

KUKOZ, F.I.

PHASE I BOOK EXPLOITATION      SOVIET

Vserossiyskaya konferentsiya professorov i prepodavateley pedagogicheskikh institutov

Primeneniye ul' traukustiki k issledovaniyu veshchestva. vyp. 10. (Utilization of Ultrasonics for the Investigation of Materials. no. 10) Moscow, Izd-vo MOPI, 1960. 321 p. 1000 copies printed.

Eds.: V. F. Nozdrev, Professor, and B. B. Kudryavtsev, Professor.

PURPOSE: This book is intended for physicists and engineers interested in ultrasonic engineering.

COVERAGE: The collection of articles reviews present-day research in the application of ultrasound in medicine, chemistry, physics, metallurgy, ceramics, petroleum and mining engineering, defectoscopy, and other fields. No personalities are mentioned. References accompany individual articles.

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Utilization of Ultrasonics (Cont.)

SOV/5644

- Kukoz, F. I. [Novocherkasskiy politekhn. in-t-Novocherkassk Polytechnical Institute]. Study of the Effect of Ultrasound on the Electrolytic Oxidation of Chromium Sulfate at a Lead Anode 95
- Trofimov, A. N. [MGPI im. Lenina-Moscow State Pedagogical Institute imeni V. I. Lenin]. The Distribution of Metal on a Cathode Surface During Electrodeposition in an Ultrasonic Field 103
- Mal' tsev, N. N., and V. I. Dal' [Dnepropetrovskiy KhTI - Dnepropetrovsk Institute of Chemical Technology]. Using Ultrasound to Intensify Absorption 109
- Mal' tsev, N. N. [Dnepropetrovsk Institute of Chemical Technology]. Study of the Precipitation of Coal Residue From the Circulating Waters of a Coal-Enriching Plant With the Aid of  
Card 4/10

40337

S/194/52/000/006/125/232  
D256/D308

5.4100 (5105)

AUTHORS: Fedorov, Yu.V., and Kukoz, F.I.

TITLE: Effect of ultrasound on polarization in the process of oxygen liberation on lead dioxide electrodes

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 6, 1962, abstract 6-5-41 r (V sb. Primeneniye ul'traakust. k issled. veshchestva, no. 12, M., 1960; 159-166)

TEXT: The effect of ultrasound on the excess potential of oxygen on a lead dioxide electrode was investigated, since it is of importance in charging lead batteries. The polarization in the process of oxygen liberation was investigated using a smooth platinum electrode; an electrode covered with the lead dioxide and an electrode of oxidized lead, with and without the ultrasonic field of a frequency of 1 Mc/s and an intensity of 3 W/cm<sup>2</sup>. It was found that the ultrasound decreases the polarization during liberation of oxygen on a smooth plate; the excess potential of oxygen on the lead dioxide deposited on the plate is reduced by ultrasound. With an Card (1/2)

Effect of ultrasound on ...

S/194/62/000/006/125/232  
D256/D308

oxidized lead electrode the ultrasound also reduces the excess potential, increasing at the same time the max. current producing the lead dioxide. 3 figures, 21 references. [Abstracter's note: Complete translation.]

Card 2/2

5.4600

77522  
SOV/80-33-1-31/49

AUTHORS: Kukoz, F. I., Skalozubov, M. F.

TITLE: Effect of Ultrasound on Anode Formation of Lead Dioxide

PERIODICAL: Zhurnal prikladnoy khimii, 1960, Vol 33, Nr 1, pp 177-181 (USSR)

ABSTRACT: The authors studied the effect of ultrasound on the formation of lead dioxide by anode polarization of a smooth lead plate in 6.7N H<sub>2</sub>SO<sub>4</sub> solution with a current of constant density (0.5 ma/cm<sup>2</sup>). A short review of previous work in this field is given. Results of the experiments are given in Figs. 1, 2, and 3.

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Effect of Ultrasound on Anode Formation  
of Lead Dioxide

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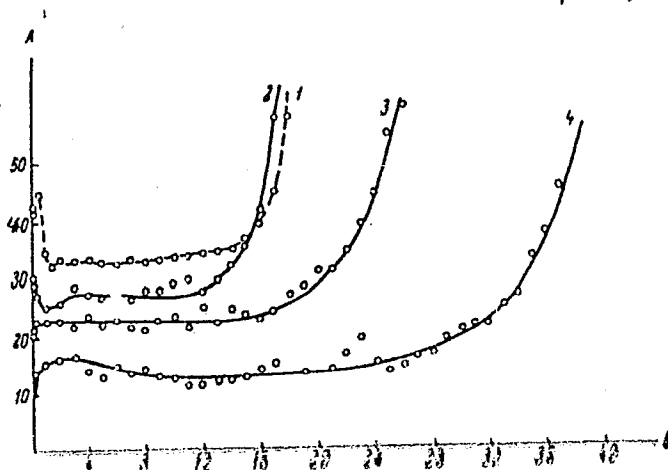


Fig. 1. Curves of anode passivation of a smooth lead electrode ( $i_a = 0.5 \text{ ma/cm}^2$ ) in 6.7N  $\text{H}_2\text{SO}_4$ .

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(A) Anode overvoltage (in mv); (B) time of anode polarization (in min).. (1) Without ultrasound; (2,3,4,) with ultrasound of 1.4 mc frequency, and 1.3 and 5 W/cm<sup>2</sup> intensity, respectively.

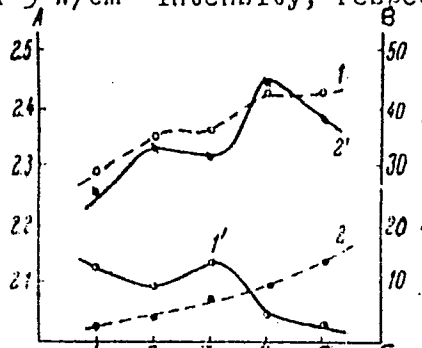


Fig. 2. Curves of change of values E<sub>max</sub> (curves 1 and 1') and time of cathode polarization needed for complete removal of products of anode corrosion

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with cathode polarization (curves 2 and 2'), depending on the number of charge-discharge cycles in an ultrasonic field of  $3 \text{ W/cm}^2$  (solid line), and out of ultrasonic field (broken line). (A) Value of maximum of anode curve  $E_{\text{max}}$  (in v); (B) time of cathode polarization (in min); (C) number of charge-discharge cycles.

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of Lead Dioxide

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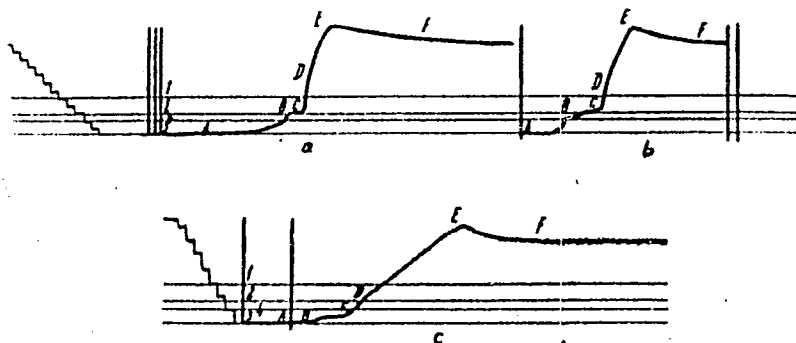
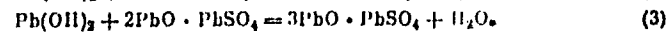
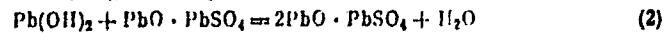
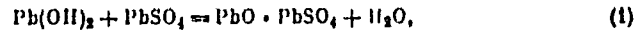


Fig. 3. Oscillograms (a, b, c) of anode charge curve in the portion of sudden shifting of potential to the positive side. (1) Conventional zero lines; (2) electrode potential at which a short lag occurs, if anode polarization is conducted without ultrasound; (3) mechanical zero of the apparatus; (4) abscissa for electrode potential (hydrogen scale). Scale of oscillograms (a) and (b) on potential axis is 120 mv/mm, and of oscillogram (c) 100 mv/mm.

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The lag of the anode potentials is connected with the formation of intermediate products. The process of basic salts formation on the anode in the sulfate pores is expressed:



The following conclusions were made: The quantitative characteristic of the anode charge curve is affected by ultrasound of 1.4 mc frequency and 1-5 W/cm<sup>2</sup> intensity. At low intensities the ultrasound accelerates the passivation process, and delays it when the intensity is sufficient to cause cavitations. The anode oxidation is not a simple replacement of one electrochemical process ( $\text{Pb} - 2e \rightarrow \text{Pb}^{++}$ ) for another ( $\text{Pb}^{++} - 2e \rightarrow \text{Pb}^{++++}$ ); it consists of a series

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of short-lived cumulative processes by which basic salts and their solid solutions are formed. Ultrasound decreases  $E_{max}$ . The decrease progresses with the increase of ultrasound intensity and with the thickness of the corrosion products layer of the first phase of passivation. It is suggested that formation of lead dioxide starts before the anode charge curve attains its maximum. Ultrasound depolarizes both the process of anode oxidation of metallic lead into bivalent and the transformation of bivalent lead into tetravalent. There are 3 figures; and 16 references, 4 U.S., 1 U.K., 3 German, 1 French, 7 Soviet. The U.S. and U.K. references are: P. Jones, R. Lind, W. K. Wynne-Jones, Trans. Faraday Soc., 9, 972 (1954); I. Burbank, J. Electroch. Soc., 103, 2, 87 (1956); R. Retschi, B. Cahan, J. Electroch. Soc., 104, 406 (1957); I. Lander, J. Electroch. Soc., 103, 1, 1 (1956); I. Lander, J. Electroch. Soc., 95, 174 (1949).

ASSOCIATION: Novochoerkask Polytechnic Institute (Novochoerkaskiy politekhnicheskij institut)  
SUBMITTED: January 15, 1959  
Card 7/7

KUKOZ, F.I., KUKOZ, I.A.

