Gurevich, A. A.

✓ Photochemical method of comparative phytoactinometry. A. A. Gurevich (K. A. Timiryazev Agr. Acad., Moscow). *Doklady Akad. Nauk. S.S.S.R.* 91, 1221–3(1953).—The method is based on the photochemical transfer of H from $PhNHNH_2 \cdot HCl$ (II) to $o\text{-}C_6H_4(NO_2)_2$ (III) that is sensitized by chlorophyll (I). The amt. of $o\text{-}NO_2C_6H_4NHON$ formed is detd. colorimetrically. The soln. used contains 10 ml. I in 30% alc., 5 drops of concd. NH_3, and 1 ml. of each of an alc. soln. of II and III. To avoid the decrease of quantum yield by depletion of H donor and the interference of light absorption by III, the exposure must last only till a very weak brown color develops. Frosted glass must be used to avoid direct light. The constancy of quantum yield in different parts of spectrum was not checked, but is probable. The photochemical reaction yield is proportional to the light intensity. A. Sementsov

GUREVICH, A. A.

Chlorophyll as the photosensitizer in the process of photosynthesis. A. A. Gurevich (Lab. Plant Physiol. and Microbiol., K. A. Timiryazev Agr. Acad., Moscow). *Trudy Inst. Fiziol. Rastenii im. K. A. Timiryazeva* 3, No. 1, 87-97(1953).—Exptl. confirmation was achieved for the idea of photosensitization activity of chlorophyll, proposed by Timiryazev (*Ob Usvoenii Sveta Rasteniyami* St. Petersburg, 1875). Satd. aq. soln. of *o*-dinitrobenzene (I) in conjunction with young wheat or *Elodea* plants, immersed partially into the soln., underwent reduction the extent of which varied with the extent of aeration (air exposure) of the plant. Under condition of illumination I undergoes reduction in the green parts of the plant at such a high intensity that the corresponding hydroxylamine is not accumulated (this took place only with high level of aeration) and the presence or absence of CO_2 in the atm. does not affect the reduction. Thus, the reduction is not a part of CO_2 reaction system. Expts. with the green plastids of chick-weed and similar plants showed definite reduction of I; the most satisfactory method of following the reaction was by means of filter-paper strips soaked in I in Et_2O then dried; such strips were placed in the reaction cells contg. the plastids and were then subjected to light introduced through the opposite wall of the container. The products, detected by color tests, contained small amounts of *o*-nitroaniline and appreciable amounts of *o*-nitrophenylhydroxylamine. No reduction took place in the dark, or at best a very small amount of reduction product was formed in long expts. (3 hrs.). Thus, in the isolated granule suspension the reaction tends to stop at the hydroxylamine stage, while in the green leaf the reduction tends to go to the nitroaniline stage. The illuminated plastid suspension in the presence of H acceptor evolves mol. O which is derived from H_2O of the medium. A alc. soln. of chlorophyll treated with I and exposed to light in the presence of $PhNHNH_2$ showed a vigorous reduction of I to the hydroxylamine stage; in the dark no reaction took place unless excess NH_4OH was added to the mixt.; in the absence of chlorophyll or $PhNHNH_2$ no reaction took place. The use of mixed isomers of dinitrobenzene (prepd. by direct nitration of benzene) in a reaction which involved $PhNHNH_2.HCl$, alc. chlorophyll soln., and a few drops of NH_4OH also yielded some *p*-nitrophenylhydroxylamine (detected by red color in alk. soln.). The paraisomer is reduced more readily than the orthoisomer. When ascorbic acid was used as H donor, the soln. of I and chlorophyll treated with NH_4OH, similar reduction of I occurred on illumination. It appears that chlorophyll in the natural state is a photocatalyst which activates H, and can be called photodehydrogenase. Chlorophyll similarly sensitizes the transfer of H from H_2S (aq. soln.) to I in the presence of light. The reactions yield the hydroxylamine deriv. G. M. Kosolapoff

GUREVICH, A. A.

CUREVICH, A. A.

Plant Physiology

Dissertation: "Investigation of the Biochemical Transfer of Hydrogen in Plants in Connection with Respiration and Photosynthesis." Dr Biol Sci, Inst of Biochemistry imeni A. N. Bakh, Acad Sci USSR, 1 Apr 54. (Vechernyaya Moskva, Moscow, 17 Mar 54)

SO: SUM 213, 20 Sept 1954

Dependence of photosynthesis in leaves on consumption of assimilables by the plant. A. A. Gurevich and O. M. Myachina (K.A. Timiryazev Agr. Acad., Moscow). *Fiziol. Rastenii* 3, 323-32(1956).—Expts. with bean plants indicate the environmental conditions favorable to photosynthesis can be controlled in their effects by the rate of efflux of assimilates from the tissues, i.e. by the rate of consumption of the nutrient substances. Thus, insufficient photosynthesis of some leaves may be compensated by increased activity of others. For this reason fruit by consuming much of the assimilable matter accelerate photosynthetic activity. The expts. were run with C^{14}-tracers (CO_2).

G. M. Kosolapoff

COUNTRY : USSR I
CATEGORY : PLANT PHYSIOLOGY. Photosynthesis.

ABS. JOUR. : REF ZHUR - BIOLOGIYA, NO. 4, 1959, No. 15242

AUTHOR : Gurevich, A.A.
INST. : Academy of Sciences USSR
TITLE : Problem of Nitrate Reduction in Green Plants in the Presence of Light.

ORIG. PUB. : V sb.: Pamyati akad. N.A. Maksimova. M. AN SSSR, 1957, 242-247

ABSTRACT : Sprouts of water thyme were put in a mixture of a 0.1 N solution of $KaNO_3$ and a 0.01 N solution of HNO_3 which had been prepared in CO_2-free distilled water. It was observed that O_2 was not liberated in the light. But if CO_2 was added to the mixture, then O_2 was liberated intensively. The conclusion was drawn that nitrate reduction by higher plants in the light in contrast to algae occurred in a direct ratio to the assimilability of

CARD: 1/2

COUNTRY :
CATEGORY : PLANT PHYSIOLOGY.

ABS. JOUR. : REF ZHUR - BIOLOGIYA, NO. 4, 1959, No. 15242

AUTHOR :
INST. :
TITLE :

ORIG. PUB. :

ABSTRACT : CO_2 and progressed at the expense of the photochemical activation of H_2 of the water. The work was accomplished at the Timiryazev Agricultural Academy.-- O.V. Bogdashevskaya

CARD: 2/2

determine how the movable hydrogen of the donor is distributed between the acceptor and oxidator in the concerned reaction. As hydrogen donor ascorbic acid was used, as hydrogen acceptor methylene red. As catalyst copper sulphate and ferrous sulphate were used. The methylene red molecule is reduced to a colorless leuco compound (Ref 3). Methylene red behaved in the previous tests quite analogously to the ortho dinitrobenzene (Ref 1). Out of the fact that the reduction of 1 molecule methylene red requires 2 hydrogen atoms follows that only 1/5 - 1/3 of the atoms of the movable hydrogen of the amount of ascorbic acid is used for it. The ascorbic acid is oxidized at this reaction. The remaining movable hydrogen of the donor is oxidized by H_2O_2.

This utilization coefficient does not depend on the concentration of the reaction participant. The ferrous sulphate operates at the said reaction only in presence of the H_2O_2 and not of the molecular oxygen. But the latter operates in this sense only on the catalytic effect of copper ions. The corresponding experiments gave an analogous result as above, but showed a smaller consumption of ascorbic acid. This can be ascribed to an exacter titration possibility than it was possible in the first

case. The said oxygen consumption was in oxygen stream 4-5 times greater than on adding H_2O_2. About the mechanism of the induced reduction. The strong peroxidase effect of iron- and copper ions is known (Ref 4). The copper ions also strongly catalyze the oxidation of the ascorbic acid by the molecular O_2 whereat H_2O_2 results. On this the idea of the formerly described (Ref 1) induced reduction can be based: the H_2O_2 introduced from outside or formed as above is activated peroxidaselike by copper- or iron ions. This H_2O_2 oxidizes the ascorbic acid monovalently. Thereby arises its free radical - the mono dehydro ascorbic acid (Ref 5). These radicals are a very strong reducing substance. Therefore its single movable hydrogen atom gets the capacity to let transfer itself more intensively to the more difficultly reduceable acceptors with a low redox potential as methylene red, ortho dinitro benzene, and others. In this way the oxidation of the first movable hydrogen atom effects the activation of the second atom of the ascorbic acid and induces thereby the reduction of the acceptor. This is only possible in the presence

of copper atoms. At the presence of H_2O_2 this reaction takes place also in the presence of iron ions. The activated H-atom of the mono dehydro ascorbic acid can of course be transferred also on an active oxidator. Therefore, the utilization coefficient of the movable hydrogen of the ascorbic acid does not equal 50% but it is much smaller. The reason is that the ascorbic acid oxidized by O_2 is only the source for H_2O_2. The arising of free radicals of the ascorbic acid was proved by A. I. Drokin (Krasnoyarsk Institute of Physics of the AS USSR) on paramagnetic way. There are 8 references, 7 of which are Soviet.

ASSOCIATION: Institut fiziki Akademii nauk SSSR g. Krasnoyarsk (Krasnoyarsk, Institute of Physics of the Academy of Sciences, USSR)

PRESENTED: March 16, 1959, by A. L. Kursanov, Academician

SUBMITTED: December 8, 1958

L0339

27.1220
26.1610

S/194/62/000/006/127/232
D256/D308

AUTHORS: Gurevich, A.A., and Golosova, N.A.

TITLE: Effect of ultrasound on oxidizing and reducing reactions of hydrogen transfer

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 6, 1962, abstract 6-5-42 n (V sb. Primeneniye ul'traakust. k issled. veshchestva, no. 12, M., 1960, 147-150)

TEXT: To explain the biological effects of ultrasound it is of interest to investigate the effect of ultrasound on the oxidizing and reducing reactions. One of such reactions is the transfer of hydrogen from the donor (ascorbic acid) to the acceptor (the methyl red) in the presence of ions of copper as catalyst. It was found that ultrasound of a frequency of 800 кс/s and 7 W/cm^2 intensity considerably accelerates the transfer of hydrogen in this reaction. [Abstracter's note: Complete translation.]

Card 1/1

GUREVICH, A.A.; GOLOSOVA, N.A.

Effect of aeration on methemoglobin reduction by ascorbic acid. Dokl.AN SSSR 133 no.6:1458-1461 Ag '60.
(MIRA 13:8)

1. Institut fiziki Sibirskogo otdeleniya Akademii nauk SSSR. Predstavleno akad. P.A.Rebinderom.
(METHEMOGLOBIN) (ASCORBIC ACID)
(OXIDATION-REDUCTION REACTION)

GUREVICH, A.A.; GOLOSOVA, N.A.

Effect of aeration and hydrogen peroxide on methemoglobin reduction.
Dokl. AN SSSR 137 no.1:211-212 Mr-Ap '61. (MIRA 14:2)

1. Institut fiziki Sibirskogo otdeleniya Akademii nauk SSSR.
Predstavleno akademikom P.A.Rebinderom.
(Hemoglobin) (Oxidation-reduction reaction)

GUREVICH, A.A.

Catalytic effect of peroxidase on the induced reaction of ortho-dinitro-benzene reduction by ascorbic acid. Dokl.AN SSSR 145 no.2:443-446 Jl '62. (MIRA 15:7)

1. Institut fiziki Sibirskogo otdeleniya AN SSSR. Predstavleno akademikom P.A.Rebinderom.
(Peroxidase) (Benzene) (Ascorbic acid)

GUREVICH, A.A.

Demonstration experiment on photosensitizing action of chlorophyl. Nauch. dokl. vys. shkoly; biol. nauki no.3: 154-155 '64 (MIRA 17:8)

1. Rekomendovana Institutom fiziki Sibirskogo otdeleniya AN SSSR.

ACCESSION NR: AP4036729 S/0020/64/156/002/0457/0460

AUTHOR: Gurevich, A. A.; Trubachev, I. N.; Rerberg, M. S.

TITLE: On the effect of hydrogen peroxide on nitrate reduction in green plants

SOURCE: AN SSSR. Doklady*, v. 156, no. 2, 1964, 457-460

TOPIC TAGS: nitrate reduction, hydrogen peroxide, algae, chlorella, nitrate, ammonia, amination, nitrogen, biosynthesis

ABSTRACT: The authors investigated whether an external introduction of a physiologically admissible concentration of hydrogen peroxide, under certain conditions, would affect nitrate reduction in a plant and, so, produce an increase in ammonia formation. The experimental subjects were one-celled green algae (chlorella vulgaris, a thermophylic variant). From some of the experimental results, it was shown that the addition of hydrogen peroxide to the nitrate solution, under either night or daylight conditions, increased ammonia production from the plant to the surrounding environment by an average of more than 1-1/2 times. When the nitrogen was depleted, however, the chlorella did not give off ammonia. It was concluded, therefore, that for green plants, the biosynthesis of albuminous matter from nitrates was accomplish-

Card 1/2

ACCESSION NR: AP4036729

ed with the assistance of the induced reduction reaction. Orig. art. has: 2 tables

ASSOCIATION: Institut fiziki. Sibirskogo otdeleniya. Akademii nauk SSSR (Institute of Physics, Siberian Branch, Academy of Sciences SSSR)

SUBMITTED: 04Sep63 DATE ACQ: 16Jun64 ENCL: 00

SUB CODE: LS NO REF SOV: 002 OTHER: 001

Card 2/2

[illegible]OVICH, A.A.; [illegible]BACHEV, I.N.

Reduction of nitrate in ammonia induced by ascorbic acid. Dokl. AN SSSR 157 no. 2:467-468 Jl '64. (MIRA 17:7)

1. Institut fiziki Sibirskogo otdeleniya AN SSSR. Predstavlano akademikom N.M.Sisakyanom.

GUREVICH, A.A., inzh.; ZAKS, A.V., inzh.; KASPAROV, G.N., inzh.;
MUCHNIK, M.M., inzh.

