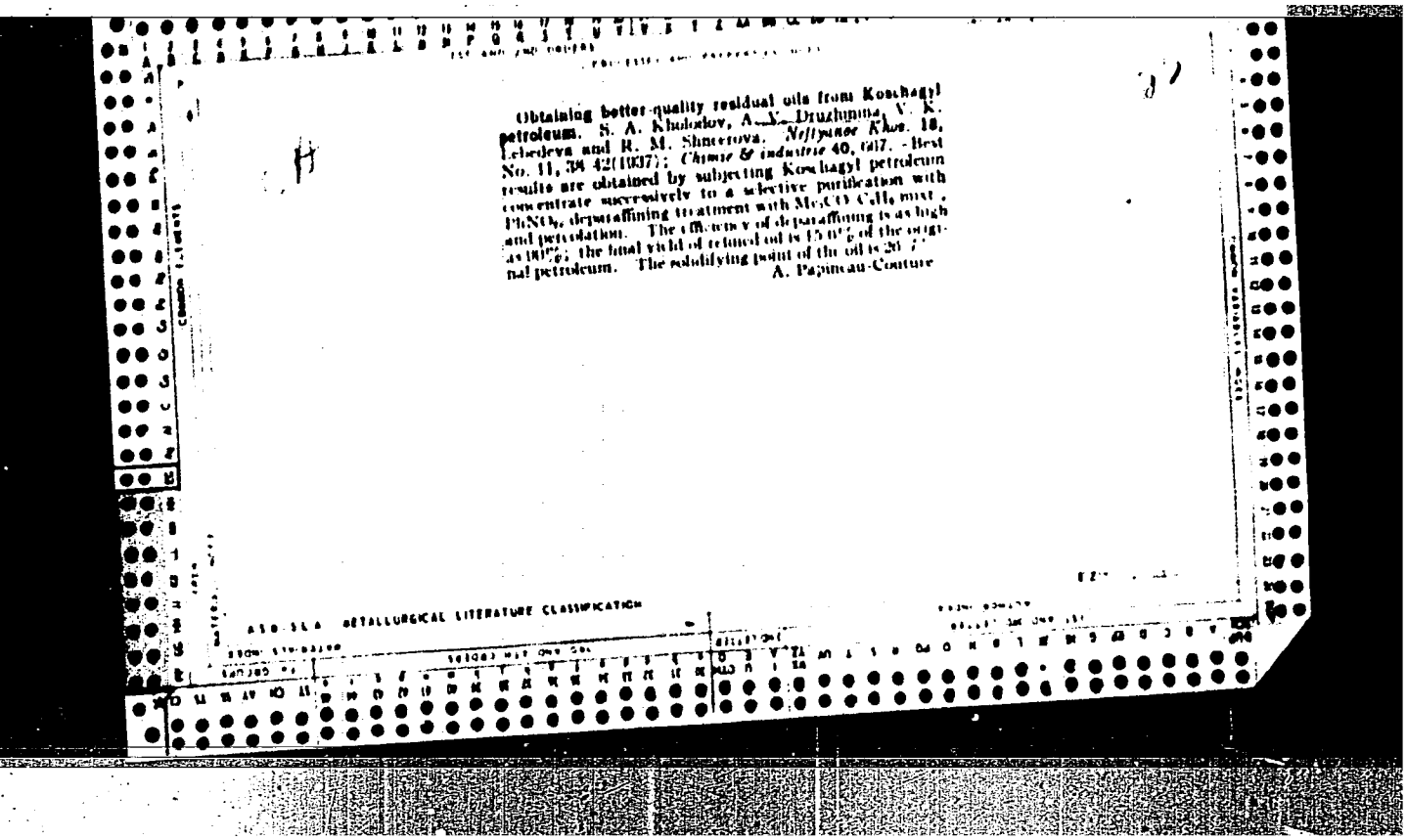

Obtaining better-quality residual oils from Koschagyl petroleum. S. A. Khalodov, A. V. Druzhinina, V. K. Lebedeva and R. M. Shmerova. *Neftyanoe Khoz.* 18, No. 11, 38-42(1937); *Chimie & industrie* 40, 617. - Best results are obtained by subjecting Koschagyl petroleum concentrate successively to a selective purification with $PhNO_2$, deparaffining treatment with $MeCO_2Et$, mixt., and percolation. The efficiency of deparaffining is as high as 80%; the final yield of refined oil is 15-16% of the original petroleum. The solidifying point of the oil is -20°.