Nature of acoustic-electrochemical phenomena. Prikl. ul'tra-  
akust. k issl. veshch. no.13:15-26 '61. (MIRA 16:6)

(Electroacoustics)  
(Electrochemistry)

24 1800

S/263/62/000/014/003/006  
1007/1207

AUTHOR: Kukoz, F. I., Kukoz, L. A. and Matsokin, V. I.

TITLE: Measurement of ultrasonic intensity in liquids

PERIODICAL: Referativnyy zhurnal, otdel'nyy vypusk. 32. Izmeritel'naya tekhnika, no. 14, 1962, 23, abstract 32.14.150. In collection Prom. primeniye ul'trazvuka Kuybyshevsk. aviats. in-t, Kuybyshev, 1961, 49-56

TEXT: Apparatus and methods are described for measuring integral acoustic power and local intensity of an ultrasonic field, as well as for investigations on the influence of ultrasonic waves on electrochemical processes. Comparison is made of the results of measuring ultrasonic intensity by calorimetric, thermoelectric and piezometric methods (the latter developed by the authors), and the piezometric technique for calibration of ultrasonic probes is outlined. Measurements were carried out at a sound frequency of 0.7 to 1.5 Mcs and a sound intensity of 5 w/cm<sup>2</sup>. Maximum errors with the calorimetric methods amount to 20-30%; with the piezometric methods the error is only 10%. There are 6 figures and 21 references.

√B

[Abstracter's note: Complete translation.]

Card 1/1

L 18216-65 EWT(1)/T/EWP(k) PF-4/PI-4 MLK

ACCESSION NR: AT5001228

S/0000/61/000/000/0203/0208

AUTHOR: Skalozubov, M. F.; Kukos, F. I.; Matsokin, V. I.

TITLE: Intensification of the process of liquid treatment of nonlaminar electrodes for alkali batteries

SOURCE: Vsesoyuznaya mezhvuzovskaya konferentsiya po promyshlennomu primeneniyu ul'trazvuka. Kuyby'shev, 1960. Promyshlennoye primeneniye ul'trazvuka (Industrial application of ultrasound); trudy konferentsii. Kuyby'shev, 1961, 203-208

TOPIC TAGS: alkali storage battery, battery electrode, electrode processing, ultrasound effect

ABSTRACT: After pointing out that the preparation of non-laminary electrodes for alkali storage batteries is a laborious and time consuming operation, the authors report the results of tests aimed at obtaining data on the effect of diffusion, deaeration, and osmosis on the rate at which a metal-ceramic base electrode can be filled with the active mass, and how ultrasonic vibration can accelerate these processes. A technique consisting of combining the action of

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ACCESSION NR: AT5001228

ultrasound, mechanical vibration, and vacuum to form the storage battery plate were used. The results showed that the application of ultrasound (1.0 Mcs, 3 W/cm<sup>2</sup>), combined with cathode polarization and the use of thermal decomposition of the nickel nitrate, accelerates the impregnation of the nickel nitrate into the plate by a factor of 12-15. The use of mechanical vibration and vacuum also accelerate the impregnation and increase the activity of the electrode mass. The results point to the need of further investigation of the impregnation procedure, with allowance for economic factors. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: None

SUBMITTED: 11May61

ENCL: 00

SUB CODE: GP, EE

NR REF SOV: 000

OTHER: 000

Card 2/2

L 18219-65 EWT(1)/T/EMP(k) Pf-4/P1-4 ASD(p)-3/AFSTR MLK

ACCESSION NR: AT500122

S/0000/61/000/000/0049/0056

AUTHOR: Kukoz, F. I.; Kukoz, L. A.; Matsokin, V. I.

BH

TITLE: Measurement of the intensity of ultrasound in a liquid

SOURCE: Vsesoyuznaya mezhvuzovskaya konferentsiya po promyshlennomu primeneniyu ul'trazvuka. Kuyby\*shev, 1960. Promyshlennoye primeniye ul'trazvuka (Industrial application of ultrasound); trudy konferentsii. Kuyby\*shev, 1961, 49-56

TOPIC TAGS: ultrasound, ultrasonic field, measurement method, calorimetric method, thermoelectric method, piezometric method

ABSTRACT: In view of the lack of published procedures for the measurement of acoustic power and its local intensity, the authors compare measurement results obtained by calorimetric, thermoelectric, and piezometric methods, and describe a new simple method for the calibration of ultrasonic probes. The measurements were made at frequencies 0.7--1.5 Mcs and intensities 0.2--5 W/cm<sup>2</sup>. In the calorimetric method the ultrasound power was measured by determining the heat rise in a volume of water irradiated by the ultrasound. The measurement accuracy was 20--30%. The thermoelectric measurements were made with a differential

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L 18219-65

ACCESSION NO: AT5001222

thermocouple probe such as described by F. Dunn and W. I. Fry (IRE Trans. Ultrasonics Engng. 1957, 5, 59). Both the calorimetric and thermoelectric measurements are laborious and yield only values that are averaged over an appreciable region in space. The authors therefore propose a new piezometric method for measuring the local intensity of ultrasound and for calibrating the other acoustic probes. The method is based on balancing the radiation pressure on the open end of a cylindrical tube immersed in the irradiated liquid, and measuring the balancing pressure with a monometer. The method is illustrated in Figure 1 of the enclosure, and details of the piezometric probe are shown in Figure 2. When an ocular micrometer is used to read the manometer, the errors of the method do not exceed 10%. Orig. art. has: 6 figures, 5 formulas, and 1 table.

ASSOCIATION: None

SUBMITTED 11May61

ENCL: 02

SUB CODE: GP

NR REF SOV: 009

OTHER: 012

Co.d 2/4

L 18219-65

ACCESSION NR: AT5001222

ENCLOSURE: 01

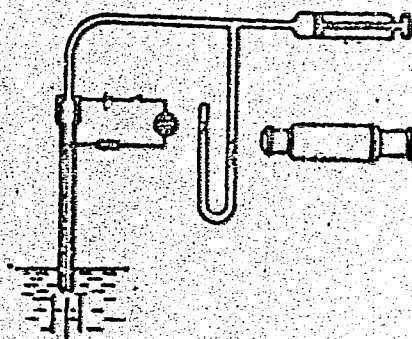


Fig. 1. Diagram of piezometric meter for ultrasound intensity

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ACCESSION NR: AT5001222

ENCLOSURE: 02

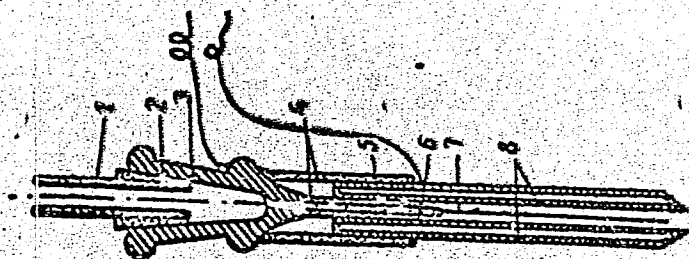


Fig. 2. Section through piezometric probe.  
1 - Glass tube, 2 - rubber stopper, 3 - metal sleeve,  
4 - rubber tubes, 5 - metal tube with hole, 6, 7 -  
steel needle, 8 - double-wall tube

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KUKOZ, F.I.

Effect of ultrasound on the potential of cathodic hydrogen  
evolution on activated smooth platinum. Prim.ul'traakust.k  
issl.veshch. no.1647-60 '62. (MIRA 16:4)  
(Electrodes, Platinum) (Ultrasonic waves)

1/04  
S/076/62/036/004/003/012  
B101/B110

5.4700

AUTHORS: Kukoz, F. I., and Kukoz, L. A.

TITLE: The nature of audio-electrochemical phenomena

PERIODICAL: Zhurnal fizicheskoy khimii, v. 36, no. 4, 1962, 703-708

TEXT: Theoretical explanations are proposed for the experimental data of other scientists concerning audio-electrochemical effects. (1) If the electrodes are covered by gas bubbles, pulsation of these bubbles sets in, whereby the actual surface and polarization current density are changed. For the amplitude  $\Delta E$  of the potential change one derives:

$$\Delta E = b \log \left\{ (1 - m)/(1 - m) \left[ (P_0 \pm P_a)/(P_0 + \kappa v) \right]^{1/2} \right\} \quad (8)$$

where  $b$  = the constant of the Tafel equation for cathodic  $H_2$  liberation,  $m$  = occupancy of the electrode by gas bubbles,  $P_0$  = hydrostatic pressure,  $P_a$  = amplitude of the acoustic pressure,  $v$  = sound frequency and  $\kappa = 0.426 \text{ cm}^{-1} \cdot \text{sec}^{-1}$ . This equation agrees well with the experimental data of E. Yeager et al. (see below) for  $1/4 < m < 1/2$ . (2) For  $m < 1/4$  and  $m = 0$ , the values calculated from Eq. (8) are smaller by 1 to 2 orders of magnitude than the

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S/076/62/036/004/003/012  
B101/B110

The nature of audio-electrochemical ...

experimental values. For this low occupancy of the electrode by gas, periodic changes of the double layer of the electrode under the effect of sound vibrations are assumed and

$\Delta \varepsilon = [8\pi\beta^2 RTI^2 (\Delta V)^2 / v^2 Dcz^2 F^2]^{1/4}$  is derived.  $\beta$  = transformation coefficient of acoustic energy into electric energy,  $I$  = intensity and  $v$  = velocity of acoustic waves,  $\Delta V$  = elementary volume,  $D$  = dielectric constant and  $c$  = concentration of the electrolyte,  $z$  = valency of the ions forming the ionic layer,  $F$  is taken from the Gouy-Stern equation for the electric capacity of electrodes in diluted electrolytes. This equation reproduces the experimental data for  $0 \leq m < 1/4$  very well. From it there follows a maximum of  $\Delta \varepsilon$  at the point of zero charge. (3) With high current density and high occupancy ( $m > 1/2$ ), the audio-electrochemical effect is based on the periodic change of resistance. (4) On the basis of the audio-electrochemical effect, a method could be developed for the experimental determination of the zero-charge potential of some solid electrodes. Professor L. I. Antropov is thanked for discussions. There are 1 figure and 1 table. The two most important English-language references read as follows: E. Yeager, F. Hovorka, J. Electrochem. Soc., 98, 14, 1951; H. Dietrick, E. Yeager, J. Bugosh, F. Hovorka, J. Acoust.