Automatic control of vacuum driers. Mekh. i avtom. proizv.
18 no.10:37-38 O '64. (MIRA 17:12)

L 65032-65 EWT(l)/EWP(e)/EWT(m)/EWG(v)/FCC/EWP(t)/EWP(k)/EWP(z)/EWP(b)

ACCESSION NR: AT6019957 JD/GW UR/2531/65/000/177/0081/0089

AUTHOR: Gurevich, A. A.; Leonov, V. A. 44,55 44,55

TITLE: The problem of frictionally charged micropowders

SOURCE: Leningrad. Glavnaya geofizicheskaya observatoriya. Trudy, no. 177, 1965. Atmosfernoye elektrichestvo (Atmospheric electricity), 81-89

TOPIC TAGS: luminophor charge, abrasive charge, friction charge, aerosol, particle charge 12, 44,55

ABSTRACT: Simultaneous measurement of the particle charge and size of luminophors and abrasives has been carried out on the PZK-1 device developed at the Glavnaya geofizicheskaya observatoriya im. A. I. Voyeykova (Main Geophysical Observatory), as described in this article. Charges and dimensions were obtained from the trajectory parameters of particles falling freely between the vertical plates of a plane parallel capacitor. Tests yielded quantitative measures characterizing the totality of observed charges of a luminophor (70% ZnS with 30% CdS) and an abrasive (99% of Al_2O_3) in micropowder form. The observed symmetrical charging of luminophors during the use of glass and polyvinylchloride atomizers and sharply asymmetric charging in the case of metallic atomizers is in good agreement with the results obtained by Kunkel (L. Leb, Staticheskaya elektrizatsiya,

Card 1/2

L 65032-65

ACCESSION NR: AT5019957

Gosenergoizdat, M.-L., 1963). During the charging of the abrasive powder within the ionic current of the negative corona, all particles became negatively charged. Orig. art. has: 10 figures and 4 tables. [08]

ASSOCIATION: Glavnaya geofizicheskaya observatoriya, Leningrad (Main Geophysical Observatory)

44,55

SUBMITTED: 00 ENCL: 00 SUB CODE: ES, EM

NO REF SOV: 004 OTHER: 000 ATD PRESS: 4082

Card 2/2

SHISHMAN, D.V., kand. tekhn. nauk; MEKHOVA, N.N., inzh.; GUREVICH, A.A., inzh.; IKHTEYMAN, F.M., inzh.; Prinimali uchastiye: ROZET, V.Ye., inzh.; KAPLAN, G.S.; KAZIMIR, A.P.

Light-weight RVO-35 valve-type discharger. Mekh. i elek. sots. sel'khoz. 21 no.3:60-62 '63. (MIRA 16:8)

1. Leningradskiy filial Gosudarstvennogo issledovatel'skogo elektrokeramicheskogo instituta (for Shishman, Mekhova, Gurevich).
2. Nauchno-issledovatel'skiy institut mekhanizatsii i elektrifikatsii sel'skogo khozyaystva Severo-Zapada (for Ikhteyman).
(Electric protection)

SHISHMAN, D.V., kand.tekhn.nauk; GUREVICH, A.A., inzh.

Experience in using "vilite" arresters. Elek.sta. 33 no.12:46-51 D '62. (MIRA 16:12)
(Electric protection) (Electric power distribution)

VOLKOVA, I.B.; NALIVKIN, D.V.; SLATVINSKAYA, Ye.A.; BOGOMAZOV, V.M.; GAVRILOVA, O.I.; GUREVICH, A.B.; MUDROV, A.M.; NIKOL'SKIY, V.M.; OSHURKOVA, M.V.; PETRENKO, A.A.; POGREBITSKIY, Ye.O.; RITENBERG, M.I.; BOCHKOVSKIY, F.A.; KIM, N.G.; LUSHCHIKHIN, G.M.; LYUBER, A.A.; MAKEDONTSOV, A.V.; SENDERZON, E.M.; SINITSYN, V.M.; SHORIN, V.P.; BELYANKIN, L.F.; VAL'TS, I.E.; VLASOV, V.M.; ISHINA, T.A.; KONIVETS, V.I.; MARKOVICH, Ye.M.; MOKRINSKIY, V.V.; PROSVIRYAKOVA, Z.P.; RADCHENKO, O.A.; SEMERIKOV, A.A.; FADDEYEVA, Z.I.; BUTOVA, Ye.P.; VERBITSKAYA, Z.I.; DZENS-LITOVSKAYA, O.A.; DUBAR', G.P.; IVANOV, N.V.; KARPOV, N.F.; KOLESNIKOV, Ch.M.; NEFED'YEV, L.P.; POPOV, G.G.; SHTEMPEL', B.M.; KIRYUKOV, V.V.; LAVROV, V.V.; SAL'NIKOV, B.A.; MONAKHOVA, L.P.[deceased]; MURATOV. M.V.; GORSKIY, I.I., glav. red.; GUSEV, A.I., red.; MOLCHANOV, I.I., red.; TYZHNOV, A.V., red.; SHABAROV, N.V., red.; YAVORSKIY, V.I., red.; REYKHERT, L.A., red.izd-va; ZAMARAYEVA, R.A., tekhn. red

[Atlas of maps of coal deposits of the U.S.S.R.]Atlas kart uglenakopleniia na territorii SSSR. Glav. red. I.I.Gorskii. Zam. glav. red. V.V.Mokrinskii. Chleny red. kollegii: F.A.Bochkovskiy i dr. Moskva, Izd-vo Akad. nauk SSSR, 1962. 17 p.
(MIRA 16:3)

1. Akademiya nauk SSSR. Laboratoriya geologii uglya. 2. Chlen-korrespondent Akademii nauk SSSR (for Muratov).
(Coal geology--Maps)

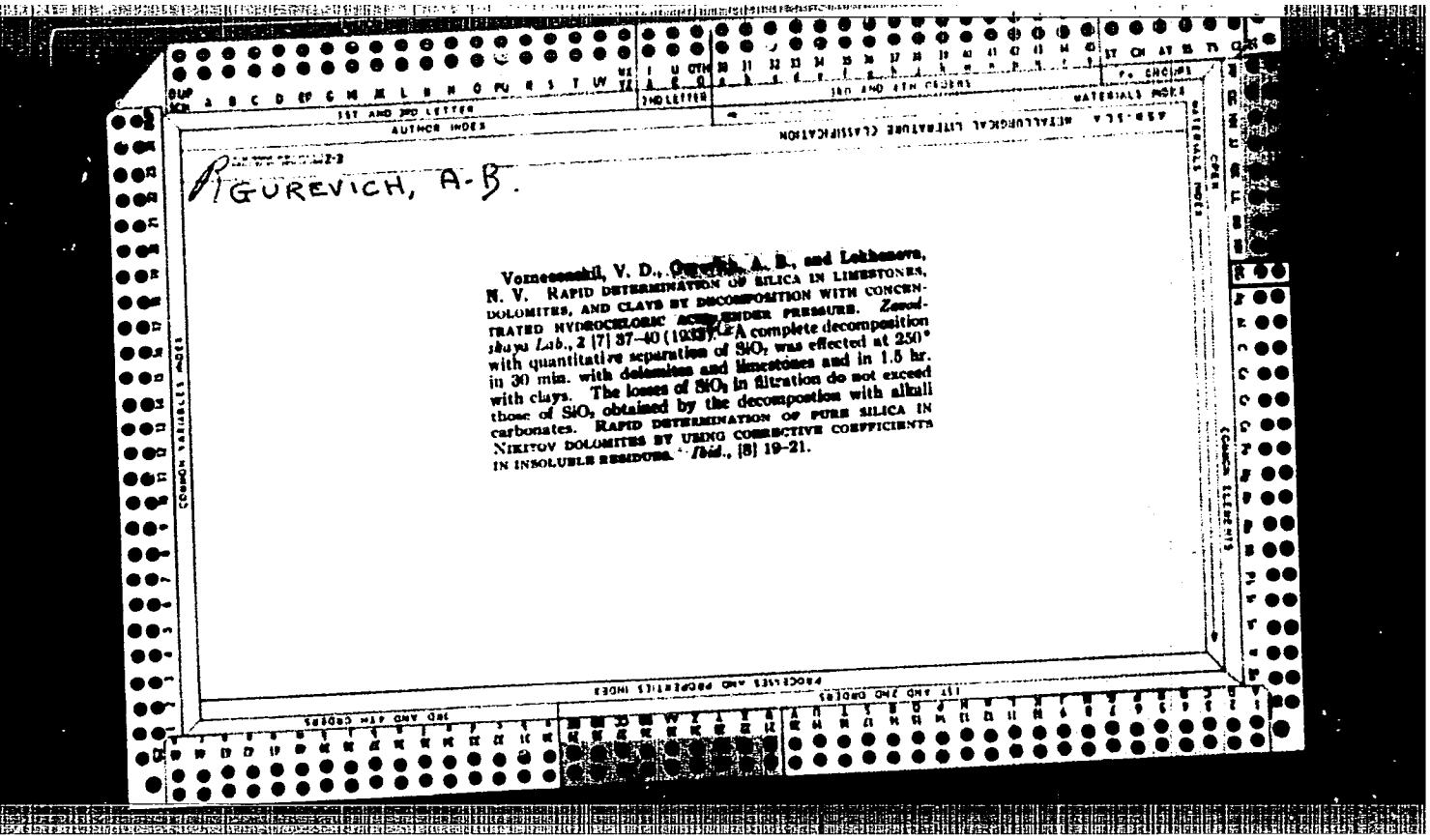
GOR, Yu.S.; GUREVICH, A.B.; SHESHENOVA, L.I.

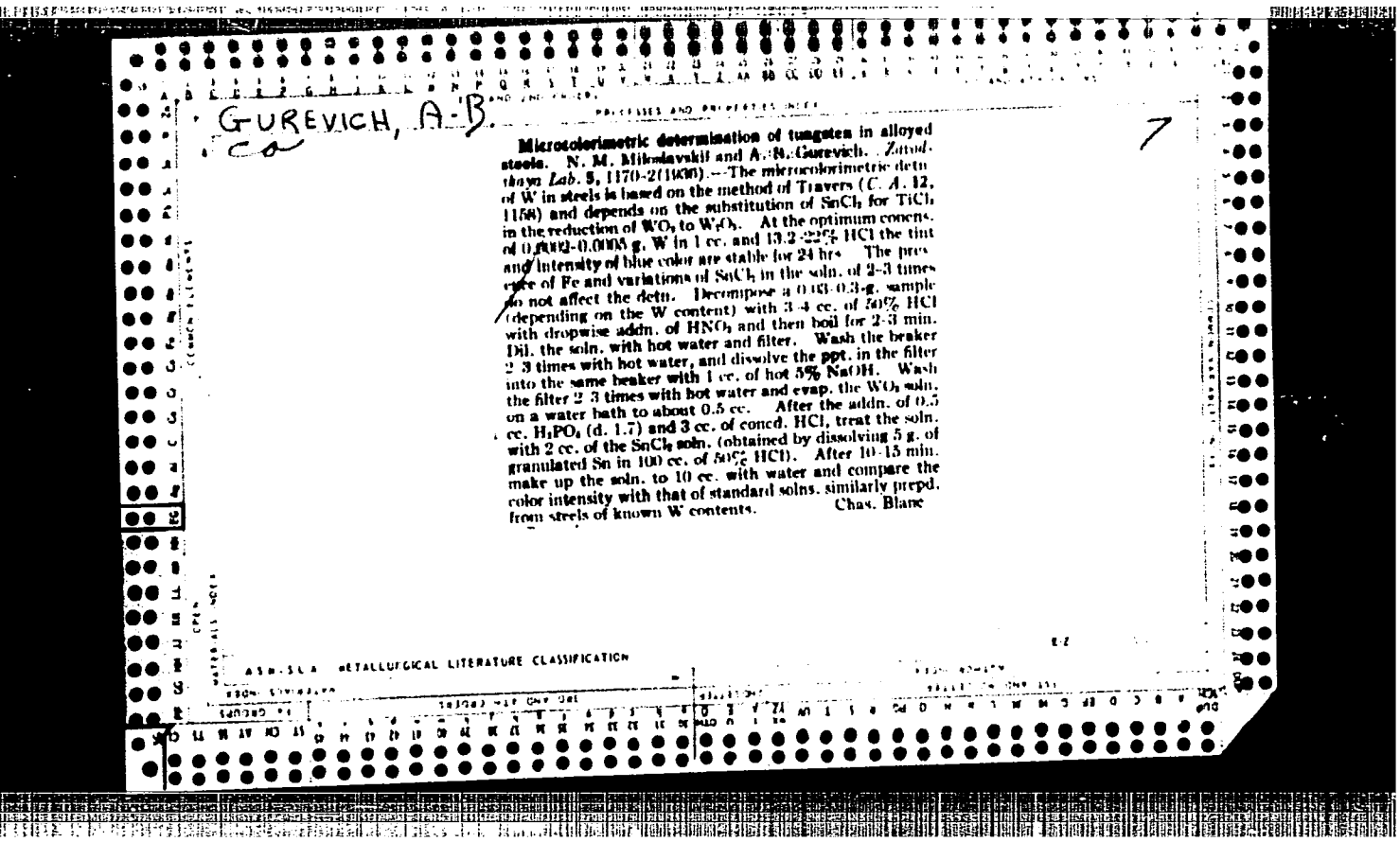
Analogues of the Kuznetsk series in the Norilsk region. Izv. AN SSSR. Ser. geol. 30 no.6:92-94 Je '65.
(MIRA 18:6)

1. Laboratoriya geologii uglya Instituta geologii i geofiziki Sibirskogo otdeleniya AN SSSR, Novosibirsk, i Institut geologii Arktiki, Leningrad.

GUREVICH, A.B.