A. Papineau-Couture

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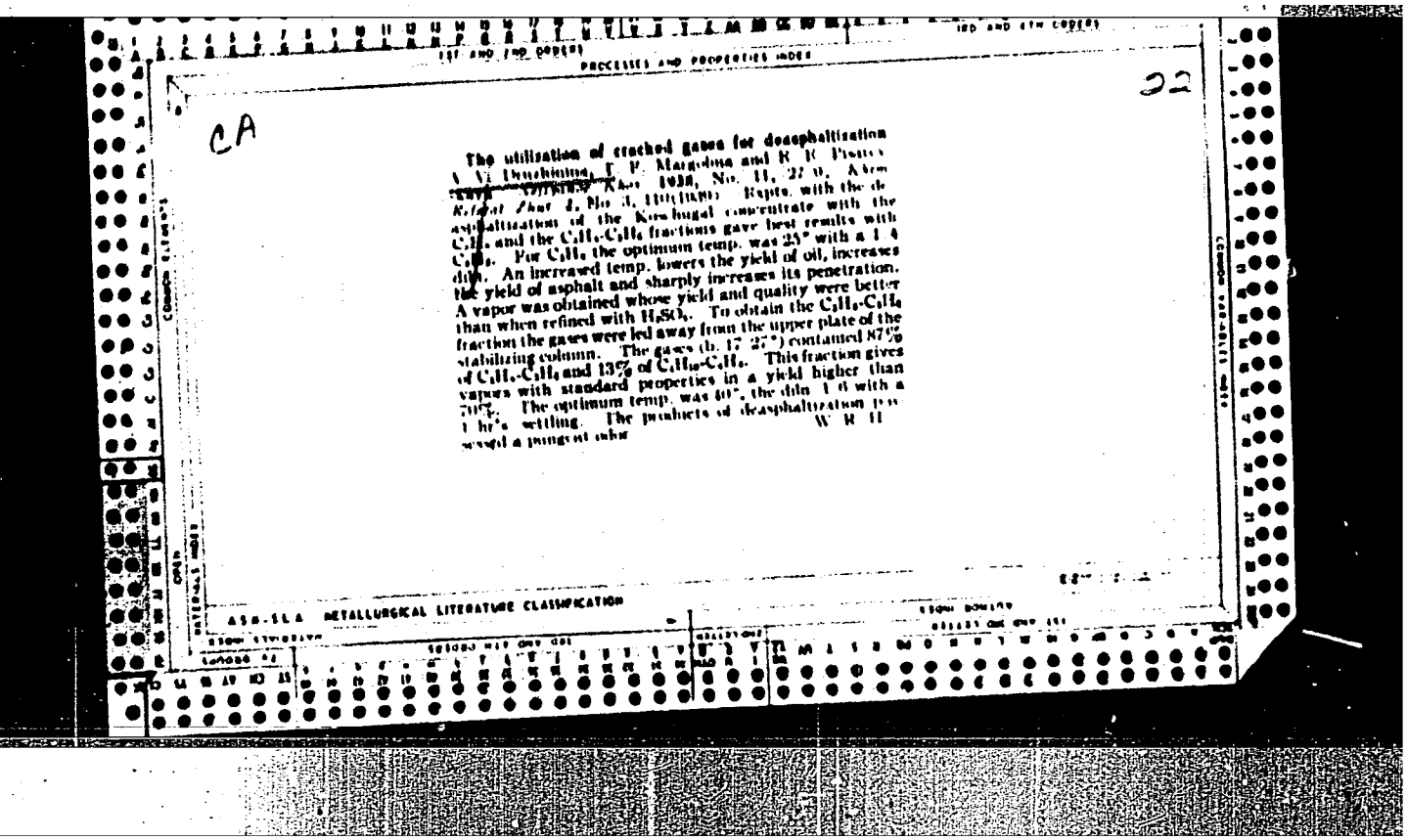

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