Card 2/3

The nature of audio-electrochemical ...

S/075/62/036/004/003/012  
B101/B110

Soc. America, 25, 446, 1953.

ASSOCIATION: Novocherkasskiy politekhnicheskiy institut im. S.  
Ordzhonikizde (Novocherkassk Polytechnic Institute imeni  
S. Ordzhonikizde)

SUBMITTED: June 16, 1960

Card 3/3

X

S/884/62/134/000/004/004  
B101/B186

AUTHOR: Kukoz, F. I.

TITLE: Electrochemical method of studying the chemical effects of ultrasonics on an aqueous solution of sulfuric acid

SOURCE: Novocherkassk. Politeknicheskii institut. Trudy, v. 134, 1962. Raboty kafedry tekhnologii elektrokhimicheskikh proizvodstv Khimiko-tekhnologicheskogo fakul'teta, 87-98

TEXT: To investigate the primary products of the action of ultrasonics on water, a 0.1 N solution of  $H_2SO_4$  containing no oxygen and no hydrogen was exposed to ultrasonic vibrations of 1.2 Mc/sec at 3 w/cm<sup>2</sup>, and the potential of a degassed, platinized platinum electrode was measured. Results: The potential of the electrode in the control solution was about 0.5 v, whereas that in the solution treated ultrasonically fell to 0.1 v after 160 min. The course of the potential curve resembled that for cathodic charging at 25  $\mu$ a, and proved that hydrogen was adsorbed on the electrode. An estimate of the utilization factor of the sound energy

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Electrochemical method of studying ...

S/884/62/134/000/004/004  
B101/B186

for the breakup of the water molecules to  $H + OH$ , taking no account of a possible recombination, gave the value  $K = 2 \cdot 10^{-7}$ . Adding 0.01 mole/l of benzene as an acceptor for the free OH radicals increased  $K$  to  $3 \cdot 10^{-6}$ .  
Conclusion: The electrochemical method of studying the redox properties of ultrasonically treated aqueous solutions by measuring the potential of a platinized platinum electrode can be recommended. The combination of a metal electrode and a chemical acceptor is particularly advantageous; it makes it possible to study the primary short-lived particles and to estimate the yield qualitatively. There are 3 figures.

Card 2/2

KUKOZ, F.I.; SEMENCHENKO, S.A.

Determination of the potentials of zero charge of solid electrodes  
from their vibro-abrasive rate. Elektrokimiia 2 no.1:74-78 Ja '66.  
(MIRA 19:1)

1. Novocherkasskiy politekhnicheskii institut imeni Sergo Ordzhoni-  
kidze. Submitted December 7, 1964.

KUKOL, F.I.; MIKHAYLENKO, G.V.; SKALCZUBOV, M.F.

Possibilities of increasing electric capacity of the silver  
electrode of a battery. Izv. vys. ucheb. zav.; khim. i khim.  
tekh. 8 no.3:448-452 '65. (MIRA 18:10)

2. Novosibirskiy politekhnicheskii institut imeni  
Orizhonikidze, kafedra tekhnologii elektrokhimicheskikh  
produktov.

KUKOZ, F.I., kand.tekhn.nauk; CHERNOV, G.K., inzh.; SEMENOV, M.F., kand.  
tekhn.nauk

Magnetic treatment of aqueous solutions. Prom. energ. 20 no.2:34-  
36 '65. (MIRA 18:4)

CHIRCH, I.A.; AMOTYEV, N.N.; KUDNOV, S.I.

Quantitative evaluation of the effect of the precipitation conditions on the granulometric composition of nickelous hydroxide. KZh, zhur. 27 no.2:207-216 Moscow '66.

(MIRA 12-66)

I. Kostovskiy pedagogicheskiy institut.

FUKOZ, F.I.; SEMENCHENKO, S.A.

Determination of the potentials of zero charge on solid electrodes from their dispersion rate in the ultrasonic field. Elektrokhemiiia 1 no.12:1454-1458 D '65.

(MIRA 19:1)

1. Novocherkasskiy politekhnicheskiiy institut. Submitted September 21, 1964.

L 22845-66 EMT(m)/EFP(t)/EHA(h) JD

ACC NR: AP6011019

SOURCE CODE: UR/0080/66/039/003/0705/0707

AUTHOR: Kukoz, F. I.; Kukoz, L. A.

ORG: Novocherkassk Polytechnical Institute im. S. Ordzhonikidze  
(Novocherkasskiy politekhnicheskiy institut)

TITLE: Obtaining poreless electrolytic deposits of platinum in an ultrasonic field

SOURCE: Zhurnal prikladnoy khimii, v. 39, no. 3, 1966, 705-707

TOPIC TAGS: electrolysis, electrolytic deposition, platinum deposition, copper coating, ultrasound application

ABSTRACT: Copper foils, 10x10x0.1 mm in size, were plated with platinum in a phosphate electrolyte by means of ultrasound applied at 1.2 Mega-cycles and 8-10 w/cm<sup>2</sup> intensity to the tank bottom. Bright, almost poreless platinum deposits were obtained. Ultrasound, in addition to reducing the coating porosity, makes it possible to obtain a platinum layer 5-10 mm thick with a fine-grained structure. It also widens the range of current densities, electrolyte temperatures, and electrolysis duration and increases the yield by 100-400%. Orig. art. has: 2 figures. [ND]

SUB CODE: 13/ SUBM DATE: 21Mar64/ ORIG REF: 008/ OTH REF: 001/ADPRES  
Card 1/1 AV UDC: 621.557.9+534.321.9' 4229

ACC NR: AP7005614

SOURCE CODE: UR/0413/67/000/002/0052/0052

INVENTOR: Kukoz, F. I.; Pridatko, I. A.; Skalozubov, M. F.

ORG: none

TITLE: A method of obtaining grid plugs for nickel oxide electrodes of alkaline storage batteries. Class 21, No. 190447 [announced by Novochoerkassk Polytechnical Institute (Novochoerkasskiy politekhnicheskiy institut)]

SOURCE: Izobrateniya, promyshlennyye obraztsey, tovarnyye znaki, no. 2, 1967, 52

TOPIC TAGS: electrode, storage battery

ABSTRACT: A method of obtaining grid plugs for nickel-oxide electrodes of alkaline storage batteries by treating metallic nickel in alkali and then oxidizing it at high temperatures is proposed. To improve the quality of products and simplify the technology of manufacture, oxidation is made to occur at a temperature of 600—650°C during 40—60 min in a dehydrated medium after the treatment in alkali. [JR]

SUB CODE: 09/0/SUBM DATE: 25Sep65

Card 1/1

UDC: 621.355.8.035.222.4



C.A.  
1951 KUKOZ, L.A.

General and Physical Chemistry

Time dependence of the high-voltage polarization in hot glass. N. S. Novosil'tsev and L. A. Kukoz (Rostov-on Don State Univ.). *Zhur. Eksp. Fiz.* 20, 734-7(1950).-- Proof that the dielec. const. of hot glass under high voltage is not a const., but varies in the course of the discharge, is given by discharge curves obtained by oscillography. Plots of  $\ln(V_0/V)$  [where  $V_0$  = initial,  $V$  = monometry voltage] as a function of time,  $t$  at 180, 220, and 250°, are not rectilinear. Consequently, a law  $V = V_0 e^{-t/\tau}$ , with a const.  $\tau$ , is not applicable. At the very beginning of the discharge, the capacity is very small, and increases gradually in the course of the discharge. However, for another type of glass, "No. 23," the exponential law is obeyed, and hence the capacity is const., at 320 and 360°. The sp. capacity per 1 sq. cm. surface area is of the order of  $5 \times 10^6$  cm./sq. cm., independent of the thickness between 0.1 and 5 mm. The thickness does have an effect on the losses. Only a thin surface layer forms the capacity; the bulk of the glass constitutes only a resistance.

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KUKOZ, L.A.

PHASE I BOOK EXPLOITATION SOV/5644

Vserossiyskaya konferentsiya professorov i prepodavateley pedagogicheskikh institutov

Primeneniye ul'trazvukov k issledovaniyu veshchestva. vyp. 10. (Utilization of Ultrasonics for the Investigation of Materials. no. 10) Moscow, Izd-vo MOPI, 1960. 321 p. 1000 copies printed.

Eds.: V. F. Nozdrev, Professor, and B. B. Kudryavtsev, Professor.

**PURPOSE:** This book is intended for physicists and engineers interested in ultrasonic engineering.

**COVERAGE:** The collection of articles reviews present-day research in the application of ultrasound in medicine, chemistry, physics, metallurgy, ceramics, petroleum and mining engineering, defectoscopy, and other fields. No personalities are mentioned. References accompany individual articles.

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Utilization of Ultrasonics (Cont.)

SOV/5644

Ultrasound	117
Kukoz, F. I., and L. A. Kukoz [Novocherkassk Polytechnical Institute]. The Effect of Ultrasound on the Properties of Disperse Galvanic Deposits of Platinum	121
Pirozhnikov, L. B. [NII stroit. fiziki i ogradhd. konstruksiy Akademii stroitel' stva i arkhitektury SSSR - Scientific Research Institute for Constructional Physics and Protective Structures of the Academy for Building and Architecture, USSR]. The Use of Ultrasound in Removing Corrosion and Passivating the Surface of Metal	131
Lependin, L. F. [Taganrogsk. radiotekhn. in-t - Taganrog Radio Engineering Institute]. The Possibility of Using Ultrasound to Improve the Structure of Submerged-Welded Joints	139

Card 5/10

KUKOZ, F.I.; KUKOZ, L.A.

Nature of acoustic-electrochemical phenomena. *Prim. ul'tra-*  
*akust. k issl. veshch. no.13:15-26 '61.* (MIRA 16:6)

(Electroacoustics)  
(Electrochemistry)

L 18219-65 EWT(1)/T/EWF(k) Pf-4/Pi-4 ASD(p)-3/AFETR MLK  
ACCESSION NR: AT500122 S/0000/61/000/000/0049/0056

AUTHOR: Kukoz, F. I.; Kukoz, L. A.; Matsokin, V. I.