Paleogeography of the Noril'sk region in the Late Paleozoic.
Uch. zap. NIIGA. Reg. geol. no.2:30-48 '64.
(MIRA 19:1)

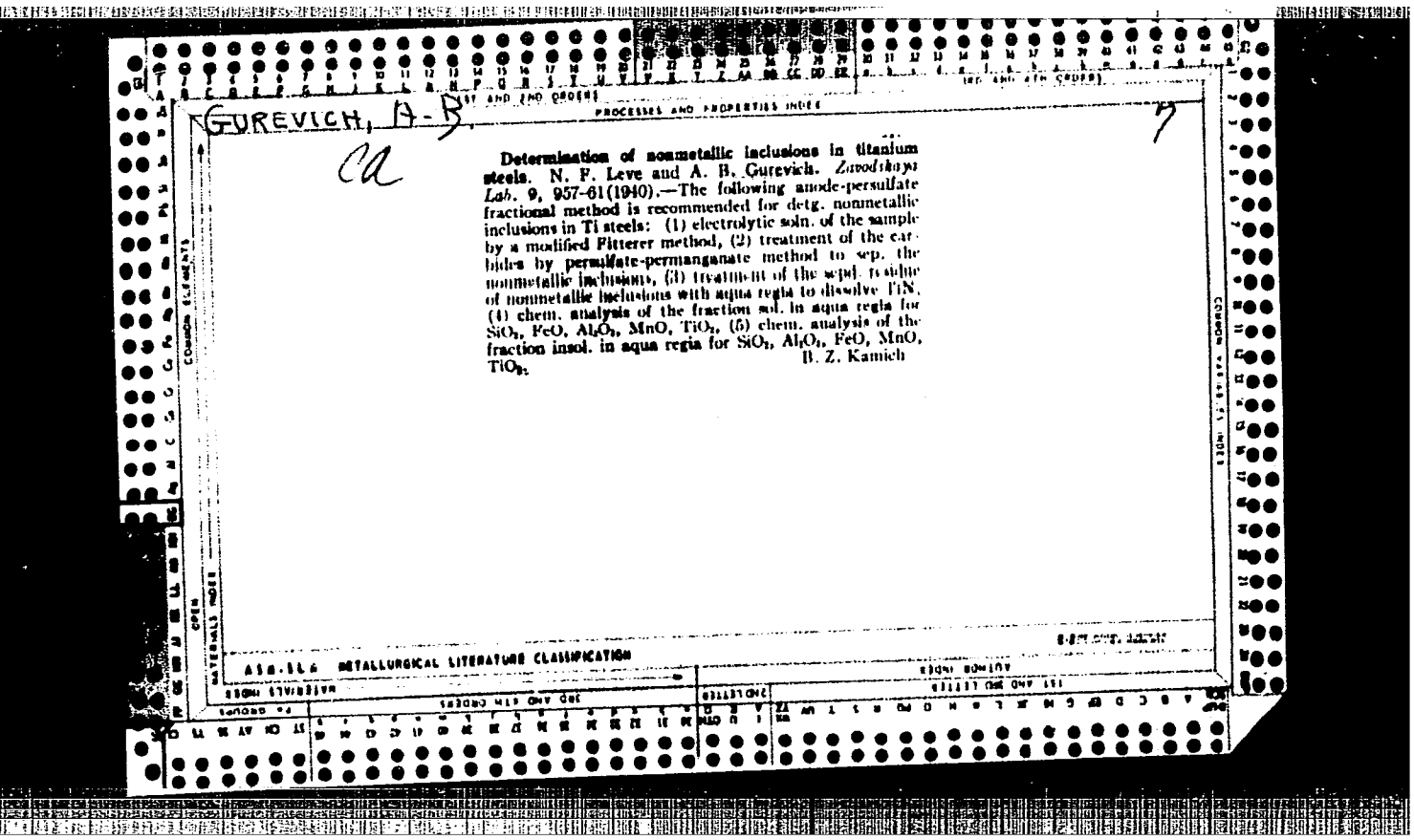




GUREVICH, A-B.

Microcolorimetric determination of tungsten in alloyed steels. N. M. Mikolaevskii and A. B. Gurevich. *Zavod. Lab.* 5, 1170-2(1936).—The microcolorimetric detn. of W in steels is based on the method of Travers (*C. A.* 12, 1158) and depends on the substitution of $SnCl_2$ for $TiCl_3$ in the reduction of WO_3 to W_2O_5. At the optimum concns. of 0.0002-0.0005 g. W in 1 cc. and 13.2-22% HCl the tint and intensity of blue color are stable for 24 hrs. The presence of Fe and variations of $SnCl_2$ in the soln. of 2-3 times do not affect the detn. Decompose a 0.03-0.3-g. sample (depending on the W content) with 3-4 cc. of 50% HCl with dropwise addn. of HNO_3 and then boil for 2-3 min. Dil. the soln. with hot water and filter. Wash the beaker 2-3 times with hot water, and dissolve the ppt. in the filter into the same beaker with 1 cc. of hot 5% NaOH. Wash the filter 2-3 times with hot water and evap. the WO_3 soln. on a water bath to about 0.5 cc. After the addn. of 0.5 cc. H_3PO_4 (d. 1.7) and 3 cc. of concd. HCl, treat the soln. with 2 cc. of the $SnCl_2$ soln. (obtained by dissolving 5 g. of granulated Sn in 100 cc. of 50% HCl). After 10-15 min. make up the soln. to 10 cc. with water and compare the color intensity with that of standard solns. similarly prepd. from steels of known W contents. Chas. Blanc

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



GUREVICH, A-B.

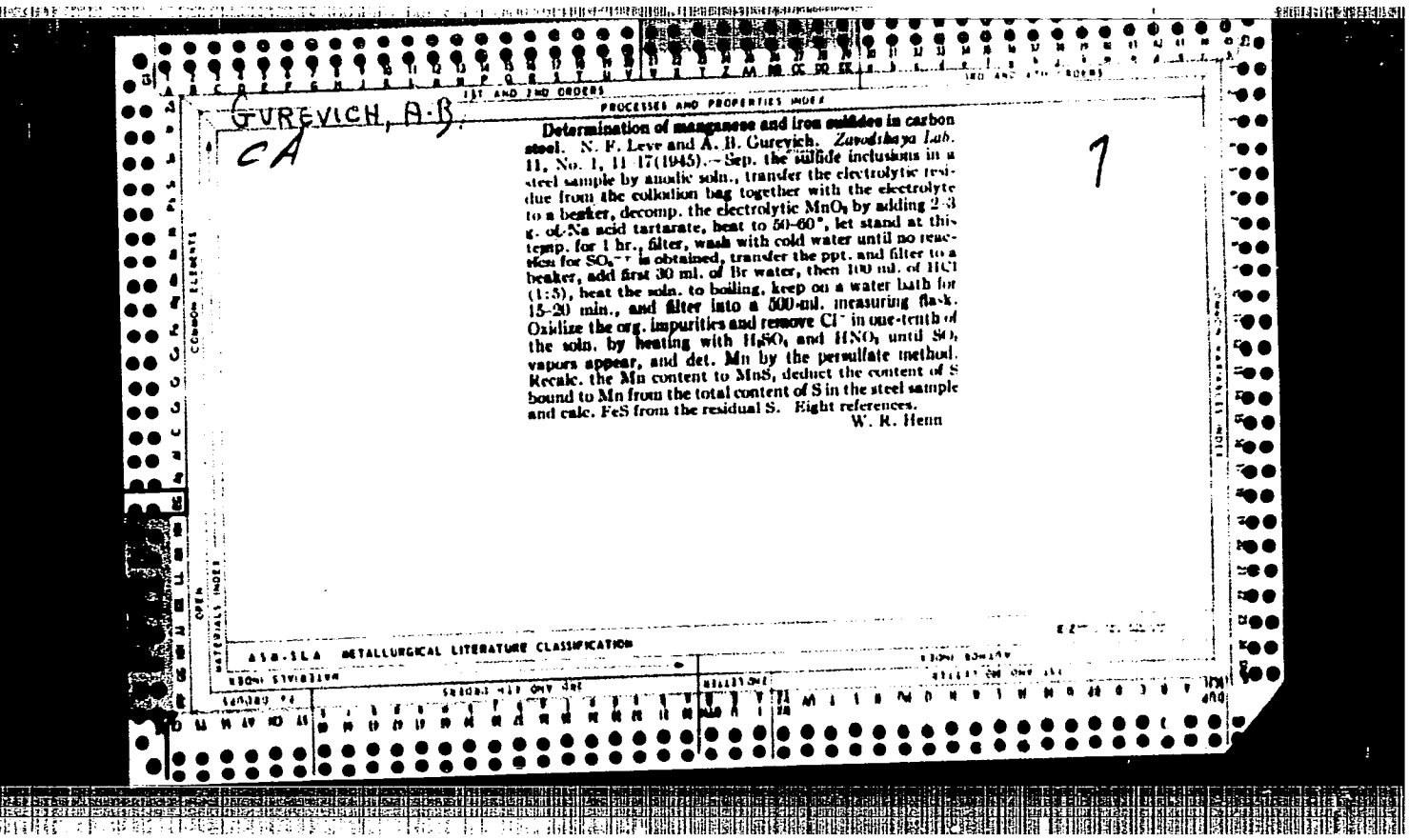
ca

PROCESSES AND PROPERTIES INDEX

Determination of nonmetallic inclusions in titanium steels. N. F. Leve and A. B. Gurevich. *Zavodskaya Lab.* 9, 957-61 (1940).—The following anode-persulfate fractional method is recommended for detg. nonmetallic inclusions in Ti steels: (1) electrolytic soln. of the sample by a modified Fitterer method, (2) treatment of the carbides by persulfate-permanganate method to sep. the nonmetallic inclusions, (3) treatment of the sepd. residue of nonmetallic inclusions with aqua regia to dissolve TiN, (4) chem. analysis of the fraction sol. in aqua regia for SiO_2, FeO, Al_2O_3, MnO, TiO_2, (5) chem. analysis of the fraction insol. in aqua regia for SiO_2, Al_2O_3, FeO, MnO, TiO_2.

B. Z. Kamich

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



GUREVICH, A.B.

CA

1

PROCESSES AND PROPERTIES INDEX

Determination of manganese and iron sulfides in carbon steel. N. F. Leve and A. B. Gurevich. *Zavodskaya Lab.* 11, No. 1, 11–17(1945).—Sep. the sulfide inclusions in a steel sample by anodic soln., transfer the electrolytic residue from the collodion bag together with the electrolyte to a beaker, decomp. the electrolytic MnO_2 by adding 2–3 g. of Na acid tartarate, heat to 50–60°, let stand at this temp. for 1 hr., filter, wash with cold water until no reaction for SO_4^{--} is obtained, transfer the ppt. and filter to a beaker, add first 30 ml. of Br water, then 100 ml. of HCl (1:5), heat the soln. to boiling, keep on a water bath for 15–20 min., and filter into a 500-ml. measuring flask. Oxidize the org. impurities and remove Cl^- in one-tenth of the soln. by heating with H_2SO_4 and HNO_3 until SO_3 vapors appear, and det. Mn by the persulfate method. Recalc. the Mn content to MnS, deduct the content of S bound to Mn from the total content of S in the steel sample and calc. FeS from the residual S. Eight references.

W. R. Henn

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

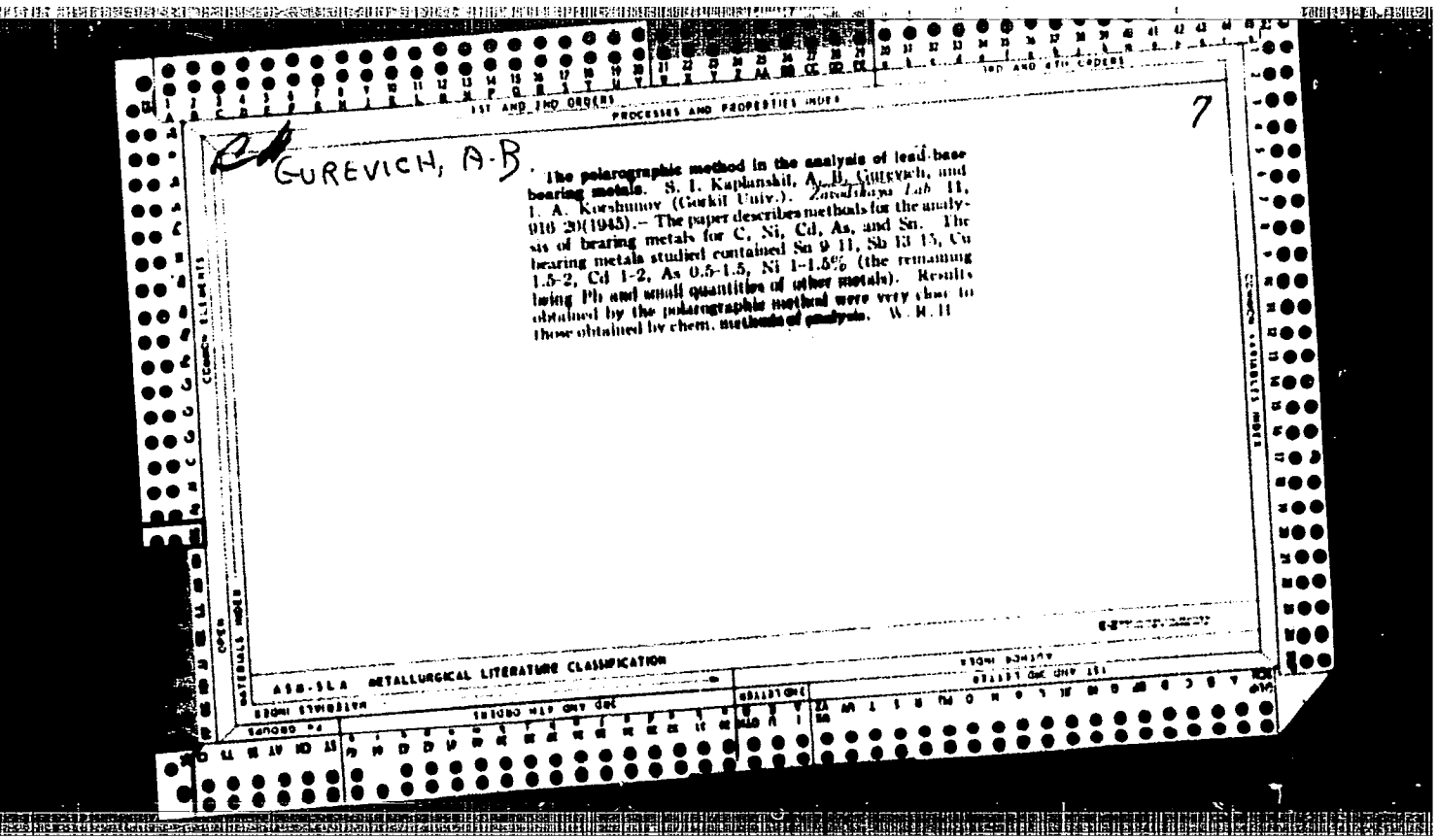
GUREVICH, A.B.