B+

TITLE: Measurement of the intensity of ultrasound in a liquid

SOURCE: Vsesoyuznaya mezhvuzovskaya konferentsiya po promyshlennomu primeneniyu ul'trazvuka. Kuyby\*shev, 1960. Promyshlennoye primeniye ul'trazvuka (Industrial application of ultrasound); trudy konferentsii. Kuyby\*shev, 1961, 49-56

TOPIC TAGS: ultrasound, ultrasonic field, measurement method, calorimetric method, thermoelectric method, piezometric method

ABSTRACT: In view of the lack of published procedures for the measurement of acoustic power and its local intensity, the authors compare measurement results obtained by calorimetric, thermoelectric, and piezometric methods, and describe a new simple method for the calibration of ultrasonic probes. The measurements were made at frequencies 0.7--1.5 Mcs and intensities 0.2--5 W/cm<sup>2</sup>. In the calorimetric method the ultrasound power was measured by determining the heat rise in a volume of water irradiated by the ultrasound. The measurement accuracy was 20--30%. The thermoelectric measurements were made with a differential

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L 18219-65

ACCESSION NR: AT5001222

thermocouple probe such as described by F. Dunn and W. I. Fry (IRE Trans. Ultra-sonics Engng. 1957, 5, 59). Both the calorimetric and thermoelectric measurements are laborious and yield only values that are averaged over an appreciable region in space. The authors therefore propose a new piezometric method for measuring the local intensity of ultrasound and for calibrating the other acoustic probes. The method is based on balancing the radiation pressure on the open end of a cylindrical tube immersed in the irradiated liquid, and measuring the balancing pressure with a manometer. The method is illustrated in Figure 1 of the enclosure, and details of the piezometric probe are shown in Figure 2. When an ocular micrometer is used to read the manometer, the errors of the method do not exceed 10%. Orig. art. has: 6 figures, 5 formulas, and 1 table.

ASSOCIATION: None

SUBMITTED 11May61

ENCL: 02

SUB CODE: GP

NR REF SOV: 009

OTHER: 012

Card 2/4

L 18219-65

ACCESSION NR: AT5001222

ENCLOSURE: 01

0

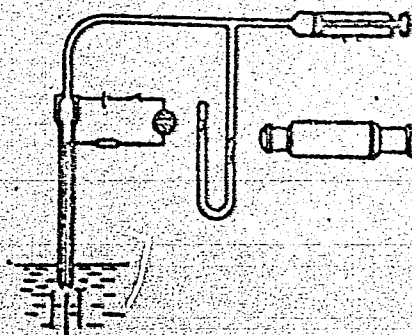


Fig. 1. Diagram of piezometric meter for  
ultrasound intensity

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L 18219-6

ACCESSION NR: AT5001222

ENCLOSURE: 02

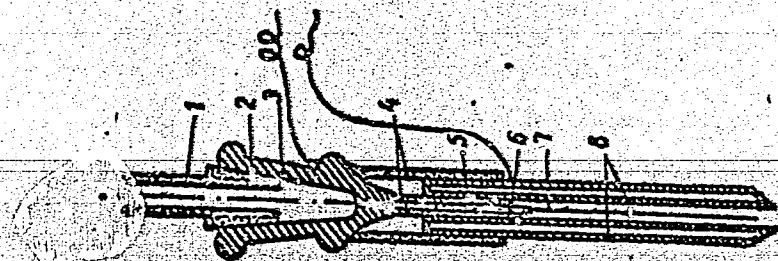


Fig. 2. Section through piezometric probe.  
1 - Glass tube, 2 - rubber stopper, 3 - metal sleeve,  
4 - rubber tubes, 5 - metal tube with hole, 6, 7 -  
steel needle, 8 - double-wall tube

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24 1600

S/263/62/000/014/003/006  
I007/I207

AUTHOR: . Kukoz, F. I., Kukoz, L. A. and Matsokin, V. I.

TITLE: Measurement of ultrasonic intensity in liquids

PERIODICAL: Referativnyy zhurnal, otdel'nyy vypusk. 32. Izmeritel'naya tekhnika, no. 14, 1962, 23, abstract 32.14.150. In collection Prom. primeneniye ul'trazvuka Kuybyshevsk. aviats. in-t, Kuybyshev, 1961, 49-56

TEXT: Apparatus and methods are described for measuring integral acoustic power and local intensity of an ultrasonic field, as well as for investigations on the influence of ultrasonic waves on electrochemical processes. Comparison is made of the results of measuring ultrasonic intensity by calorimetric, thermoelectric and piezometric methods (the latter developed by the authors), and the piezometric technique for calibration of ultrasonic probes is outlined. Measurements were carried out at a sound frequency of 0.7 to 1.5 Mcs and a sound intensity of 5 w/cm<sup>2</sup>. Maximum errors with the calorimetric methods amount to 20-30%; with the piezometric methods the error is only 10%. There are 6 figures and 21 references. AB

[Abstracter's note: Complete translation.]

Card 1/1

15.2120

L1742  
3/081/62/000/019/002/053  
B144/B180AUTHOR: Kukoz, L. A.TITLE: Electrical conductivity of glasses of the  $B_2O_3 - PbO - Bi_2O_3$  system

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 19, 1962, 55, abstract 19B218 (Tr. Novocherk. politekhn. in-ta, v. 118, 1961, 53-57)

TEXT: The specific electrical conductivity of the  $B_2O_3 - PbO - Bi_2O_3$  system was studied at 240 - 450°C. It was found to follow the rule  $\log K = a - b/T$ , where T is the absolute temperature. The temperature coefficient of the electrical conductivity depends on the composition of the glass; it increases with rising  $B_2O_3$  and falling  $Bi_2O_3$  content. It was found that the activation energy of the glass can be reduced appreciably by substituting the  $B_2O_3$  by  $Bi_2O_3$ . The resistivity, determined by extrapolation to 20°C, is comparable with that of quartz ( $10^{17}$  ohm·cm).  
[Abstracter's note: Complete translation.]

Card 1/1

NOTE  
S/076/62/036/004/003/012  
B101/B110

5.4700

AUTHORS: Kukoz, F. N., and Kukoz, L. A.

TITLE: The nature of audio-electrochemical phenomena

PERIODICAL: Zhurnal fizicheskoy khimii, v. 36, no. 4, 1962, 703-708

TEXT: Theoretical explanations are proposed for the experimental data of other scientists concerning audio-electrochemical effects. (1) If the electrodes are covered by gas bubbles, pulsation of these bubbles sets in, whereby the actual surface and polarization current density are changed. For the amplitude  $\Delta E$  of the potential change one derives:

$$\Delta E = b \log \left\{ (1 - m) / (1 - m) \left[ (P_0 \pm P_a) / (P_0 + \kappa \nu) \right]^{1/2} \right\} \quad (8)$$

where  $b$  = the constant of the Tafel equation for cathodic  $H_2$  liberation,  $m$  = occupancy of the electrode by gas bubbles,  $P_0$  = hydrostatic pressure,  $P_a$  = amplitude of the acoustic pressure,  $\nu$  = sound frequency and  $\kappa = 0.426 \text{ cm}^{-1} \cdot \text{sec}^{-1}$ . This equation agrees well with the experimental data of E. Yeager et al. (see below) for  $1/4 < m < 1/2$ . (2) For  $m < 1/4$  and  $m = 0$ , the values calculated from Eq. (8) are smaller by 1 to 2 orders of magnitude than the

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The nature of audio-electrochemical ...

S/076/62/036/004/003/012  
B101/B110

experimental values. For this low occupancy of the electrode by gas, periodic changes of the double layer of the electrode under the effect of sound vibrations are assumed and

$\Delta \epsilon = [8\pi\beta^2 RTI^2 (\Delta V)^2 / v^2 Dcz^2 F^2]^{1/4}$  is derived.  $\beta$  = transformation coefficient of acoustic energy into electric energy,  $I$  = intensity and  $v$  = velocity of acoustic waves,  $\Delta V$  = elementary volume,  $D$  = dielectric constant and  $c$  = concentration of the electrolyte,  $z$  = valency of the ions forming the ionic layer,  $F$  is taken from the Gouy-Stern equation for the electric capacity of electrodes in diluted electrolytes. This equation reproduces the experimental data for  $0 \leq m < 1/4$  very well. From it there follows a maximum of  $\Delta \epsilon$  at the point of zero charge. (3) With high current density and high occupancy ( $m > 1/2$ ), the audio-electrochemical effect is based on the periodic change of resistance. (4) On the basis of the audio-electrochemical effect, a method could be developed for the experimental determination of the zero-charge potential of some solid electrodes. Professor L. I. Antropov is thanked for discussions. There are 1 figure and 1 table. The two most important English-language references read as follows: E. Yeager, F. Hovorka, J. Electrochem. Soc., 98, 14, 1951; H. Dietrick, E. Yeager, J. Bugosh, F. Hovorka, J. Acoust.

Card 2/3

The nature of audio-electrochemical ...

S/076/62/036/004/003/012  
B101/3110

Soc. America, 25, 446, 1953.

ASSOCIATION: Novocherkasskiy politekhnicheskiy institut im. S.  
Ordzhonikizde (Novocherkassk Polytechnic Institute imeni  
S. Ordzhonikizde)

SUBMITTED: June 16, 1960

Card 3/3

X

KUKOZ, L.A.

Nature of the chemical action of ultrasound on aqueous solutions.  
Trudy NPI 133:129-140 '62. (MIRA 17:2)

S/884/62/134/000/002/004  
B101/B186

AUTHOR: Kukoz, L. A., Skalozubov, M. F.  
TITLE: Effect of ultrasonics on some properties of the nickel-oxide electrodes in alkaline batteries  
SOURCE: Novocherkassk. Politekhnicheskiy institut. Trudy. v. 134. 1962. Raboty kafedry tekhnologii elektrokhimicheskikh proizvodstv Khimiko-tekhnologicheskogo fakul'teta, 19 - 30

TEXT: This paper reports attempts made to increase the utilization factor of nickel in the  $Ni(OH)_2$  electrodes of alkaline batteries by the action of vibrations on the precipitation process of  $Ni(OH)_2$ . Nickel sulfate solution was stirred into alkali solution at 1450 rpm and exposed to ultrasonic vibrations of 27, 80, 340, or 1500 kc/sec for 1-30 min, or to mechanical vibrations of 100 cps. The intensities were 1.5 w/cm<sup>2</sup> at 27 and 80 kc/sec, 2-3 w/cm<sup>2</sup> at 340 kc/sec, and 5-6 w/cm<sup>2</sup> at 1500 kc/sec. The  $Ni(OH)_2$  precipitated was not pressed out. A mixture of 153 g precipitate, 34 g graphite, 3 ml NaOH, and 10 ml  $Ba(OH)_2$  was pressed into briquettes which

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S/884/62/134/000/002/004  
B101/B186

Effect of ultrasonics on some ...

were then shaped to laminas. The chemical and grain compositions of the nickel hydroxide, its specific volume, and the electrical properties of the laminas were tested and compared with standard specimens made without ultrasonic treatment. Results: The  $SO_4^{2-}$  ions washed out of the irradiated specimens more easily. The grain composition of  $Ni(OH)_2$  was changed by irradiation; data found for 10 min precipitation:

Conditions of precipitation	Grain composition, %				cm <sup>3</sup> /g
	+48 mesh	+100 mesh	+250 mesh	-250 mesh	
commercial control	29	37	22	17	0.64
vibrations	27	53	15	5	0.72
27 kc/sec	35	37	19	9	0.67
80 kc/sec	5	35	34	26	0.63
340 kc/sec	6	38	32	24	0.65
1500 kc/sec	23	42	21	15	0.52
	30	36	20	14	0.56

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S/884/62/134/000/002/004  
B101/B186

Effect of ultrasonics on some ...

The utilization factor of Ni increased on ultrasonic treatment. Its values in % were: 74 for commercial laminas; 56 for controls; 60 for laminas exposed to mechanical vibrations; and, for laminas treated ultrasonically, 78 at 27 kc/sec, 75 at 80 kc/sec, 70 at 340 kc/sec, and 69 at 1500 kc/sec. The value is lower for the controls than for the commercial laminas because the precipitated  $\text{Ni(OH)}_2$  was not pressed out.

Ultrasonic treatment of nickel hydroxide increases swelling by about 5-10 %, most intensely between 20 and 100 kc/sec. Optimum treatment time is 3 - 5 min. There are 6 figures and 3 tables.

Card 3/3

KHUCOL, L.A.; ANDREYEV, N.YA.; KHUCOL, F.I.

Quantitative evaluation of the effect of the precipitation conditions on the granulometric composition of nickelous hydroxide. Koll. zhur. 27 no. 2:227-232 Moscow 1985.

QKFA 11-85

L. Rostovskiy pedagogicheskiy institut.

L 22845-66 ENT(m)/EWP(t)/ENA(h) JD

ACC NR: AP6011019

SOURCE CODE: UR/0080/66/039/003/0705/0707

AUTHOR: Kukoz, F. I.; Kukoz, L. A.

ORG: Novocherkassk Polytechnical Institute im. S. Ordzhonikidze  
(Novocherkasskiy politekhnicheskiy institut)

TITLE: Obtaining poreless electrolytic deposits of platinum in an ultrasonic field

SOURCE: Zhurnal prikladnoy khimii, v. 39, no. 3, 1966, 705-707

TOPIC TAGS: electrolysis, electrolytic deposition, platinum deposition, copper coating, ultrasound application

ABSTRACT: Copper foils, 10x10x0.1 mm <sup>13</sup> in size, were plated with platinum in a phosphate electrolyte by means of ultrasound applied at 1.2 Mega-cycles and 8-10 w/cm<sup>2</sup> intensity to the tank bottom. Bright, almost poreless platinum deposits were obtained. Ultrasound, in addition to reducing the coating porosity, makes it possible to obtain a platinum layer 5-10 mm thick with a fine-grained structure. It also widens the range of current densities, electrolyte temperatures, and electrolysis duration and increases the yield by 100-400%. Orig. art. has: 2 figures. [ND]

SUB CODE: 13/ SUBM DATE: 21Mar64/ ORIG REF: 008/ OTH REF: 001/ADP/RES/4229  
Card 1/1

JEDLICKA, Jaroslav; KUKRALOVA, Helena

Endothoracic sarcoidosis. Sborn. lek. 59 no.1:9-20 Jan 57.

1. J. J., Katerinska 19, Praha 2.

(THORAX, dis.  
sarcoidosis (Cz))

(SARCOIDOSIS  
thorax (Cz))

KUKRALOVA, Helena

Prognosis in rupture of a tuberculous cavity. Sborn. lek. 61 no.9:  
258-263 Sept 59.

1. Plicni klinika fakulty vseobecneho lekarstvi University Karlovy  
v Praze, prednosta prof. dr. Jaroslav Jedlicka.  
(TUBERCULOSIS, PULMONARY, compl.)

KUKRALOVA, H.; JIROVA, M.

A contribution to contemporary advances in the treatment of military tuberculosis. Cas.lek.cesk 100 no.32/33:1032-1039 18 Ag '61.

1. Klinika tuberkulozy v Praze, prednosta prof. MUDr. J. Jedlicka.

(TUBERCULOSIS MILIARY ther)

KURUWA, D.

Fossibilities of selling window glass in Pakistan markets.

p. 26 (Hempro-Bilten. Vol. 6, no. 3/4, 1956. Beograd, Yugoslavia)

Monthly Index of East European Accessions (EEAI) IC. Vol. 7, no. 2,  
February 1958

NAVASARDYAN, G.S.; KUKROV, R.A.

Improving the heat insulation shielding of drying machinery.  
Tekst.prom. 23 no.1:20-22 Ja '63. (MIRA 16:2)

1. Nachal'nik Spetsial'nogo konstruktorskogo byuro po  
proyektirovaniyu sushil'nogo oborudovaniya dlya tekstil'noy  
i legkoy promyshlennosti (for Navasardyan). 2. Ispolnyayushchiy  
obyazannosti nachal'nika otdela avtomatizatsii Spetsial'nogo  
konstruktorskogo byuro po proyektirovaniyu sushil'nogo  
oborudovaniya dlya tekstil'noy i legkoy promyshlennosti  
(for Kukrov).

(Drying apparatus)



S/053/61/000/010/012/100  
A001/A101

3.24/0

AUTHORS: Zhdanov, A.P., Kuks, I.M., Skirda, N.V., Yakovlev, R.M.

TITLE: On the form of angular distribution of shower particles in jets of nucleon - nuclear origin

PERIODICAL: Referativnyy zhurnal, Fizika, no. 10, 1961, 95-96, abstract 10B493.  
("Tr. Mezhdunar. konferentsii po kosmich. lucham, 1959, v. 1", Moscow, AN SSSR, 1960, 87 - 92)

TEXT: The authors present preliminary results of investigating distributions of shower particles over polar and azimuth angles. The study of 65 jets generated in interactions of high-energy ( $E_0 = 10^{10} - 10^{13}$  eV) single-charged particles with nuclei of the emulsion has shown that: 1) Angular distributions of shower particles of these jets possess azimuthal symmetry; they are symmetrical relative to angle  $\pi/2$  in the center-of-mass system; 2) Multiplicity of anomalous jets can be apparently easily explained from the viewpoint of a single meson production, without resorting to the concept of intranuclear cascade.

VB

[Abstracter's note: Complete translation]

L. Dorman

Card 1/1

86887

S/056/60/039/005/001/051  
B029/B079

24.690°

**AUTHORS:** Zhdanov, A. P., Kuks, I. M., Skirda, N. V., Yakovlev, R.M.

**TITLE:** Multiple Production of Particles in the Interaction  
Between Nucleons of Energies  $> 10^{11}$  ev and Emulsion Nuclei

**PERIODICAL:** Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,  
Vol. 39, No. 5(11), pp. 1177 - 1185

**TEXT:** The authors analyzed 80 events of meson production observed in an emulsion chamber consisting of 180 layers of НИКФИ-Р (NIKFI-R) emulsions (area,  $10 \cdot 10 \text{ cm}^2$ ; thickness,  $400 \mu$ ). This chamber was irradiated for 9 hours at an altitude of 24 km. 120 nuclear interactions with more than five relativistic particles were found. In each of these stars, the number of thin ( $N_s$ ), gray ( $N_g$ ), and black ( $N_h$ ) tracks was counted, and by means of a goniometer the angle  $\theta_{1/2}$  was estimated, which included half the amount of relativistic particles. The grains in the tracks were counted by means of microscopes of the types МБИ-8 (MBI-8),

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Multiple Production of Particles in the  
Interaction Between Nucleons of Energies  
>  $10^{11}$  ev and Emulsion Nuclei

S/056/60/039/005/001/051  
B029/B079

MBI-8M (MBI-8M), and Ky& 4005 (Kuk 4005). The number  $l$  of nucleons of the target nucleus, which were involved in meson production, was calculated from the formulas  $N_g = (2l)^{1/4}(1 + l)\gamma_c^{1/2}$  and  $\gamma_c = [1 - (v_c/c)^2]^{-1/2}$  which are valid in Landau's hydrodynamic theory;  $v_c$  denotes the velocity of the center-of-mass system of the primary nucleon and of the nucleons of the nucleus. The correlation coefficient is  $r = -0.33 \pm 0.10$ . These results may be explained as follows: At energies of  $10^{11} \div 10^{12}$  ev, the factor  $\gamma_c$  is small, and considerable part of the energy of the primary nucleon may be transferred to the nucleus which is located behind the cylindrical tube. When the energy of the primary nucleon is increased, two processes will compete in meson production: The average multiplicity per nucleon increases, and the number of excited nucleons of the target nucleus decreases. For energies of up to  $10^{12}$  ev the second effect is stronger. The anisotropy in the angular distribution of the shower

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Multiple Production of Particles in the  
Interaction Between Nucleons of Energies

S/056/60/039/005/001/051  
B029/B079

$>10^{11}$  ev and Emulsion Nuclei

particles may be described by  $\kappa_1 = \log \tan \theta_1$ . For constant energies of the primary particle, the anisotropy of nucleon-nucleon showers and showers caused by central collisions of a primary nucleon with a heavy nucleus differ largely. D. S. Chernavskiy (Ref.7) has given a hypothesis concerning the existence of a special type of inhomogeneities in nucleon-nucleon collisions. The present paper leads to the following conclusions: 1) When studying interactions of high-energy nucleons (up to  $10^{12}$  ev) with heavy nuclei, one must take into account the expansions of the nuclear matter tube when striking this matter out of the nucleus. 2) The anisotropy in the angular distribution of nucleon-nuclear showers does not decrease with increasing number of excited nucleons. This holds, at least, for energies of up to  $5 \cdot 10^{12}$  ev. 3) In this energy range, the relative probability of accompanying showers as predicted by Chernavskiy does not exceed 0.04. The "accompanying tube" must not be investigated independently of the principal one. 4) The angular distributions of relativistic particles in the showers are homogeneous and can be

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Multiple Production of Particles in the  
Interaction Between Nucleons of Energies  
> 10<sup>11</sup> ev and Emulsion Nuclei

S/056/60/039/005/001/051  
B029/H079

exactly described by Gauss functions in the variables  $x = \log \tan \theta$ .  
The authors thank A. A. Blyudzin, D. M. Samoylovich, A. N. Charakhch'yan,  
V. P. Grigor'yev, Ye. L. Feynberg, and G. A. Milekhin for assistance  
and discussions. There are 8 references: 5 Soviet, 1 Dutch, and  
1 Italian.