C1

PROCESSES AND PROPERTIES INDEX

Determination of chloride ion by polarographic titration. I. A. Korshunov and A. B. Gurevich (Gor'kii State Univ.). *Zavodskaya Lab.* 11, 638-51(1945).—Mix 2-4 ml. of the sample soln. contg. Cl^- with 3-6 ml. of alc. to make the content of alc. at the equiv. point equal to 55-60%, transfer the soln. to an electrolyzer equipped with a tube for passing H_2, and titrate with $Pb(NO_3)_2$ soln. of a concn. 2-3 times that of the Cl^-, pouring the titrating soln. into a microburet with its end immersed in the electrolyzer. A const. potential of approx. 0.9–1.1 v. is kept throughout the titration. Measure the diffusion current after each addn. of 0.1 ml. of the titrating soln. and mix the contents of the electrolyzer by a current of H_2 or some other gas. Plot the no. of ml. of $Pb(NO_3)_2$ used for the titration on the X-axis and the diffusion current on the Y-axis. A const. diffusion current indicates an excess of Cl^- in the soln. which binds the Pb ion in the ppt. Deviations from this position indicate the appearance of free Pb ion, i.e., the end of titration. A small excess of $Pb(NO_3)_2$ is added and a correction for the current due to the soly. of $PbCl_2$ is made by drawing a straight line parallel to the X-axis on the Pb wave in satd. $PbCl_2$ soln. from the horizontal region of the diffusion current to the intersection with the titration curve. The abscissa of this point corresponds to the no. of ml. of $Pb(NO_3)_2$ used to reach the equiv. point. $X = 58.46an/m$ (X is the content of NaCl in ml., a the titer of $Pb(NO_3)_2$ soln., n the no. of ml. of $Pb(NO_3)_2$ used, and m the no. of ml. of NaCl used for the analysis).

W. R. Henn



GUREVICH, A-B.

7

The polarographic method in the analysis of lead-base bearing metals. S. I. Kaplanskii, A. B. Gurevich, and I. A. Korshunov (Gorkii Univ.). *Zavodskaya Lab.* 11, 916-20(1945).— The paper describes methods for the analysis of bearing metals for C, Ni, Cd, As, and Sn. The bearing metals studied contained Sn 9-11, Sb 13-15, Cu 1.5-2, Cd 1-2, As 0.5-1.5, Ni 1-1.5% (the remaining being Pb and small quantities of other metals). Results obtained by the polarographic method were very close to those obtained by chem. methods of analysis. W. H. H

A58-SLA METALLURGICAL LITERATURE CLASSIFICATION

GUREVICH, A.B.

USSR/Solid State Physics - Phase Transformations in Solids, E-5

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 34687

Author: Leve, N. F., Gurevich, A. B.

Institution: None

Title: Investigation of the Effect of Heat Treatment of Steel on the Composition and Nature of the Nonmetallic Inclusions

Original Periodical: Collection: Svoystva i term. obrabotka transp. metalla, Khar'kov, metallurgizdat, 1955, 205-222

Abstract: The effect of soaking at 900-1,300° on carbide and sulfide inclusions in various steels and on ferrous oxide in armco-iron is studied. Chemical, microscopic, and metallographic analysis methods were used. It is shown that heat treatment of specimens at 900-1,300° for 30 minutes does not change the composition and the shape of a sulfur and oxygen inclusion in carbon steels or in alloyed chromium and nickel steels, and leads to a noticeable spheroidization, starting with 1,000°, of ferrous oxide in armco-iron. As a result of a longer heating at 1,300° (15 hours and more), there is a partial spheroidization of the sulfides in steels and a contamination of the nonmetallic residue by oxides of iron and chromium. In steel alloyed with

USSR/Solid State Physics - Phase Transformations in Solids, E-5

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 34687

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Institution: None

Title: Investigation of the Effect of Heat Treatment of Steel on the Composition and Nature of the Nonmetallic Inclusions

Original Periodical: Collection: Svoystva i term. obrabotka transp. metalla, Khar'kov, metallurgizdat, 1955, 205-222

Abstract: chromium and tungsten (up to one percent), the spheroidization of sulfide inclusions is clearly seen when heated to 1,300° for 30 minutes. The carbides of iron and manganese become transformed as a result of similar heat treatment into a solid solution, and the contents of iron and manganese in the nonmetallic residue of the hardened specimens diminishes sharply.

2 of 2

GUREVICH, A.B.

Determination of sulfides and oxides of manganese in carbon steel and their separation from manganese carbides. N. F. Leve and A. B. Gurevich. *Zavodskaya Lab.* 21, 1032–5(1955).—Alkali tartrate and NH_4 citrate dissolve Mn_3C but do not break up the double carbide of Mn_3C and Fe_3C. Electrolytic treatment of C-Mn steels with an anolyte of 0.1*N* KBr contg. 10% citric acid and a catholyte of 10% $CuSO_4$ and subsequent treatment with 10% Na citrate and with $(NH_4)_2SO_4$ dissolved only a part of the carbides: 38.36% Mn_3C and 51.9% Fe_3C in the 1st solvent and 35.70% Mn_3C and 43.75% Fe_3C in the 2nd solvent from a high-Mn steel (C 1.24, Mn 9.00, S 0.000%) and 19.20% Mn_3C and 58.33% Fe_3C by the 1st solvent and 23.40% Mn_3C and 48.60% Fe_3C in the 2nd solvent from a ferromanganese steel (C 6.4, Mn 72.11, S 0.008). Thus the existence of $(Mn_3C)_x$-$(Fe_3C)_y$ is substantiated. Thermal treatment at 900° and quenching in H_2O brings the carbides into a solid soln. with Fe. The following analytical procedure gave satisfactory results: Heat the sample to 900° for 30 min. and quench in H_2O (heating to 1300° does not affect the results). Dissolve anodically in a neutral soln. Filter and wash the residue free of the electrolyte. Stir with 100 ml. of 10% $(NH_4)_2SO_4$ for 1 hr. at room temp. and filter. (*a*) The filtrate contains the "unstable" MnO (defined as that MnO which is sol. in 10% $(NH_4)_2SO_4$). The temp. is an important factor since at higher temps. such compds. as Mn silicates may dissolve. (*b*) The residue is boiled with 100 ml. H_2SO_4 (1:3), filtered, evapd. with 5 ml. HNO_3 and 10 ml. H_2SO_4 to the appearance of SO_3 fumes, cooled, dild. to 250 ml., and MnS detd. (*c*) The insol. residue is fused with Na_2CO_3, dissolved in HCl, and MnO detd. I. Bencowitz

GUREVICH, A.B

137-58-5-11192

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 327 (USSR)

AUTHORS: Gurevich, A.B., Kalina-Zhikhareva, V.I.

TITLE: Employment of Cationites and of Trilonometric Titration for Determination of Arsenic in High-arsenic Alloys (Opredeleniye mysh'yaka v vysokomysh'yakovistykh splavakh s primeneniyem kationitov i trilonometricheskogo titrovaniya)

PERIODICAL: Tr. Nauchno-tekhn. o-va chernoy metallurgii. Ukr. resp. pravl., 1956, Vol 4, pp 127-130. Comments, pp 131-137

ABSTRACT: As is separated from Fe by means of passing a solution of the alloy through an ion exchanger containing 60 g of sulfocarbon or 40 g of KU-2. The As is precipitated in the solution by a magnesia-ammonia mixture. $MgNH_4AsO_4$ is filtered out and is dissolved in HCl (1:1); after adding NH_4OH, a buffer solution, and an indicator (acidic, dark-blue Cr), the As is titrated with a solution of trilon B. Another method of titrating As with trilon B is also described. The results of determination of As in ferroarsenic are presented in a tabulated form.

1. Arsenic compounds 2. Arsenic--Determination P.K.
3. Titration--Applications 4. Ions--Applications

Card 1/1

16(1) PHASE I BOOK EXPLOITATION SOV/1818

Gurevich, Avigdor Berkovich (Viktor Borisovich), and Vasiliy Pavlovich Minorskiy

Uchebnik analiticheskoy geometrii dlya vtuzov (Textbook of Analytical Geometry for Vtuzes) Moscow, Fizmatgiz, 1958. 163 p. 35,000 copies printed.

Eds.: R.Ya. Shostak and V.A. Solodkov; Tech. Ed.: S.N. Akhlamov.

PURPOSE: The book is intended as a textbook on analytic geometry for students at vtuzes.

COVERAGE: The book is written according to teaching programs which include 360-400 teaching hours for mathematics. The book contains a brief, but complete and accurate, presentation of the methods of plane and solid analytic geometry. The fundamentals of determinants and vector analysis are presented, and are applied to the study of analytic geometry. No personalities are mentioned. There are no references.

Card 1/11

Gurevich, A.B.

25(1) **PHASE I BOOK EXPLOITATION** SOV/2132

Kiyev. Ukrainskiy Nauchno-issledovatel'skiy institut metallov

Tekhnologiya proizvodstva i svoystva chernykh metallov; sbornik (The Manufacture and Characteristics of Ferrous Metals; a collection of articles) Khar'kov, Khar'kovskiy gos.univ. im. A.M. Gor'kogo, 1958. 271 p. (Series: Its: Trudy, vyp. 4) Errata slip inserted. 1,000 copies printed.

Editorial Staff of this book: P.A. Aleksandrov, D.S. Kazarnovskiy, M.I. Kurmanov, N.P. Leve, V.P. Onopriyenko, V.A. Tikhovskiy, and Ya. A. Shneyerov; Ed.: S.S. Liberman; Tech. Ed.: K.O. Gurin

PURPOSE: The book is intended for the scientific personnel of institutes and for engineers and technicians of metallurgical enterprises and other branches of the industry.

COVERAGE: The collection of articles reviews the work carried on at the Institute of Metals on the technology of blast furnaces, open-hearth furnaces, and rolled stock production. It also deals with problems in metallography, heat treatment of ferrous metals and methods for their study. Particular attention is devoted to the preparation of charges and blast furnace practice with increased gas pressure, open-hearth production with oxygen blast and rolling of light profiles. No personalities are mentioned. References accompany each article.

TABLE OF CONTENTS:

SCIENCE OF METALS AND HEAT METAL TREATMENT

Kurmanov, M.I., and O.G. Solov'yeva. Importance of Resilience Tests For Evaluation of Sheet Steel Quality 221

Besedin, P.T. Causes For Formation of Flakes in Steel 233

Dyubin, N.P., D.S. Kazarnovskiy, K.M. Klimov, M.T. Bul'skiy, A.M. Zannes, V.G. Gugulashvili, and O.R. Layzan. Prevention of Flakes in 25 m.Rails Made of Open-hearth Steel 243

METHODS OF STUDYING THE QUALITY OF METAL

Leve, N.P. and A.B. Gurevich. The Composition of The Carbide Phase In Low Carbon Unalloyed and Low-alloy Steels 257

Nikitina, O.I., N.G. Sklyar, and Z.G. Miroshnichenko. Determining Low Concentrations of Elements in Steel by Spectral Methods 261

AVAILABLE: Library of Congress (TN 607.T4)

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9/21/59

Card 6/6

GUREVICH, A.B.

Lithology and coal potential of lower Carboniferous sediments in the Belgorod-Oboyan' area. Izv. vys. ucheb. zav.; geol. i razv. 1 no.12:17-37 D '58. (MIRA 12:12)

1. Leningradskiy gornyy institut.
(Belgorod Province--Coal geology)

LEVE, N.F., prof.; GUREVICH, A.B., kand. khim. nauk

Constitution of the carbide phase in low-carbon unalloyed and low-alloy steels. Trudy Ukr. nauch.-issl. inst. met. no.4:257-260 '58. (MIRA 12:3)

(Steel--Metallography)

KURMANOV, M.I., kand.tekhn.nauk; LEVE, N.F., prof.; SOLOV'YEVA, G.G., inzh.; GUREVICH, A.B., kand.khim.nauk

Effect of arsenic on the reversible temper brittleness of alloyed steels. Trudy Ukr.nauch.-issl.inst.met. no.5:202-211 '59. (MIRA 13:1)

(Steel--Brittleness) (Arsenic)

S/137/60/000/02/08/010

Translation from: Referativnyy zhurnal, Metallurgiya, 1960, No 2, p 261, # 3887

AUTHORS: Kurmanov, M.I., Dobruskina, Sh.R., Leve, N.F., Gurevich, A.B.