ASSOCIATION: Radiyevyy institut Akademii nauk SSSR (Radium Institute  
of the Academy of Sciences USSR)

SUBMITTED: April 6, 1960

Card 4/4

S/120/61/000/001/012/062

E032/E114

AUTHORS: Zhdanov, A.P., and Kuksa, I.M.

TITLE: A Device for the Identification of Multiply-Charged Particles Stopping in Nuclear Emulsions

PERIODICAL: Pribory i tekhnika eksperimenta, 1961, No.1, pp.45-47

TEXT: A photoelectric device for the measurement of the width of charged particle tracks is described. The device is based on the ordinary biological microscope M5M-3 (MBI-3) with a special stage and the M $\Phi$ -1 (MF-1) attachment. Fig.1 illustrates the optics of the device. After passing through the objective, light rays from the object enter either the eyepiece of the attachment so that the position of the track can be observed visually or are reflected by the mirror 3 into the slit of a photomultiplier. The plane of observation and the plane of the photomultiplier slit are optically conjugate and the cross wire in the plane of observation coincides with the position of the photomultiplier slit on the real image plane. The mirror 3 is adjustable with the aid of the magnet M and is used to displace the image of the track relative to the slit. The electromagnet is mains operated and the

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S/120/61/000/001/012/062  
EO32/E114

A Device for the Identification of Multiply-Charged Particles  
Stopping in Nuclear Emulsions

windings on the electromagnets include crystal diodes so that the image of the track can be periodically displaced relative to the slit at a repetition frequency of 100 cps. The effective slit size on the plane of the emulsion is  $0.15 \times 6 \mu^2$  while the width of the band "examined" by the slit while the mirror is vibrating is  $4 \mu$ . The basic idea on which the measurement of the halfwidth of the track is based consists in the transformation of the photo-multiplier pulses into rectangular pulses of fixed amplitude and a length equal to the halfwidth of the photomultiplier pulse. The circuit employed is shown in Fig.2. The 100 cps voltage pulses from the anode of the photomultiplier represent the form of the transverse profile of the track. These pulses are amplified by an amplifier mounted on the photomultiplier container 6H3P (6N3P) tubes and two additional amplification stages 6Z1P (6Zh1P) and 6P1P (6P1P). Negative voltage pulses (some tens of volts) are then fed through a limiter to the control grid of the squaring tube 6Z4 (6Zh4). The discriminator (in the dashed box in Fig.2) is

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S/120/61/000/001/012/062  
E032/E114

A Device for the Identification of Multiply-Charged Particles  
Stopping in Nuclear Emulsions

similar to that described by I.M. Kuks in Ref.3. The discriminator threshold is set up by the 47 kohm potentiometer and is independent of the magnitude of the signal and always corresponds to one half of its amplitude. For this reason the length of the pulse at the output of the discriminator is equal to the halfwidth of the pulse at its input. The time average of the signal at the anode of the squaring valve 6Zh4 is shown on an output meter. Tests have shown that changes in the amplitude of the signal at the input of the discriminator in the range 20-60 V produce a change of not more than 2% in the output meter M1 (M1). Fig.3 shows the results obtained for Li and H tracks (track width as a function of residual range, 30 divisions = 1  $\mu$  on the vertical axis; the residual range is in microns along the horizontal axis). Lithium hammer tracks and proton tracks identified by other methods, and having dip angles smaller than  $7^\circ$ , were used.

There are 3 figures and 3 references: 2 Soviet and 1 non-Soviet.  
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S/120/61/000/001/012/062

A Device for the Identification... E032/E114

ASSOCIATION: Radiyevyy institut AN SSSR (Radium Institute,  
AS USSR)

SUBMITTED: February 28, 1960

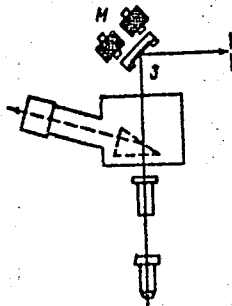


Fig. 1

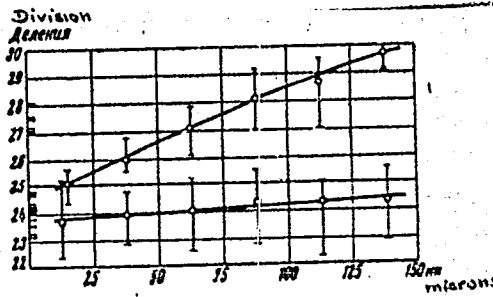


Fig. 3

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KUKS, I.M.

Clipping circuit with a clipping threshold proportional to the amplitude of the effective pulses. Prib. i tekhn. eksp. 6 no.1: 98-99 Ja-F '61. (MIRA 14:9)

1. Radiyevyy institut AN SSSR.  
(Pulse techniques (Electronics))

37546  
S/048/62/026/005/010/022  
B108/B104

A45 12  
AUTHORS: Zhdanov, A. P., and Kuks, I. M.  
TITLE: Particularities of the angular distributions of relativistic particles in  $\alpha$ -nuclear showers  
PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 5, 1962, 618-621

TEXT: In the coordinates  $x_i = \log \tan \vartheta_i$ , most nucleon-nucleus showers have a Gaussian angular distribution. An inhomogeneous distribution of  $\alpha$ -nuclear showers would prove that the processes of meson emission from excited systems are not interdependent. 28 inelastic scattering events ( $\vartheta_c > 3$ ,  $n_s > 25$ ) of alphas and nuclei of a photoemulsion were studied. These showers can be divided into three groups: (1) nucleon-nucleus showers with Gaussian distribution; (2) showers with one or two particles collimated in the direction of the primary alpha; without such particles, the distribution of the remaining showers would be as Gaussian as that of the showers of group (1); (3) showers with a distribution indicating super-

Card 1/2

Particularities of the angular...

S/048/62/026/005/010/022  
B108/B104

position of two Gaussian distributions with different statistical weights and different maxima. A close correlation between the polar and azimuthal angles has been established, which is probably related to the law of conservation of transverse momentum of the system of particles. There are 2 figures and 1 table.

Card 2/2

KUKS, I.M.

System for determining the energy threshold of sensitivity of  
AgBr microcrystals to charged particles. Zhur.nauch. i prikl.fot.  
i kin. 9 no. 6:458-459 N-D '64. (MIRA 18:1)

AUTHOR: ~~Kuks, L. M.~~ SCV/140-58-4-15/30

TITLE: On Some Properties of the Solutions of Non-Linear Equations of Elliptic Type (O nekotorykh svoystvakh resheniy nelineynykh uravneniy ellipticheskogo tipa)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika, 1958, Nr 4, pp 131-139 (USSR)

ABSTRACT: The author considers the second order partial differential equation

$$(1) F(x, z) = F(x_1, x_2; z, z_1, z_2, z_{11}, z_{12}, z_{22}) = 0,$$

where  $x_1, x_2$  are the independent variables,  $z$  - unknown function,

$$z_i = \frac{\partial z}{\partial x_i}, \quad z_{ik} = \frac{\partial^2 z}{\partial x_i \partial x_k}. \quad \text{Let further } F_{ik} = \frac{\partial F}{\partial z_i \partial z_k} \quad \text{and let}$$

the form  $F_{11} \xi_1^2 + 2F_{12} \xi_1 \xi_2 + F_{22} \xi_2^2$  be definite (an absolutely elliptic system [Ref 1]).

Theorem: In the domain  $D$  with the boundary  $S$  let  $v$  be the solution of (1). Let  $u$  be a two times continuously differentiable function for which  $F(X, u) > 0$ . Let further  $u|_S = v|_S$ . Let

$$A_1 = \frac{1}{2} \sum_{k=1}^2 \frac{\partial}{\partial x_k} \left( \frac{\partial F}{\partial z_{k1}} \right) - \frac{1}{2} \frac{\partial F}{\partial z_1} + B_1 \quad (l=1,2)$$

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On Some Properties of the Solutions of Non-Linear Equations of Elliptic Type SOV/140-58-4-15/30

$$R = \frac{\partial B_1}{\partial x_1} + \frac{\partial B_2}{\partial x_2} - \frac{\partial F}{\partial z},$$

where in the derivatives with respect to  $z, z_i = z_{ik}$  instead of  $z$  there is put the expression  $v + \theta(u-v)$ ,  $0 \leq \theta \leq 1$  and  $B_1$  and  $B_2$  are continuous functions in  $D$ , the derivatives  $\frac{\partial B_1}{\partial x_1}, \frac{\partial B_2}{\partial x_2}$  of which are piecewise continuous. If under these conditions

$$\begin{vmatrix} \frac{\partial F}{\partial z_{11}} & \frac{\partial F}{\partial z_{12}} & A_1 \\ \frac{\partial F}{\partial z_{12}} & \frac{\partial F}{\partial z_{22}} & A_2 \\ A_1 & A_2 & R \end{vmatrix} > 0,$$

then  $u \leq v$ .

The second theorem contains the principle of Phragmen-Lindelöf for the equation

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$$F(X, z) \equiv \sum_{i, k=1}^2 \frac{\partial}{\partial x_i} (A_{ik} \frac{\partial z}{\partial x_k}) + f(X, z) = 0.$$

Four further theorems are of the type of Sturm and base on the generalization of the identity of Picone [Ref 6]. The results are used for the investigation of the uniqueness of the solution of the Dirichlet problem. The author's formulations as well as misprints easily lead to misunderstandings.

There are 11 references, 6 of which are Soviet, 3 Italian, 1 Roumanian, and 1 American.

ASSOCIATION: L'vovskiy gosudarstvennyy universitet imeni Ivana Franko (L'vov State University imeni Ivan Franko)

SUBMITTED: January 31, 1958

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16(1)

AUTHOR:

Kuks, L. M.

SOV/140-59-3-16/22

TITLE:

Some Geometric Marks for the Uniqueness of the Solution of the Dirichlet Problem for Strongly Elliptic Systems of Differential Equations With Partial Derivatives of Second Order

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika, 1959, Nr 3, pp 168-172 (USSR)

ABSTRACT:

In the domain D with the boundary S the author considers the system

$$(1) \quad Lu \equiv (Au_x + Bu_y)_x + (Bu_x + Cu_y)_y + A_1 u_x + B_1 u_y + C_1 u = 0$$

and the selfadjoint elliptic or parabolic equation

$$(2) \quad Tv \equiv (\theta v_x + \tau v_y)_x + (\tau v_x + \zeta v_y)_y + kv = 0.$$

It is assumed that A, B, C, A<sub>1</sub>, B<sub>1</sub>, C<sub>1</sub> are continuous real quadratic matrices of the order n, u = (u<sub>1</sub>, u<sub>2</sub>, ..., u<sub>n</sub>), and θ, τ, ζ, θ<sub>x</sub>, τ<sub>x</sub>, τ<sub>y</sub>, ζ<sub>y</sub>, k are bounded continuous functions.

Theorem: If in D it holds

$$\eta A \eta + \eta B \xi + \xi B \eta + \xi C \xi - 2\theta \eta - 2\xi \tau \eta - \xi \zeta \xi \geq 0$$

$$\eta k \eta + \frac{1}{2} \eta (A_{1x} + B_{1y} - 2C_1) \eta \geq 0,$$

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Some Geometric Marks for the Uniqueness of the Solution of the Dirichlet Problem for Strongly Elliptic Systems of Differential Equations With Partial Derivatives of Second Order SOV/140-59-3-16/22

and if (1) has a solution  $u$ ,  $u|_S = 0$ , which does not vanish identically, then the ratios  $\frac{u_i}{v}$  ( $i=1,2,\dots,n$ ), where  $v$  is a solution of (2), satisfy identically the pair of equations

$$\theta \frac{\partial \varphi}{\partial x} + \tau \frac{\partial \varphi}{\partial y} = 0$$

$$t \frac{\partial \varphi}{\partial x} + \zeta \frac{\partial \varphi}{\partial y} = 0.$$

The theorem is used in order to get marks for the uniqueness of the solution of (1). It is stated: If the boundary of  $D$  does not consist only of characteristics of (2) and if (2) in  $D$  has a solution vanishing not identically, then in  $D$  also the uniqueness of the solution of the Dirichlet problem is guaranteed for (1).

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The author thanks V.Ya.Skorobogat'ko for the scientific guidance and Ya.B.Lopatinskiy and B.R.Lavruk for advice.  
There are 5 references, 2 of which are Soviet, and 3 Italian.

ASSOCIATION: L'vovskiy gosudarstvennyy universitet imeni Ivana Franko  
(L'vov State University imeni Ivan Franko)

SUBMITTED: May 4, 1958

Card 3/3

SKOROBOGAT'KO, V.Ya.; KUKS, L.M., otv. red.; KOTLYAROV, Yu.L., red.;  
SARANYUK, T.V., tekhn. red.

[Study of the qualitative theory of partial differential  
equations] Issledovanie po kachestvennoi teorii dif-  
ferentsial'nykh uravnenii s chastnymi proizvodnymi. L'vov,  
Izd-vo L'vovskogo univ., 1961. 124 p. (MIRA 15:4)  
(Differential equations, Partial)

S/140/61/000/032/005/009  
G111/G222

AUTHOR: Kuks, L.M.

TITLE: On regions of solvability of the first boundary value problem for strongly elliptic systems of differential equations

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika, no.2, 1961, 90-99

TEXT: On October 30, 1959 the author reported about the content of the present paper in the seminar of Ya.B.Lopatinskiy on differential equations at the State University im.Iv.Franko.

For a class of systems satisfying the condition (E) (Ref.2: M.I.Vishik, O sil'no ellipticheskikh sistemakh differentsial'nykh uravneniy [On strongly elliptic systems of differential equations ], Matem.sb.,vol.29 (71):3, 615-676, 1951) the author gives solvability conditions which lead to the conditions of V.Ya.Skorbogat'ko (Ref.4: Ob oblastiakh razreshimosti zadachi Dirikhle dlya samosopryazhennykh uravneniy ellipticheskogo tipa [ On regions of solvability of the Dirichlet problem for selfadjoint equations of elliptic type ] U M Zh, vol.7, no.1, 94-95, 1955) for an equation so that it becomes possible to use the geometrical mark of Picone (Ref.3: Sul problema di Dirichlet per la piu Card 1/8

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C111/0222

generale equazione lineare ellittica autoaggiunta alle derivate del second'ordine. Rend.Acc.Lincol, v.20, p.331-338, 1941) and the theorem on the "inner diameter" of (Ref.4) for the question of the solvability of the first boundary value problem for strongly elliptic systems. The author points to the application of the results in the theory of nuclear reactors and in the theory of elasticity.

Let  $u = (u_1, \dots, u_N)$  be a solution of the strongly elliptic system

$$Lu \equiv \sum_{i=1}^n \frac{\partial}{\partial x_i} (A_i \frac{\partial u}{\partial x_i}) + 2 \sum_{i=1}^n B_i \frac{\partial u}{\partial x_i} + Cu = 0, \quad (1)$$

[Abstracter's note: In the original paper there is no numbering of the formulas ] where.

$$A_i = \begin{pmatrix} a_{11} & & & \\ & a_{12} & & \\ & & 0 & \\ & & & a_{NN} \end{pmatrix}, B_i = \begin{pmatrix} b_{11}^i & b_{12}^i & \dots & b_{1N}^i \\ b_{12}^i & b_{22}^i & \dots & b_{2N}^i \\ \dots & \dots & \dots & \dots \\ b_{1N}^i & b_{2N}^i & \dots & b_{NN}^i \end{pmatrix}, C = \begin{pmatrix} c_{11} & c_{12} & \dots & c_{1N} \\ c_{12} & c_{22} & \dots & c_{2N} \\ \dots & \dots & \dots & \dots \\ c_{1N} & c_{2N} & \dots & c_{NN} \end{pmatrix}, \quad (2)$$

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where the elements of the matrices are continuous in a region D of the  $x_1, \dots, x_n$ , and the index s over the matrix means that its symmetrical part is taken. It is stated that the first boundary value problem for (1) is solvable in D if in D there exist continuous functions  $\varphi_{ij}$  ( $1 \leq i \leq n, 1 \leq j \leq n$ ) so that the chain of the inequalities

$$-c_{11} + \sum_{i=1}^n \frac{\partial b_{11}^i}{\partial x_i} + \sum_{i=1}^n \frac{\partial \varphi_{11}}{\partial x_i} - \sum_{i=1}^n \frac{\varphi_{11}^2}{a_{11}} > 0,$$

$$\left( -c_{22} + \sum_{i=1}^n \frac{\partial b_{22}^i}{\partial x_i} + \sum_{i=1}^n \frac{\partial \varphi_{22}}{\partial x_i} - \sum_{i=1}^n \frac{\varphi_{22}^2}{a_{22}} \right) \left( -c_{11} + \sum_{i=1}^n \frac{\partial b_{11}^i}{\partial x_i} + \sum_{i=1}^n \frac{\partial \varphi_{11}}{\partial x_i} - \sum_{i=1}^n \frac{\varphi_{11}^2}{a_{11}} \right) - \left( -c_{12} + \sum_{i=1}^n \frac{\partial b_{12}^i}{\partial x_i} \right)^2 > 0. \quad (3)$$

is satisfied.

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Let  $u = (u_1, \dots, u_N)$  be a solution of the strongly elliptic system with constant coefficients

$$Lu \equiv \Delta^{2m} u + A_{2m-1} \Delta^{2m-1} u + A_{2m-2} \Delta^{2m-2} u + \dots + A_1 \Delta u + A_0 u = 0, \quad (4)$$

where

$$A_j = \begin{vmatrix} a_{j,11} & & & \\ & a_{j,22} & & 0 \\ & & \ddots & \\ 0 & & & a_{j,NN} \end{vmatrix} \quad (5)$$

The first boundary value problem for (4) is solvable in D if there exist  $\varphi_{ik}^j$  so that the inequalities

$$\frac{\partial \varphi_{i1}^j}{\partial x_1} + \dots + \frac{\partial \varphi_{in}^j}{\partial x_n} - (\varphi_{i1}^j)^2 - \dots - (\varphi_{in}^j)^2 > \frac{(a_{2j-1,ii+1})^2}{4} - (a_{2j-2,ii-1}) \quad (6)$$

$(1 \leq j \leq m, 1 \leq i \leq N)$

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are satisfied.

Let

$$M = \max_{(i,j)} \left[ \frac{(a_{2j-1,ii+1})^2}{4} - (a_{2j-2,ii-1}) \right]. \quad (6_1)$$

If the functions  $\varphi_k$  ( $k=1, \dots, n$ ) satisfy the inequality

$$\frac{\partial \varphi_1}{\partial x_1} + \dots + \frac{\partial \varphi_n}{\partial x_n} - \varphi_1^2 - \dots - \varphi_n^2 > M \quad (6_2)$$

then obviously all other inequalities are satisfied too.