TITLE: Phase Distribution of Titanium and Its Effect on the Properties of High-Strength Low-Alloy 15ГДЮТ (15GDYuT) Steel

PERIODICAL: Sb. tr. Ukr. n.-i. in-t metallov, 1959, No 5, pp 212 - 222

TEXT: Investigations were carried out into phase distribution of Ti and Al in 15GDYuT steel and into the effect of these elements on the steel properties. Specimens were cut out of hot-rolled 24-mm thick sheets in the after-rolling and after-normalization state at 800°- 1,200°C. The steel was composed as follows (in %): C 0.10-0.13; Mn 1.20-1.34; Si 0.13-0.17; Cu 0.36-0.39; Ti_{tot} 0.086-0.081; Al_{tot} 0.11-0.053; N 0.024-0.038. It was established that in hot-rolled steel 85% of the total Ti amount (0.1%) was contained in the carbide phase and 15% in the solid solution. In steel normalized at 800°, 900° and 1,000°C, the

Card 1/2

GUREVICH, A.B., kand.khim.nauk; KIRZHNER, O.M., inzh.

Phase analysis of titanium steels. Trudy Ukr.nauch.-issl.inst. met. no.5:249-256 '59. (MIRA 13:1)
(Titanium steel--Metallography)
(Phase rule and equilibrium)

3(5)
AUTHOR: Gurevich, A. B. SOV/20-127-5-39/58

TITLE: On the Lower Carboniferous Deposits of the Belgorod-Oboyan' District

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 5, pp 1074 - 1077 (USSR)

ABSTRACT: The district mentioned in the title is situated in the south-western part of the Kursk magnetic anomaly (KMA) in the iron-ore district of Belgorod. The deposits mentioned in the title were discovered by prospecting in 1953. In the South they overlie deposits of Proterozoic iron ores and in the North and East they contain workable coal beds. The author investigated these deposits in detail in 1956-58. Lower Carboniferous is represented also in this case by the Visean stage which contains the following horizons: Stalinogorskiy, Tul'skiy, Aleksinskiy, Mikhaylovskiy, and Venevskiy, furthermore in the South also the Serpukhovskiy lower stage. These deposits are stratified on a considerably structured surface of the pre-Cambrian fundament and are covered by Mesocenozoic deposits (290-470 m thick). From the structural point of view the Lower Carboniferous deposits form the northern edge of the Dnepr-Donets depression. They slope to the South-West at an angle of 2o-35'. The horizons mentioned above are divided

Card 1/2

On the Lower Carboniferous Deposits of the Belgorod-Oboyan' District SOV/20-127-5-39/58

into 3 sedimentation cycles. These cycles, their flora (spores; determination by K. I. Inosova), and their fauna (Foraminifera, determined by Ye. V. Fomina; Brachiopoda, determined by P. Donakova) are described. They are compared with other parts of the Russian platform. There are 5 Soviet references.

ASSOCIATION: Laboratoriya geologii uglya Akademii nauk SSSR (Laboratory of Coal Geology of the Academy of Sciences, USSR)

PRESENTED: March 21, 1959, by D. V. Nalivkin, Academician

SUBMITTED: March 18, 1959

Card 2/2

GUREVICH, A.B.

Lower Carboniferous of the Voronezh anteclise. Dokl. AN SSSR 135 no.3:682-685 N '60. (MIRA 13:12)

1. Laboratoriya geologii uglya Sibirskogo otdeleniya Akademii nauk SSSR. Predstavleno akad. D.V. Nalivkinym.
(Belgorod Province--Geology, Stratigraphic)
(Kursk Province--Geology, Stratigraphic)

GUREVICH, A.B.; TURUBINER, L.M.

Acidless separation of oxide inclusions from carbides and sulfides in carbon steel. Zav.lab. 29 no.3:280-282 '63. (MIRA 16:2)

1. Ukrainskiy nauchno-issledovatel'skiy institut metallov.

(Steel—Analysis)
(Oxides)

S/032/63/029/003/005/020
B117/B186

AUTHORS: Gurevich, A. B., Kirzhner, O. M., Sandler, N. I., and Murav'yev, V. N.

TITLE: Determination of cerium-containing inclusions in alloy steels

PERIODICAL: Zavodskaya laboratoriya, v. 29, no. 3, 1963, 283-286

TEXT: Cerium compounds formed by introducing small amounts of cerium in alloy steels were investigated. Steels containing 0.05 - 0.12% Ce, 0.60% Mn, 0.30 - 0.40% C, and 0.3% S were used. The nonmetallic phase was separated by dissolving the steel specimens in the usual iron sulfate electrolyte with complex formers. The anode slime was first treated with 30% copper ammonium chloride solution containing 1% $FeSO_4$ and 5% ammonium citrate, and then with iodine solution in potassium iodide; subsequently, the slime was studied petrographically and by x-ray analysis. Cerium compounds were found in the form of sulfides (CeS, Ce_2S_3) in the steels investigated; no oxysulfide compounds were detected. Since cerium sulfides, soluble in hydrochloric acid, are insoluble in iodine solution, they can

Card 1/2

be easily separated from iron and manganese sulfides. The amount of cerium inclusions in the steel was independent of the total cerium content. This was due to the high degree of liquefaction of cerium sulfides and their irregular distribution over the cross section of specimens. The electrolyte residues contained much more cerium than the sulfide phase. Cerium was irregularly distributed in the sulfide and the carbide phase. In the carbide phase, it was contained in the cementite lattice which was confirmed by x-ray analysis. There are 5 figures and 3 tables.

ASSOCIATION: Ukrainskiy nauchno-issledovatel'skiy institut metallov
(Ukrainian Scientific Research Institute of Metals)

SANDLER, N.I.; GUREVICH, A.B.; NAVROTSKIY, I.V.; YENASH, V.N.; RUBINER, L.M.; KIRZHNER, O.M.

Phase distribution of vanadium, tungsten, and niobium in low-alloy steels. Sbor. trud. (NIIM no.9:349-356 '62.
(MIRA 1831)

GUREVICH, A.B.

Distribution functions and the Darboux property. Dokl. AN BSSR 9 no.12:785-787 D '65. (MIRA 19:1)

1. Belorusskiy gosudarstvennyy universitet imeni Lenina.

ARAKELOV, A.S.; BORISOV, V.A.; GAL'PERIN, I.I.; GUREVICH, A.G.; DOVZHUK, G.T.; PARSHIN, R.N.; SOKOLOVSKIY, S.M.; SELIKHOV, V.L., SHIFRIN, D.L.; ETKIN, M.V.; GET'YE, V.A., red.toma; YELIN, V.I., red.toma; SOLDATOV, K.N., red.toma; SVYATITSKAYA, K.P., vedushchiy red.; TROFIMOV, A.V., tekhn.red.

[Equipment used in the petroleum industry] Neftianoe oborudovanie; v shesti tomakh. Moskva, Gos.nauchno-tekhn.izd-vo neft. i gorno-toplivnoi lit-ry. Vol.1. [Compressors and pumps] Kompressory i nasosy. 1958. 234 p. (MIRA 12:5)
(Petroleum industry--Equipment and supplies)
(Pumping machinery) (Compressors)

GUREVICH, A.G.

Use of plastics in some branches of the machinery industry.
Biul. tekh. ekon. inform. no.9:86-90 '59. (MIRA 13:3)
(Machinery industry) (Plastics)

GUREVICH, A.G.; STRONGIN, M.A.

Regulating the amount of materials used in tire manufacture. Kauch. i rez. 19 no.6:45-47 Je '60. (MIRA 13:6)

1. Nauchno-issledovatel'skiy institut shinnoy promyshlennosti.
(Tires, Rubber)

GUREVICH, A.G.

AUTHOR: Voronova, A.V. and Gurevich, A.G. 109-4-5/20

TITLE: Evaluation of the Propagation Constants of a Rectangular Waveguide with Ferrite Plates. (Raschet postoyannykh rasprostraneniya v pryamougolnom volnovode s ferritovymi plastinami)

PERIODICAL: Radiotekhnika i Elektronika, 1957, Vol.2, No.4, pp. 401 - 407 (USSR)

ABSTRACT: Two waveguide phase-shifters are considered. One of these comprises a ferrite plate of thickness H , which is placed near one of the narrow walls of the guide. The second phase-shifter comprises two ferrite plates which are parallel to the narrow walls. The longer walls of the guide have a length a , and the plates are magnetised perpendicularly to the axis of the system. The plates are characterised by a permittivity ε and magnetic parameters $\mu = 0.9$ and α ; the permettivity and the permeability of the guide were assumed as $\varepsilon_0 = \mu_0 = 1$.

The propagation constant γ of the guide with one ferrite plate can be found by solving:

Card 1/4

$$\frac{x}{u_1} \operatorname{ctg} xh + x_0 \operatorname{ctg} x_0 l + \frac{\alpha\gamma}{uu_1} = 0 \qquad (2)$$

Evaluation of the Propagation Constants of a Rectangular Waveguide with Ferrite Plates.

where:

$$x^2 = k_0^2 \varepsilon\mu_1 - \gamma^2$$

$$x_0^2 = k_0^2 - \gamma^2$$

$$k_0 = \frac{\omega}{c} = \frac{2\pi}{\lambda}$$

$$\mu_1 = \mu - \frac{\alpha^2}{\mu}$$

and

$$l = \frac{a}{2} - h.$$

Similarly, the propagation constant of a guide with two plates can be found from:

$$\frac{x}{\mu_1} \operatorname{ctgh} x - x_0 \operatorname{tg} x_0 l + \frac{\alpha\gamma}{\mu\mu_1} = 0 \qquad (3)$$

Card 2/4

Evaluation of the Propagation Constants of a Rectangular Waveguide with Ferrite Plates.

Equations (2) and (3) are given without derivation; they are presumably taken from a paper by V.V. Nikolskiy [Ref. 5]. The equations were solved numerically by the Newton's method by employing a fast electronic computer. The calculations were made for two directions of propagation (or two directions of the magnetising field), corresponding to the propagation constants γ_+ and γ_- ; and for the following values of the variable parameters: $\alpha = 0$ to 0.5 , $\varepsilon = 3$ to 11 , $h = (0.08$ to $0.26)a$, and $\lambda = \lambda_0 \pm \Delta\lambda$, where $\lambda_0 = 1.39a$ and $\Delta\lambda|\lambda = 0.05$. The calculated results of γ_+ and γ_- were used to evaluate the so-called non-mutual phase-shift:

$$\eta = (\gamma_+ - \gamma_-)a \qquad (5)$$

and of its frequency coefficient:

$$K = \frac{\eta_{01} - \eta_{02}}{\eta_{01}} \quad \frac{\lambda_0}{2\Delta\lambda}$$

Card 3/4

Evaluation of the Propagation Constants of a Rectangular Waveguide with Ferrite Plates.

where η_{01} was calculated for $\lambda_1 = \lambda_0 - \Delta\lambda$ and η_{02} for $\lambda_2 = \lambda_0 + \Delta\lambda_2$. The values of η and K are plotted as functions of all the above variables for both the phase shifters (single-plate and two plates). Altogether twelve sets of graphs are given. By comparing the results obtained with a single plate (η_1, and K_1) with those for the system with two plates (η_2 and K_2) it is seen (Figs. 9 and 10) that the latter gives a bandwidth about twice larger than the former.
There are 6 references, of which 3 are Slavic.

SUBMITTED: October 25, 1957.

AVAILABLE: Library of Congress.

Card 4/4

GUREVICH, A.G.

AUTHOR: Gurevich, A.G.

TITLE: Internal Field in an Ellipsoid with Tensorial Parameters. (Vnutrenneye pole v ellipsoide s tenzornymi parametrami) (Brief News item)

PERIODICAL: Radiotekhnika i Elektronika, 1957, Vol.II, No.7, pp. 937 - 939 (USSR)

ABSTRACT: An ellipsoid having tensorial permeability $\bar{\bar{\mu}}$ is situated in an external uniform magnetic field $\vec{H}_0$ in a medium having scalar permeability μ_0. It is shown that the internal field of the ellipsoid is given by:

$$\vec{H} = \vec{H}_0 - 4\pi\bar{\bar{N}}\vec{M} \qquad (1)$$

where $\vec{M}$ is magnetisation of the ellipsoid, $\bar{\bar{N}}$ is the tensor of the de-magnetising factors. The internal field is also related to $\vec{M}$ and $\vec{H}$ by eq. (2). Consequently, the external field can be expressed by:

$$\vec{H} = \bar{\bar{a}}\vec{H}_0 \qquad (3)$$

Card 1/2

109-7-13/17

Internal Field in an Ellipsoid with Tensorial Parameters.

in which the tensor $\bar{\bar{a}}$ is given by eq. (4) where I is a unit tensor, and $\Delta\bar{\bar{N}}$ is expressed by eq. (5). If the tensor $\bar{\bar{N}}$ is expressed by means of its diagonal components N_x, N_y and N_z, then the tensor $\bar{\bar{a}}$ is given by eq. (6), which is the solution of the problem.
There are 3 references, 1 of which is Slavic.

SUBMITTED: January 11, 1957.

AVAILABLE: Library of Congress.

Card 2/2

GUREVICH, A G

109-8-3/17

AUTHOR: Gurevich, A.G.

TITLE: Quadratic Relationships for the Media with Tensorial Parameters. (Kvadratichnyye sootnosheniya dlya sred s tenzornymi parametrami.)

PERIODICAL: Radiotekhnika i Elektronika, 1957, Vol.II, No.8, pp. 960 - 968 (USSR).

ABSTRACT: The purpose of this work is to derive the principal, quadratic lemmata for the media represented by tensorial parameters and to analyse certain corollaries resulting from them. These are of interest in the ultra-high frequency techniques. The basic quadratic lemmata can be derived from the Maxwell equations for two electro-magnetic processes occurring at two different frequencies and having different external currents and tensorial parameters. In the Gaussian system of units, the Maxwell equations can be written as shown by equations (1), (2), (3) and (4). From these, the quadratic relationships are expressed, in terms of complex amplitudes, by equations (5), (6) (9) and (10). These represent a generalization of the quadratic lemmata, as formulated by Kisunko [Ref.1], in particular, for the media with different and tensorial parameters. For the case of equal parameters of the media and equal frequencies, the

 lemma is given by equation (11) which is a generalization of

Quadratic Relationships for the Media with Tensorial Parameters.

the known Lorentz lemma. When the media are represented by anti-symmetrical tensors, equation (11) leads to the standard Lorentz lemma as given by:

$$\frac{c}{4\pi} \operatorname{div} (\vec{E}_1 \times \vec{H}_2 - \vec{E}_2 \times \vec{H}_1) + \vec{j}_{cm_2} \vec{E}_1 - \vec{j}_{cm_1} \vec{E}_2 = 0 \qquad (14)$$

where E_1, E_2, H_1, H_2, j_{cm_1} and j_{cm_2} are the electric and magnetic fields and the currents, respectively. Expression (14) is also a differential formula of the known reciprocity principle. Integration of the equation (14) over a volume V, limited by a surface S, expresses the reciprocity principle in an integral form as given by equation (17). The combination of the lemmata expressed by equations (9) and (10) for the case of equal tensorial parameters, frequencies, fields and currents leads to:

$$\frac{c}{4\pi} \operatorname{div}(\vec{E} \times \vec{H}^*) + \frac{i\omega}{4\pi}(\vec{H}^* \cdot \vec{\vec{\mu}} \vec{H} - \vec{E} \cdot \vec{\vec{\varepsilon}}^* \vec{E}^*) + \vec{j}^*_{cm} \vec{E} = 0 \qquad (24)$$

Card 2/4 where the asterisk refers to conjugate quantities. Equation (24)

109-8-3/17

Quadratic Relationships for the Media with Tensorial Parameters.

is a generalization of the Umov-Poynting theorem for the media represented by tensorial parameters. The basic, quadratic lemmata can also be employed in the derivation of the perturbation formulae. It is assumed that an electro-magnetic phenomenon which is represented by the indices 2 in the expressions for the lemmata corresponds to an unperturbed condition of the system, while a perturbed state is denoted by indices 1. The most important practical case is when the system in its initial state is represented by scalar and real parameters and the external currents are absent. Formulae (6) and (9) lead then to equations (28) and (29), which can be regarded as the basic perturbation lemmata. These are applied to three fundamental boundary problems of the electro-dynamics of hollow systems: 1) determination of the propagation constant of a regular wave-guide; 2) calculation of the transmission and reflection coefficients at the discontinuities in a wave-guide and 3) the determination of the natural frequencies of a cavity resonator. In all cases, it is assumed that the metallic surfaces limiting the above hollow systems are ideal conductors. The author expresses his gratitude to the Corresponding Member of the Soviet Academy of Sciences A.A. Pistolkors for the discussion on the results

card3/4

109-8-3/17

Quadratic Relationships for the Media with Tensorial Parameters.

of this work.
There are 16 references, of which 9 are Slavic, and 3 figures.

SUBMITTED: December 6, 1956.

AVAILABLE: Library of Congress

Card 4/4

GUREVICH, A. G.

24(6) 9(3,4) PHASE I BOOK EXPLOITATION SOV/1503

Akademiya nauk SSSR. Institut poluprovodnikov

Poluprovodniki v nauke i tekhnike, t. 2. (Semiconductors in Science and Technology, Vol 2) Moscow, Izd-vo AN SSSR, 1958. 658 p. 17,000 copies printed.

Resp. Ed.: A.F. Ioffe; Tech. Ed.: R.S. Pevzner.

PURPOSE: This collection of articles is intended for scientists, engineers and technicians.

COVERAGE: The collection, published by the Semiconductor Institute, Academy of Sciences, USSR, under the supervision of Academician A.F. Ioffe, contains Parts II and III of a two-volume work on semiconductors. Part II completes the material on semiconductor devices, begun in Volume I, and Part III describes various semiconductor materials. Lack of space did not permit inclusion of such subjects as crystal counters, thermoelectric generators, atomic batteries, luminophores, semiconductor catalyzers, materials for complex cathodes and various other applications of semiconductors. Ioffe points out that the article by the American scientists V. Johnson and K. Lark-Horovitz on semiconductors at low temperatures deals with a subject hardly covered in the Soviet literature. Similarly, the article by the Swiss scientists G. Busch and U. Winkler fills a gap in the Soviet literature on methods of investigating semiconductor characteristics. These subjects will be dealt with exclusively in a proposed third volume. References appear separately after each article.

TABLE OF CONTENTS:

Ch. 20. Smolenskiy, G.A., and A.G. Gurevich. Ferromagnetic Semiconductors 349

The author discuss the application of ferromagnetic semiconductors in multichannel telephony, radar, electroacoustics, electronic counters, cores of induction coils, transformers and filters, permanent magnets, magnetostriction transducers, memory elements, etc. They explain the crystallography of ferrites and the theoretical fundamentals of noncompensated antiferromagnetism.

Card 6/9

They also discuss problems of magnetic saturation in ferrites and their behaviour in a-c magnetic fields and at very high frequencies. Special chapters cover such subjects as electromagnetic oscillations in ferrites and nonlinear processes occurring at very high frequencies. The concluding chapters deal with the electric properties of ferrites and with ferrite materials and their selection. There are 53 references, of which 33 are English and 20 Soviet.

Ch. 21. Smolenskiy, G.A., and V.A. Isupov. Seignetoelectric Materials 425

The authors explain the differences and similarities between seignetoelectric, piezoelectric and ferromagnetic materials. They present a historical survey of seignetoelectricity and provide data tables of seignetoelectric materials. The authors explain the fundamentals of the microscopic theories on seignetoelectric phenomena and discuss in detail the crystal lattice structure, physical properties and problems of producing various seignetoelectric materials. They briefly describe antiseignetoelectric materials and draw attention to recently adopted applications of these materials, e.g., miniature capacitors, nonlinear capacitors, piezoelements and memory elements. There are 35 references, of which 20 are Soviet, 13 English

Card 7/9

AUTHORS: Gurevich, A. G. and Bogomaz, N. A.

TITLE: Non-Reciprocal Phase Shifts and the Attenuation Coefficient for a Waveguide with a Ferrite Plate (Nevzaimnyye fazovyye sdvigi i koeffitsiyent zatukhaniya v volnovode s ferritovoy plastinoy)

PERIODICAL: Radiotekhnika i elektronika, 1958, Vol 3, Nr 9, pp 1133-1143 (USSR)

ABSTRACT: The calculated results of an accurate computation of the phase constant and the attenuation coefficient for a rectangular waveguide with a transversely magnetized ferrite plate are reported. The calculations were made by means of a fast electronic computer. The calculation of the propagation constant γ in the waveguide (see Fig.1) was done on the basis of Eq.(1), where k_0 is the wave number in free space, ε is the permittivity of the plate and μ and α are the complex components of the magnetic permittivity tensor whilst h , g and ℓ are the dimensions (see Fig.1). The permittivity tensor is defined by the determinant on p 1134. The non-reciprocal difference of phase shifts, η , was calculated without taking into account the attenuation. The difference η is defined by:

Non-Reciprocal Phase Shifts and the Attenuation Coefficient for a Waveguide with a Ferrite Plate

$$\eta = \gamma'_+ - \gamma'_- \quad , \qquad (2)$$

where γ_+ and γ_- are the propagation constants for two propagation directions of the waves or for two directions of the magnetization of the plate. The dependence of η on the wavelength λ is illustrated in Fig.2 for various values of g. The bandwidth of the waveguide-ferrite system can be characterised by a frequency coefficient defined by:

$$K = \frac{\eta(\lambda_0 - \Delta\lambda) - \eta(\lambda_0 + \Delta\lambda)}{\eta(\lambda_0)} \frac{\lambda_0}{2\Delta\lambda} \qquad (3)$$

where $\Delta\lambda$ is a certain fixed quantity; in this case it was assumed that $\Delta\lambda/\lambda_0 = 5\%$. The dependence of η and K on g for various values of h and ε are shown in Figs.3, 4,

Non-Reciprocal Phase Shifts and the Attenuation Coefficient for a Waveguide with a Ferrite Plate

5 and 6. Since the attenuation coefficient in the ferrite was comparatively small, the imaginary part of the propagation constant could be determined from the approximation formula:

$$\gamma'' = \frac{\partial \gamma'}{\partial \varepsilon'} \varepsilon'' + \frac{\partial \gamma'}{\partial \mu'} \mu'' + \frac{\partial \gamma'}{\partial \alpha'} \alpha'' \quad . \qquad (4)$$

The calculated results giving the values of the derivatives of Eq.(4) for the two directions of propagation, as a function of g and h are shown in Figs.7, 8 and 9. The attenuation coefficient as a function of g is illustrated in Fig.10. In the region of ferromagnetic resonance the phase constant γ' and the attenuation coefficient γ'' can be determined by finding the complex roots of Eq.(1) for complex values of μ and α. The parameters μ and α were evaluated from Eqs.(8) and (9) respectively; for the purpose of calculations it was assumed that the magnetization curve for the ferrite plate was in the form shown in Fig.11. The calculations were done for a frequency of $\omega/2\pi$ = 9575 Mc/s. The phase and attenuation as a function of the magnetizing field H_o for various values of the

Non-Reciprocal Phase Shifts and the Attenuation Coefficient for a Waveguide with a Ferrite Plate

loss parameter δ are shown in Figs.12. Similar curves are given in Figs.13 and 14 but these show the phase and the attenuation for various values of δ and h. The quality factor of the waveguide-ferrite non-reciprocal phase-shifter can be defined by:

$$Q = \frac{\eta}{\gamma''_{cp}} \qquad (10)$$

where γ''_{cp} represents the average attenuation. The calculated values of Q as a function of δ are shown in Fig.15 for various values of h. The paper contains 15 figures and 13 references, of which 8 are English and 5 are Soviet.

SUBMITTED: September 20, 1957.

Card 4/4

SOV/109-3-12-6/13

AUTHOR: Gurevich, A.G.

TITLE: Resonators with Tensorial Media (Rezonatory s tenzornoy sredoy)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, Nr 12, pp 1475-1484 (USSR)

ABSTRACT: The work deals with the problems of the general theory of cavity resonators filled with tensorial media. The method of analysis is based on the application of the eigen functions of a cavity resonator which was proposed by Frenkel' (Ref 7) and used by Kisun'ko for developing a resonator theory for the case of scalar media (Ref 8). The principal concepts of this theory are here generalised and extended to the case of media with tensorial parameters First, a closed volume, V , limited by an ideally conducting surface S and filled with a medium whose tensorial parameters are $\hat{\varepsilon}$ and $\hat{\mu}$ is considered. The parameters $\hat{\varepsilon}$ and $\hat{\mu}$ are arbitrary functions of the co-ordinates (Figure 1). For the case of free undamped oscillations in the resonator, the complex field amplitudes for the m-th type of oscillation should fulfil the Maxwell equations:

Cardl/5

Resonators with Tensorial Media

$$\left.\begin{aligned} \operatorname{rot} \vec{H} &= i\omega_m \overleftrightarrow{\varepsilon} \vec{E} \\ \operatorname{rot} \vec{E} &= -i\omega_m \overleftrightarrow{\mu} \vec{H} \end{aligned}\right\} \qquad (1)$$

and the boundary conditions given by Eq (2), where $\vec{n}_o$ is a unit vector normal to the surface S . The field vectors can be represented by Eqs (3), where e and h are complex amplitudes which are related by Eq (4). From the above, it follows that the eigen vectors $\vec{E}_m$ and $\vec{H}_m$ of the resonator should satisfy Eqs (7) and (8), where ω_m is the eigen frequency of the resonator. This can be expressed as a ratio of two volume integrals, as is shown in Eq (9). The orthoganality condition for the electrical eigen functions of the resonator is given by Eq (13), while that of the magnetic eigen functions should satisfy Eq (14). If the medium is not lossless, the tensors $\overleftrightarrow{\varepsilon}$ and $\overleftrightarrow{\mu}$ are not Hermitian functions and the eigen frequencies of the resonator are complex and can be

expressed by:

$$\omega_n = \omega_n' + i\omega_n'' = \omega_n' \left(1 + i \frac{1}{Q_n}\right) \qquad (17)$$

where $Q_n = \omega_n'/2\omega_n''$ is the quality factor of the resonator for the n-th eigen oscillation. In the case of forced oscillations in the resonator, the Maxwell equations are written as Eqs (18) to (21) and these should fulfil the boundary conditions given by Eqs (22) and (23) (Figure 2). The field of forced oscillations of the system is in the form of series expressed by Eqs (24) and (25), where $\vec{E}_m$ and $\vec{H}_m$ are eigen functions of the resonator, as derived in the earlier formulae, while the coefficients e_m and h_m and the functions φ and ψ are to be determined. It is shown that φ can be determined from Eq(26) and ψ from Eq (29). On the other hand, coefficients e_m and h_m are expressed by Eqs (39) and

(40), where F_m and I_m are given by Eqs (37) and (38). If the losses in the medium are comparatively small, they can be taken into account by substituting the frequencies in Eqs (39) and (40) by the complex frequencies of Eq (17). In this case, the coefficients e_m and h_m are expressed by Eqs (41) and (42). From the above, it is seen that the field of forced oscillations in a resonator with a tensorial medium can be determined, provided the eigen frequencies and eigen functions of the resonator are known. In a waveguide resonator with a scalar medium, the eigen frequencies are given by expression (43) where l is the length of the resonator, n is an integer and $\gamma(\omega)$ is the propagation constant of the waveguide which can be regarded as a known function. In the case of a tensorial medium with non-reciprocal propagation constants, the eigen frequencies of the resonators (which are similar to those shown in Figure 3) can be determined from Eq (46), where γ^+ and γ^- denote the propagation constants for two opposite directions.

The author expresses his gratitude to A.A. Pistol'kors, Corresponding Member of the Ac.Sc.USSR and N.A. Kuz'min for their valuable observations in discussing this work.
There are 4 figures and 11 references, 6 of which are Soviet and 5 English.

SUBMITTED: February 21, 1957

GUREVICH, A.G.

Using structures with honeycomb fillers. Biul.tekh.-ekon. inform. no.1:93-96 '59. (MIRA 12:2)
(Structural frames)

GUREVICH, A.G.; GUBLER, I. Ye.