Let

$$\check{C}_{mu} = (-1)^m \sum_{(l)} \frac{\delta^{mB(l_1, \dots, l_m; j_1, \dots, j_m)}(x) \frac{\partial^m u(x)}{\partial x_{j_1} \dots \partial x_{j_m}}}{\partial x_{l_1} \dots \partial x_{l_m}} \quad (7) \quad \checkmark$$

where the matrices  $B^{(i_1, \dots, i_m; j_1, \dots, j_m)}(x)$  are symmetric and in  $D$  they have bounded and continuous derivatives up to the  $m$ -th order;

$$B^{(i_1, \dots, i_m; j_1, \dots, j_m)}(x) = B^{(j_1, \dots, j_m; i_1, \dots, i_m)}(x).$$

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In the finite region D let  $\tilde{C}_m$  satisfy the condition (E) if

$$[\tilde{C}_m u, u]_D \geq A_m [(-1)^m \Delta^m u, u]_D, \quad (8)$$

where  $A_m$  is a positive constant. Let

$$K_m u = (-1)^m \frac{1}{2} \sum_{r(s)} \frac{\partial^m \bar{K}(s_1, \dots, s_m; r_1, \dots, r_m)(x) \frac{\partial^m u(x)}{\partial x_{r_1} \dots \partial x_{r_m}}}{\partial x_{s_1} \dots \partial x_{s_m}}, \quad (9)$$

where the matrices  $\bar{K}(\cdot)(x)$  are skew-symmetric. The author considers the system

$$L_{2m} u \equiv \sum_{t=0}^m (\tilde{C}_{m-t} + K_{m-t}) u = 0, \quad (10)$$

where all  $\tilde{C}_{m-t}$  satisfy the condition (E). The first boundary value problem for (10) is solvable if  $[L_{2m} u, u]_D > 0$ . But

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$$[L_{2m} u, u]_D = \sum_{t=0}^m \{ [C_{m-t} u, u]_D + [K_{m-t} u, u]_D \} \geq \sum_{t=0}^m A_{m-t} [(-1)^{m-t} \Delta^{m-t} u, u]_D \quad (11)$$

is so that the question leads to the results given above.  
The author gives a number of simple partially known (Ref.4) marks that there exist derivatives so that

$$\frac{\partial \varphi_1}{\partial x_1} + \dots + \frac{\partial \varphi_n}{\partial x_n} \geq M + \varphi_1^2 + \dots + \varphi_n^2 \quad (12)$$

is valid; therefrom there follow marks for the solvability of the first boundary value problem, e.g.

Mark 3: If D can be included into an n-dimensional cube the length of edges of which is  $< \frac{\sqrt{n}}{M}$  then the first boundary value problem for  $L_{2m}$  ✓

is solvable in D.

Mark 7: If D can be included into a cylinder of the height H and the radius R which satisfy

$$M = \left( \frac{2.4048}{R} \right)^2 + \left( \frac{\sqrt{n}}{H} \right)^2 \quad (13)$$

then the first boundary value problem for  $L_{2m}$  is solvable in D.

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It is pointed out that e.g. the mark 7 determines the critical magnitude of the nuclear reactors and that the equation

$$\Delta^2 w + \sigma^2 \Delta w + k^2 w = 0$$

for the stability of a plate in the elastical medium belongs to the considered classes of equations. ✓

The author mentions S.A.Chaplygin. There are 7 Soviet-bloc and 2 non-Soviet-bloc references.

ASSOCIATION: L'vovskiy gosudarstvennyy universitet im.I.Franko (L'vov State University im.I.Franko)

SUBMITTED: January 13, 1960

Card 8/8

KUKS, L.M.

Theorems in the qualitative theory of highly elliptic systems  
of the second order. Usp.mat.nauk 17 no.3:181-184 My-Je '62.  
(MIRA 15:12)

(Differential equations)

32809

16:3500

S/020/62/142/001/005/021  
C111/C444AUTHOR: Kuks, L. M.

TITLE: Sturm's theorem and the oscillation of the solution of strongly elliptic systems

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 1, 1962, 32-35

TEXT: Considered are the strongly elliptic systems

$$\sum_{i,j=1}^n \frac{\partial}{\partial x_i} \left( A_{ij}(x) \frac{\partial u}{\partial x_j} \right) + C(x) u = 0 \quad (1)$$

$$\sum_{i,j=1}^n \frac{\partial}{\partial x_i} \left( G_{ij}(x) \frac{\partial v}{\partial x_j} \right) + H(x) v = 0, \quad (2)$$

where  $A_{ij}(x) = A_{ji}(x)$ ,  $G_{ij}(x) = G_{ji}(x)$  are twice continuously differentiable,  $C(x)$  and  $H(x)$  are continuous real symmetric square matrices of order  $N$ , being defined in a domain  $D$ . One supposes that for every  $x \in D$  and for every column  $\xi \neq 0$  with the height  $nN$  the following

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Sturm's theorem and the . . .  
conditions are satisfied

$$\xi^* \alpha(x) \xi > 0, \xi^* Q(x) \xi > 0$$

where

$$\alpha(x) = \| A_{ij}(x) \|_{i,j=1}^n, \quad Q(x) = \| G_{ij}(x) \|_{i,j=1}^n.$$

First of all the author proves the theorem of Sturm: If in D the conditions

$$\xi^* (\alpha(x) - Q(x)) \xi \geq 0 \quad (3)$$

$$\eta^* (H(x) - C(c)) \eta \geq 0 \quad (4)$$

are satisfied, where the column  $\eta$  has the height N, and if there exists a solution  $u(x) \not\equiv 0$  of (1) vanishing on the boundary  $s$ , then the determinant of every square matrix  $V(x)$  of order N, for which

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S Sturm's theorem and the . . .

$$v^*(x) \left[ \sum_{j=1}^n G_{ij}(x) \frac{\partial v(x)}{\partial x_j} \right] - \left[ \sum_{j=1}^n \frac{\partial v^*(x)}{\partial x_j} G_{ij}(x) \right] v(x) \quad (i=1, \dots, n) \quad (5)$$

holds and for which the form

$$v^*(x) \left[ \sum_{i,j=1}^n \frac{\partial}{\partial x_i} \left( G_{ij}(x) \frac{\partial v(x)}{\partial x_j} \right) + H(x)v(x) \right] \quad (6)$$

is negative semidefinite, vanishes in at least one point of the domain D. Adjoining the author defines: the system (1) is called non-oscillating in D, if in every subdomain of D the first boundary value problem is uniquely solvable. X

Theorem 2: If in D there exist symmetric square matrices  $\phi_1(x), \dots, \phi_n(x)$  of order N, being continuous in all arguments, and continuously differentiable with respect to  $x_1, x_2, \dots, x_n$  the matrix

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Sturm's theorem and the . . .

$$-c(x) + \sum_{j=1}^n \frac{\partial \phi_j(x)}{\partial x_j} - \phi^*(x) \mathcal{A}^{-1}(x) \phi(x) \quad (11)$$

where  $\phi^*(x) = (\phi_1(x), \dots, \phi_n(x))$  being positive definite, then (1) is non-oscillating in D.

For the single elliptic equation

$$L(u) = \sum_{i,j=1}^n \frac{\partial}{\partial x_i} \left( a_{ij}(x) \frac{\partial u}{\partial x_j} \right) + c(x)u = 0, \quad a_{ij}(x) = a_{ji}(x) \quad (12)$$

there holds

Theorem 3: In order the solution of (12) to be non-oscillating in D, it is necessary and sufficient that there exists in D a positive twice continuously differentiable function  $v(x)$  such that  $L(v) \leq 0$ .

The author mentions: M. I. Yel'shin, V. Ya. Skorobogat'ko and Lyapunov.

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C111/C444

S Sturm's theorem and the . . .

There are 6 Soviet-bloc and 4 non-Soviet-bloc references. The 3 references to English-language publications read as follows: P. Hartman, A Wintner, Proc. Am. Math. Soc., 6, no. 6(1955); G. Bliss, J. Schoenberg, Am. J. Math., 53, 781 (1931); R. L. Sternberg, Duke Math. J., 19, no. 2, 311(1952).

PRESENTED: July 26, 1961, by I. G. Petrovskiy, Academician

SUBMITTED: July 22, 1961

X

Card 5/5

KUKSA, A.V.

Investigating the character of ingot mold wall deformations  
with the use of a plexiglas model. Izv. vys. ucheb. zav.;  
chern. met. 8 no.5:45-50 '65. (MIRA 18:5)

1. Volgogradskiy politekhnicheskii institut.

KUKSA, Genek

Problems of determining rest periods and their inclusion in the output standards. Prace mzda 11 no.6:259-263 Jo '63.

1. Vyrobní hospodarska jednotka Svit, Gottwaldov.

KUKSA, Genek

Bonus regulations in the shoe industry. Prace mzda 11  
no.10:456-459 '63.

1. Vyrobní hospodarska jednotka Svit, Gottwaldov.

KUKSA, Genek

Problems of determination of the rest time standards and their inclusion in the output standards. Kozarstvi 13 no.9: 281-284 S '63.

1. Vyrobní hospodarska jednotka Svit, Gottwaldov.

KUKSA, Genek, promovany ekonom

Problems of determining the rest periods and their inclusion  
in output standards. Prace mzda 11 no.9:415-419 S'63

1. Vyrobní hospodarska jednotka Svit, Gořtvaldov.

KUKSA, Cenek

Importance of the improvement of qualification for raising the  
labor productivity. Prace mzda 12 no. 4:155-158 Ap '64.

1. Vyrobní hospodarska jednotka Svit, Gottwaldov.



AUTHOR: Kuksa, I., senior foreman SOV/27-59-1-25/31

TITLE: These are the Hands of Diligent Young People (Vot eti ruki, ruki moločyye)

PERIODICAL: Professional'no-tehnicheskoye obrazovaniye, 1959, Nr 1, p 32 (USSR)

ABSTRACT: In honor of the 21st Congress of the USSR Communist Party, the students of the Sharlykskoye uchilishche mekhanizatsii sel'skogo khozyaystva Nr 12 (Sharlykskoye Agricultural Mechanization School Nr 12) agreed to increase the productivity of their work.

Card 1/1

KUKSA, I.N.

Development of scientific and experimental works on the  
biological fixation of atmospheric nitrogen. Izv. AN SSSR.  
Ser. biol. 31 no.1:170-174 Ja-F '66.

(MIRA 19:1)