Ferromagnetic resonance in yttrium ferrite single crystals. Fiz. tver.tela 1 no.12:1847-1850 D '59. (MIRA 13:5)

1. Institut poluprovodnikov AN SSSR, Leningrad.
(Yttrium ferrate--Magnetic properties)

GUREVICH, A.G.; GUBLER, I. Ye.; SAFANT'YEVSKIY, A.P.

Superhigh-frequency properties of yttrium and lutetium ferrites with structures of the garnet type. Fiz.tver.tela 1 no.12: 1862-1865 D '59. (MIRA 13:5)

1. Institut poluprovodnikov AN SSSR, Leningrad.
(Yttrium ferrate) (Lutetium ferrate)

SOV/48-23-3-16/34

.24(3)
AUTHOR: Gurevich, A. G.

TITLE: Ferromagnetic Semiconductors in Super-High-frequency Fields (Ferromagnitnyye poluprovodniki v polyakh sverkhvysokikh chastot)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 3, pp 361-371 (USSR)

ABSTRACT: The work under review deals with magnetized materials which are used in practice. To begin with, the properties of ferromagnetic semiconductors were investigated in small alternating fields in the range of superhigh frequencies. Tensor character and ferromagnetic resonance of the semiconductor are the most important characteristic features of the magnetic susceptibility $\overline{\chi}$. Figure 1 shows the components of the tensor of magnetic susceptibility of a polycrystalline ferromagnetic semiconductor. Within the range of superhigh frequencies a not compensated antiferromagnetic behaves, like a ferromagnetic the magnetization of which is equal to the sum of magnetization of the sub-lattices, and which has a factor of spectroscopic splitting up g_{eff}. Figure 2 shows the precession of magnetization in the non-compensated antiferromagnetic. In connection with

Card 1/4

the consideration of the waves of magnetization it is necessary to take into account the so-called spin waves (Ref 10). A spectrum of the spin waves in the unlimited medium is given in figure 3. Under certain conditions they are connected with homogeneous oscillations and exercise a considerable influence upon the processes taking place in ferromagnetic semiconductors within the superhigh frequency range. An explanation for the observed course of temperature and the duration of relaxation τ is given by the theory (Ref 20) which brings the relaxation processes with spin waves and magnetic heterogeneity into connection, especially with the non-ordered distribution of the magnetic ions in lattice point. It was found that τ as well as the g-factor can be exactly measured only on monocrystals. The effect of the domain structure is also of outstanding importance. The results found for unlimited media may also be applied to bodies with limited dimensions if the tensor τ does not hold for the external but the internal alternating field. Unfortunately, it is only possible to solve a very low number of boundary problems. Of the approximation methods, only two of the coarsest (least accurate) are used at the present time.

the method of "infinite space" (Refs 49,50) and the perturbation method with a quasi-static approximation of the internal field (Refs 51,52). Apart from theory, also apparatus were developed during the past 6 years in the case of which it is possible to make use of the properties of ferromagnetic semiconductors for the solution of practical tasks of superhigh frequency. The principle of such apparatus is fundamentally clear (Refs 56,57). The main problem is now the supply with suitable materials and the necessary parameters. In the short-wave range of superhigh frequencies it is relatively easy to fulfill the requirements. Considerable difficulties arise, however, in the case of longer waves. In the case of low frequencies the ranges of natural resonance and the resonance in the external field overlap (Fig 4). This is the reason why semiconductors with small anisotropy and saturation magnetization were developed for the long-wave range. The combination of a small saturation magnetization and a sufficiently high Curie point is the greatest difficulty in this connection. Spin waves play a considerable role in the theory of non-linear losses. They pass the energy produced from homogeneous oscillations to the lattice, which

causes an increase in losses. This phenomenon obviously occurs in all ferromagnetic semiconductors. Only the values of the threshold field vary. The non-linear combination of homogeneous oscillations and spin waves does not only explain the higher losses, but may also be used in non-linear ferromagnetic generators and amplifiers of superhigh frequencies. There are 7 figures and 76 references, 23 of which are Soviet.

PHASE I BOOK EXPLOITATION SOV/4433

Gurevich, Aleksandr Grigor'yevich

Ferrity na sverkhvysokikh chastotakh (Ferrites at Super-High Frequencies) Moscow, Fizmatgiz, 1960. 407 p. (Series: Fizika poluprovodnikov i poluprovodnikovykh priborov). Errata slip inserted. 10,000 copies printed.

Ed.: Ye.L. Starokadomskaya: Tech. Ed.: V. N. Kryuchkova.

PURPOSE: This book is intended for technical personnel and scientists working in the fields of radio physics, radio engineering, physics of solid bodies and the technology of magnetic materials. Its purpose is to convey a general understanding of the subject, rather than to be a review, or serve as a handbook.

COVERAGE: This book is an attempt to generalize theoretical and experimental data gathered during the processing and utilization of ferrites in the super-high frequency range. Part I of the book examines the magnetic properties of ferrites in the weak fields at the super-high frequency range. Part II deals with the electrodynamics of media with tensor parameters to which belong magnetized ferromagnetic semiconductors. Part III is concerned with the nonlinear

Card ~~1/6~~

processes occurring in ferromagnetic semiconductors at high amplitudes of the variable magnetic field. The coverage is limited to a small number of characteristic phenomena, which are exposed in detail, with the relating of intermediate computations being given in most cases. The author thanks G. A. Smolenskiy, Doctor of Physical and Mathematical Sciences, V. V. Nikol'skiy, Candidate of Technical Sciences and A. I. Pil'shchikov, Candidate of Physical and Mathematical Sciences for their valuable advice. There are 469 references: 326 English, 123 Soviet, 10 German and 10 French.

TABLE OF CONTENTS:

Preface 6

PART I. MAGNETIC PROPERTIES OF FERRITES IN WEAK SUPER-HIGH FREQUENCY FIELDS

Ch. I. Isotropic Ferrites Magnetized to Saturation 13
1. Susceptibility tensor. Ferromagnetic resonance 13
2. Ferromagnetic resonance in unbalanced antiferromagnetics 26
3. Spinning waves 36

NIKOL'SKIY, V.V.; GUREVICH, A.G., kand.tekhn.nauk, retsenzent; MYALIK, A.N., red.

[Theory of the electromagnetic field; manual for students of radio engineering] Teoriia elektromagnitnogo polia; uchebnoe posobie dlia studentov radiotekhnicheskogo fakul'teta. Moskva, Gos.energ.izd-vo, 1960. 430 p. (MIRA 14:1)
(Radio--Handbooks, manuals, etc.)
(Electromagnetic theory)

GUREVICH, Aleksandr Grigor'yevich; STAROKADOMSKAYA, Ye.L.; KRYUCHKOVA, V.N., tekhn.red.

[Ferrites at microwave frequencies] Ferrity na sverkhvysokikh chastotakh. Moskva, Gos.izd-vo fiziko-matem.lit-ry, 1960. 407 p. (MIRA 13:7)

(Ferrates) (Microwaves)

GUREVICH, A.G.

PHASE I BOOK EXPLOITATION SOV/4893

Vsesoyuznoye soveshchaniye po fizike, fiziko-khimicheskim svoystvam ferritov i fizicheskim osnovam ikh primeneniya. 3d, Minsk, 1959

Ferrity; fizicheskiye i fiziko-khimicheskiye svoystva. Doklady (Ferrites; Physical and Physicochemical Properties. Reports) Minsk, Izd-vo AN BSSR, 1960. 655 p. Errata slip inserted. 4,000 copies printed.

Sponsoring Agencies: Nauchnyy sovet po magnetizmu AN SSSR. Otdel fiziki tverdogo tela i poluprovodnikov AN BSSR.

Editorial Board: Resp. Ed.: N. N. Sirota, Academician of the Academy of Sciences BSSR; K. P. Belov, Professor; Ye. I. Kondorskiy, Professor; K. M. Polivanov, Professor; R. V. Telesnin, Professor; G. A. Smolenskiy, Professor; N. N. Shol'ts, Candidate of Physical and Mathematical Sciences; E. M. Smolyarenko; and L. A. Bashkirov; Ed. of Publishing House: S. Kholyavskiy; Tech. Ed.: I. Volokhanovich.

PURPOSE: This book is intended for physicists, physical chemists, radio electronics engineers, and technical personnel engaged in the production and use of ferromagnetic materials. It may also be used by students in advanced courses in radio electronics, physics, and physical chemistry.

COVERAGE: The book contains reports presented at the Third All-Union Conference on Ferrites held in Minsk, Belorussian SSR. The reports deal with magnetic transformations, electrical and galvanomagnetic properties of ferrites, studies of the growth of ferrite single crystals, problems in the chemical and physicochemical analysis of ferrites, studies of ferrites having rectangular hysteresis loops and multicomponent ferrite systems exhibiting spontaneous rectangularity, problems in magnetic attraction, highly coercive ferrites, magnetic spectroscopy, ferromagnetic resonance, magneto-optics, physical principles of using ferrite components in electrical circuits, anisotropy of electrical and magnetic properties, etc. The Committee on Magnetism, AS USSR (S. V. Vonsovskiy, Chairman) organized the conference. References accompany individual articles.

Ferrites (Cont.) SOV/4893

Khlystov, A. S. Ferromagnetic Materials for Lower Frequencies of the SHF Range 530

Fabrikov, V. A. On the Effectiveness of the Operation of Ferrite Components as SHF Mixers in Rectifying Systems 534

Gurevich, A. G., and I. Ye. Gubler. Investigation of the SHF Properties of Ferrites With Narrow Resonance Curve 539

Mikhaylovskiy, L. K., V. P. Balakov, and B. P. Pollak. The Transformation of SHF Electromagnetic Waves in Ferrites 560

Polivanov, K. M., L. K. Mikhaylovskiy, S. A. Medvedev, B. P. Pollak, and V. P. Balakov. Magneto-Uniaxial Ferrites at SHF 567

Krinchik, G. S., and M. V. Chetkin. Gyromagnetic and Gyroelectric Properties of Ferrites 578

Card 16/18

Card 4/18

GUREVICH, A.G. [translator]; NAKHIMSON, I.G., red.; POTAPENKOVA, Ye.S., tekhn. red.

[Ferrites in nonlinear microwave devices; collected articles. Translated from the English] Ferrity v nelineinykh sverkhvysokochastotnykh ustroistvakh; sbornik statei. Moskva, Izd-vo inostr. lit-ry, 1961. 634 p. (MIRA 14:5)
(Ferrates) (Microwaves)

89271

S/181/61/003/001/003/042
B102/B212

24.7900 (1147, 1158, 1160)

AUTHORS: Gurevich, A. G., Gubler, I. Ye,, and Titova, A. G.

TITLE: Temperature dependence of the width of the resonance curve, and relaxation processes in ferrite single crystals

PERIODICAL: Fizika tverdogo tela, v. 3, no. 1, 1961, 19-31

TEXT: One of the most suited methods for studying relaxation processes in ferromagnetic materials is based on the analysis of the temperature dependence of the width ($2\Delta H$) of ferromagnetic resonance absorption curves in ferrite single crystals. This paper reports on such measurements. Spherical yttrium-ferrite single crystals with a garnet structure, and manganese and magnesium-manganese ferrites with a spinel structure served as specimens; the measurements were made in the range from -196°C to the Curie point of these ferrites. The growing of the single crystals is described briefly. A standard method has been used to determine $2\Delta H$ at 9100 Mc. Altogether 6 specimens have been investigated, and their characteristics are given in a table. Fig. 2 shows $2\Delta H$ as a function of temperature for these 6 specimens; Fig. 3 shows $\lambda''_{res}(T)$ for specimen no. 1

Card 1/7

Temperature dependence of the...

(λ''_{res} denotes the imaginary part of the diagonal component of the "external" susceptibility tensor at the point of ferromagnetic resonance). $2\Delta H$ is determined in ferrite single crystals by the following processes: Interaction of homogeneous precession with spin waves; relaxation processes, in which magnetic impurity ions with a strong frequency spin-lattice relaxation take part; excitation of spin waves (with $k \sim 10^5$-10^6 cm^{-1}) as a result of scattering of a homogeneous precession from microscopic magnetic fluctuations which are caused by a random distribution of magnetic ions among the lattice sites; a widening of the resonance curve, caused by the roughness of the specimen's surface; and incoherent relaxation processes due to thermal fluctuations of the magnetic moment. The latter effect entails a rapid increase of $2\Delta H$ when approaching the Curie point. When analyzing the $2\Delta H = f(T)$ curves, it is assumed that n processes that influence $2\Delta H$ are additive: $2\Delta H = \sum_n (2\Delta H)_n$. A detailed discussion is then given of the effect of the roughness of the specimen; of fluctuations near the Curie point; of rare-earth impurities; and of impurities and magnetic disorder in spinels. The results of the investigation lead to following conclusions: 1) The component of $2\Delta H$, due to the roughness of the specimen,

Card 2/7

is approximately proportional to the magnetization; the factor of proportionality is not a function of the ferrite composition. 2) The relaxation frequency of rare-earth impurity ions in Y-ferrite grows from $2 \cdot 10^{12}$ to $6 \cdot 10^{13}$ when heating the specimen from -196° to +200°C; at room temperature it has a value of $3 \cdot 10^{13}$. 3) The relaxation mechanism characteristic of spinel-type ferrites leads to a $2\Delta H$ component of several oersteds caused by a spin-wave excitation; therefore it is possible to measure resonance curve widths of less than 10 oersteds in single crystals of such ferrites. 4) The $2\Delta H$ component caused by thermal fluctuations of magnetization increases in proportion to $(T_C - T)^{-1/2}$ when approaching the Curie point. 5) Due to the fact that the latter component grows with increasing temperature, while the components caused by impurity ions and by the roughness of the specimen decrease, all $2\Delta H = f(T)$ curves have a minimum above room temperature. Position and distinctness of this minimum is a function of the values and temperature dependence of these components. Increasing roughness, e.g., brings about a shift of this minimum to higher temperatures. The authors thank Professor G. A. Smolenskiy for discussions; F. M. Samigullin participated in measurements. N. N. Parfenova and Ya. I. Shtreys of NII

S/181/61/003/001/003/042
B102/B212

Temperature dependence of the...

tokov vysokoy chastoty im. V. Vologdina (Scientific Research Institute of High-frequency Currents imeni V. Vologdin), and E. Ye. Telezhkina and M. A. Zaytseva of VNII abrazivov i shlifovaniya (All-Union Scientific Research Institute of Abrasives and Grinding) are mentioned. There are 8 figures, 1 table, and 19 references: 7 Soviet-bloc and 12 non-Soviet-bloc.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors, AS USSR, Leningrad)

SUBMITTED: June 17, 1960

Card 4/7

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Temperature dependence

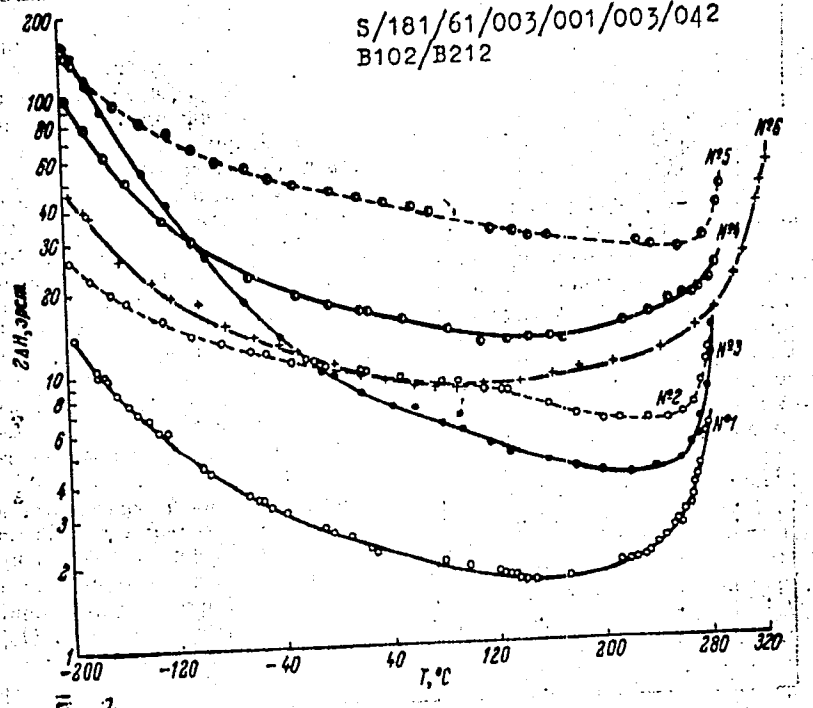

Fig. 2

Card 5/7

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B102/B212

Temperature dependence of the...

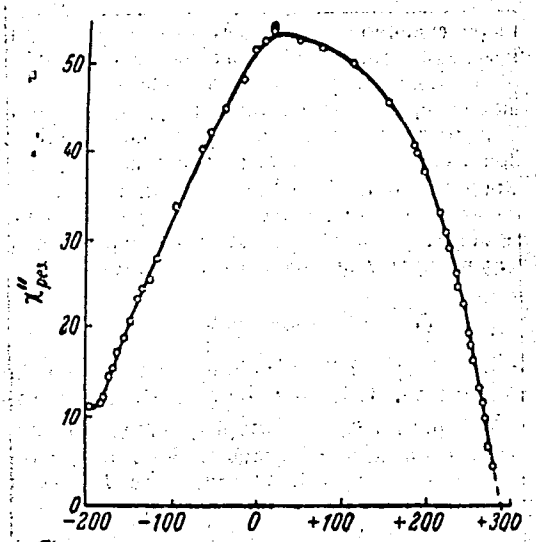

Fig. 3

Card 6/7

Temperature dependence of the...

Legend to Table: 1) Number of specimen; 2) composition; 3) diameter (mm); 4) grain size (μ) of abrasives, with which the specimens were finally polished; 5) magnetization (gauss) at 20°C and H = 3250 oe; 6) Curie point, (°C); 7) 2Δh (oersteds) at -196°C, 20°C, and minimum value; 8) minimum temperature.

1 Номер образца	2 Состав	3 Диаметр сфер, мм	4 Размер зерна абразива (шкура), на котором производилась окончательная обработка сфер, мк	5 Намагниченность при 20° С, и $H = 3250$ эрст, гс	6 Точка Кюри, °С	7 Ширина резонансной кривой, эрст. при −196° С	при 20° С	минимальная	8 Температура минимум, °С
1	$Y_3Fe_5O_{12}$	0.47	1—3	190	290	14	2.2	1.6	170
2		0.55	60	—	290	26	10	6	240
3		0.49	1—3	—	—	165	8.5	3.9	230
4	$Mn_{1.03}Fe_{1.93}O_4$	0.60	1—3	320	300	101	16	12	150
5		0.58	60	—	—	148	41	26	260
6	$Mg_{0.525}Mn_{0.865}Fe_{1.81}O_4$	0.76	1—3	230	333	46	9.5	8.5	100

Card 7/7

25686
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B102/B202

24.7900

AUTHORS: Gurevich, A. G. and Starobinets, S. S.

TITLE: Instability thresholds in the case of ferromagnetic resonance in yttrium garnet single crystals

PERIODICAL: Fizika tverdogo tela, v. 3, no. 7, 1961, 1995 - 1998

TEXT: The authors present the results of a study of ferromagnetic resonance in yttrium garnet single crystals with different content of rare-earth admixtures and different surface treatment. It has been found before by experiments (and also theoretically) that the resonance susceptibility χ''_{res} decreases with increasing amplitude (h) of the variable magnetic field. The studies were made only for small values of h. The authors studied $\chi''_{res}(h)$ in a large h range in different yttrium ferrites. The measurements were made at 9370 Mc/sec (in pulsed operation, the reciprocal of the pulse duty factor was 4000) in spherical specimens (diameter$\sim$0.5 mm). The three specimens studied had the following characteristics:

Card 1/4

25686
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B102/B202

Instability thresholds ...

No	purity of the initial yttrium oxide	grain size of the abrasive μ	$2\Delta H$ for $h \to 0$, oerst.	$2\Delta H'_k$, oerst.	$2\Delta H''_k$, oerst.	m_{max}, gauss
1	99.995	3	2.3	20	5.2	18
2	99.995	10	4.7	24	-	17
3	99.95	3	7.6	49	9.8	24

The best curves of measurement are obtained if $\chi''_{res} h^2$ is plotted as a function of h. This is shown in Fig. 1 where the diagram b shows the first part of a) on an enlarged scale. In all curves a series of linear parts follows the first part (with χ''_{res} = const): $\chi''_{res} h^2 = m_{lim} h + p$, where m_{lim} and p are constant quantities for each part. m_{lim} is the limiting value of the variable magnetization $\chi''_{res} h$ (for a given part) at $h \to \infty$, p characterizes the velocity of the approach of $\chi''_{res} h$ to m_{lim} with an increase in h. It is assumed that m_{lim} is the critical amplitude

Card 2/4

Instability thresholds ...

of magnetization of the homogeneous precession for the first linear part for which $m_{cr} = M_o \sqrt{\frac{2\Delta H_k}{4\pi m_o}}$ holds theoretically. M_o is the constant magnetization, $2\Delta H_k$ the width of the resonance curve of the spin waves which become unstable; (these calculated values are also given in the table as $2\Delta H_k'$). Assuming the magnetization at the beginning of the first linear part as magnetization threshold, a value which is given in the table under $2\Delta H_k''$ is obtained for $2\Delta H_k$. These values can be divided into an intrinsic plus an impurity part (the specimens 1 and 3 differ in their impurity content by one order of magnitude); the following values were obtained:

	No 1.	No 3
$2 H_k'$	17 + 3	17 + 32 oe
$2 H_k''$	4.7 + 0.5	4.7 + 5.1 oe

All curves showed three linear parts. With increasing concentration of the rare-earth impurities the slope of the first two parts considerably

Card 3/4

increased. The slope of the last one was the same for almost all specimens. For specimens which differed only by their surface treatment it was equal. Hence, the limiting amplitude of the homogeneous precession depends neither on the rare-earth concentration nor on the roughness of the surface at sufficiently high alternating field strengths. The maximum values of the amplitudes of the homogeneous precession m_{max} are also given in the table. Ya.Loos is mentioned. There are 2 figures, 1 table and 6 references: 1 Soviet-bloc and 5 non-Soviet-bloc.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors AS USSR, Leningrad)

SUBMITTED: November 25, 1960 (initially), February 4, 1961 (after revision)

9.2571
15 2660
24 1900 1158 1163 1395 1144

30065
S/048/61/025/011/010/0
B108/B138

AUTHORS Gurevich, A. G., and Starobinets, S. S.

TITLE: Ferromagnetic resonance in ferrites in strong variable magnetic fields

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 25, no. 11, 1961, 1357-1360

TEXT: In order to study ferromagnetic resonance at high power levels, the authors measured χ''_{res}, $2\Delta H$, and H_{res} of single yttrium garnets. The measurements were made at a frequency of 9375 Mcps with a pulse generator. The specimens in the shape of spheres 0.5 mm diameter were placed in the magnetic field antinode of a TE_{106}-mode rectangular cavity. With a precision attenuator at the input end of the cavity all the measurements could be made at constant power output. χ'' was determined from the power absorbed in the sample as shown by the attenuator. The method of measurement has been described in Ref. 1 (Fizika tverdogo tela, 3, 7, 1995 (1961)) by the authors as well as in Refs. 2 and 3 (see below). The

Card 1/3

Ferromagnetic resonance in ferrites in...

advantages are that the magnetic field amplitude is the same at any point on the resonance curve, and that the results do not depend on the crystal detector characteristics. The results show that, both at room and nitrogen temperatures, the power absorbed is, after a short initial section, linearly dependent on h. The rise in the resonance losses observed with decreasing temperature is attributed to the effect of rare-earth impurities which favor resonance absorption. The anisotropy of the resonance losses increases considerably with field amplitude. The resonance field H_{res} is connected with the angle Θ between [001] axis and (110) plane through the relation $H_{res} = \frac{\omega}{\gamma} \cdot \frac{|K_1|}{M} f(\Theta)$ (1), where $f(\Theta) = \frac{3}{16} + \frac{5}{4}\cos 2\Theta + \frac{15}{16}\cos 4\Theta$. The intersection of the straight line (1) with the ordinate axis yields the g-factor. At room temperature, this g-factor increases with rising power level. At 77°K, the g-factor is independent of power level down to field strengths of about 3 oersted. The observed decrease of the product $\chi''_{res} \cdot \Delta H$ with rising field amplitude indicates reduction of permanent magnetization as a result of increasing

Card 2/3

Ferromagnetic resonance in ferrites in... ,

spin wave amplitudes. This paper was read at the Conference on ferromagnetism and antiferromagnetism in Leningrad, May 5-11, 1961. There are 5 figures and 7 references: 1 Soviet and 6 non-Soviet. The two most recent references to English-language publications read as follows: Weiss M. T., J. Appl. Phys., 31, N 5, 778 (1960); Green J. J., Schlömann E. IRE Trans. Microwave Theory and Techn., 8, N 1, (1960).

Card 3/3

30066
S/048/61/025/011/011/031
B104/B102

9.2571
15.2660
24.7900 (1055,1144,1163)

AUTHORS: Gurevich, A. G., Safant'yevskiy, A. P., Solov'yev, V. I. and Sher, Ye. S.

TITLE: Effect of induced anisotropy upon ferromagnetic resonance

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 25, no. 11, 1961, 1361 - 1367

TITLE: The authors studied the effect of electron-induced anisotropy of polycrystalline yttrium garnets upon ferromagnetic resonance from 4.2-300°K. The measuring technique used in the temperature range of 77 - 300°K had been described in a previous paper (A. G. Gurevich et al., Fizika tverdogo tela. 3, no. 1, 19 (1961). A square resonator was dipped into liquid helium with the specimen between 4.2 and 77°K. With 3.2-cm waves the resonance field H_{res} and the width $2\Delta H$ of the resonance curve were determined from the dependence of the reflection factor $|\Gamma|$ on the magnetic field, as recorded by an ЭПП-09(EPP-09) voltmeter. An example is illustrated in Fig. 1. Manganese-free specimens annealed at high temperatures showed a rapid increase of $2\Delta H$ with decreasing temperature. For an initial yttrium oxide

Card 1/3

with a purity of 99.995%, the said rise cannot be attributed to rare-earth impurites. Present results show that the induced anisotropy of polycrystalline yttrium garnet is due to Fe^{2+} ions. To clarify the establishment of induced anisotropy with time, the authors determined the time dependence of $|\Gamma|$ when the specimens were rotated through 90° within ~0.1 sec. $|\Gamma|$ did not change noticeably above 130°K. At lower temperatures, $|\Gamma|$ changed abruptly during rotation, and then returned to its original value (Fig. 4). Sign and amplitude of the jump were found to depend on the constant field H_o. It is believed that induced anisotropy is not yet fully established immediately after rotation through 90° and that the resonance curve at a given temperature shifts by H_c toward stronger fields relative to the static curve. H_c = 550 oersteds is obtained at 77°K, and H_c = 200 oersteds at 90°K. It follows from a discussion of this result that in addition to the processes that are observed after rotation, also other processes take place which have time constants considerably smaller than the time of rotations. These processes are held responsible for the major part of the induced anisotropy field. As is shown, a superposition of several processes with different time constants and activation energies of the order of 0.05 ev

GUREVICH, A. G.

Dissertation defended for the degree of Doctor of Physicomathematical Sciences at the Institute of Metal Physics in 1962:

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Vest. Akad. Nauk SSSR. No. 4, Moscow, 1963, pages 119-145