KONOBEYEVSKIY, S. T.

PA 36T76

USSR/Physics Nov 1947
Structural Analysis
X-ray Inspection

"Thirty Years of Soviet X-ray Technique and Structural Analysis," S. T. Konobeyevskiy, Corresponding Member of the Academy of Sciences of the USSR, 9 pp

"Zavodskaya Laboratoriya" Vol XIII, No 11

The first attempt to study the structure of crystals by means of X-rays was in 1912. The development of this branch of science is a history of Soviet scientific development. Discusses briefly the techniques used in Russia, institutions and laboratories which figured in the development of this science and names of the more important scientists who contributed to the Soviet store of knowledge on the subject of X-ray analysis of materials.

16 36T76

2

CA

Texture of condensed metal films. M. M. Umanskii and S. T. Konobeevskii. (Moscow State Univ.). *Zhur. Eksper. Teoret. Fiz.* 17, 408-18(1947).—Films of Zn produced by condensation from a mol. beam of evapd. metal show a peculiar structure, with different parts of the beam reflecting specularly under different angles. This property is linked with a certain pattern of distribution of the orientation of the crystallites. By reflection diffractograms, this orientation varies regularly over the surface of the film, depending on the angle β between the normal at the given point and the direction of the mol. beam. Axial-symmetrical orientation with the [0001] axis coinciding with the normal to the surface is found only at the point of normal incidence of the beam ($\beta = 0$). In all other points, the (100) plane lies in the plane comprising the normal to the point and the mol. beam; the direction of the hexagonal axis [001] lies in that plane, forming a certain angle $\Delta\theta$ with the beam, depending on the angle β at that point. The angle between the hexagonal axis and the normal is greater than β. The crystallite orientation of the whole of the specimen possesses axial symmetry. The observed pattern cannot be due to a max. growth of crystals in the direction of the mol. beam as this would result in the [100] direction coinciding with the beam. An explanation lies in a sort of "refraction" of the beam near the surface of the beam, brought about by frequent reflections, i.e. evapns. of atoms having hit the surface, and by elastic collisions, creating an atm. of crystal germs at some distance from the surface. Formulation of this "refraction" leads to the relation $\operatorname{tg}\Delta\theta = \operatorname{tg}\theta_0(1-\epsilon)/(\operatorname{tg}^2\theta_0 + \epsilon)$, where ϵ = ratio of the ds. at a distance from the film and near its surface, θ = angle between [001] and the normal to the surface, and $\theta_0 = \theta - \Delta\theta$. This relation accounts for the observed relation between $\Delta\theta$ and θ, but not for the particular position of the (100) plane.

N. Thon

USSR/Physics Dec 1947
X-Ray Analysis
X-Ray Spectra

"X-Ray Structure Analysis and X-Ray Spectroscopy for Thirty Years," S. T. Konobeyevskiy, 16 pp

"Uspekhi Fiz. Nauk" Vol XXXIII, No 4

Written in honor of thirtieth year of Soviet physics. Briefly describes advances in fields of X-ray analyses of structure as well as X-ray spectroscopy. Mentions names of scientists responsible for greatest developments in this field including: Yu. V. Vul'f on diffraction of X-rays, G. I. Petrenko, G. S. Zhdanov, and others.

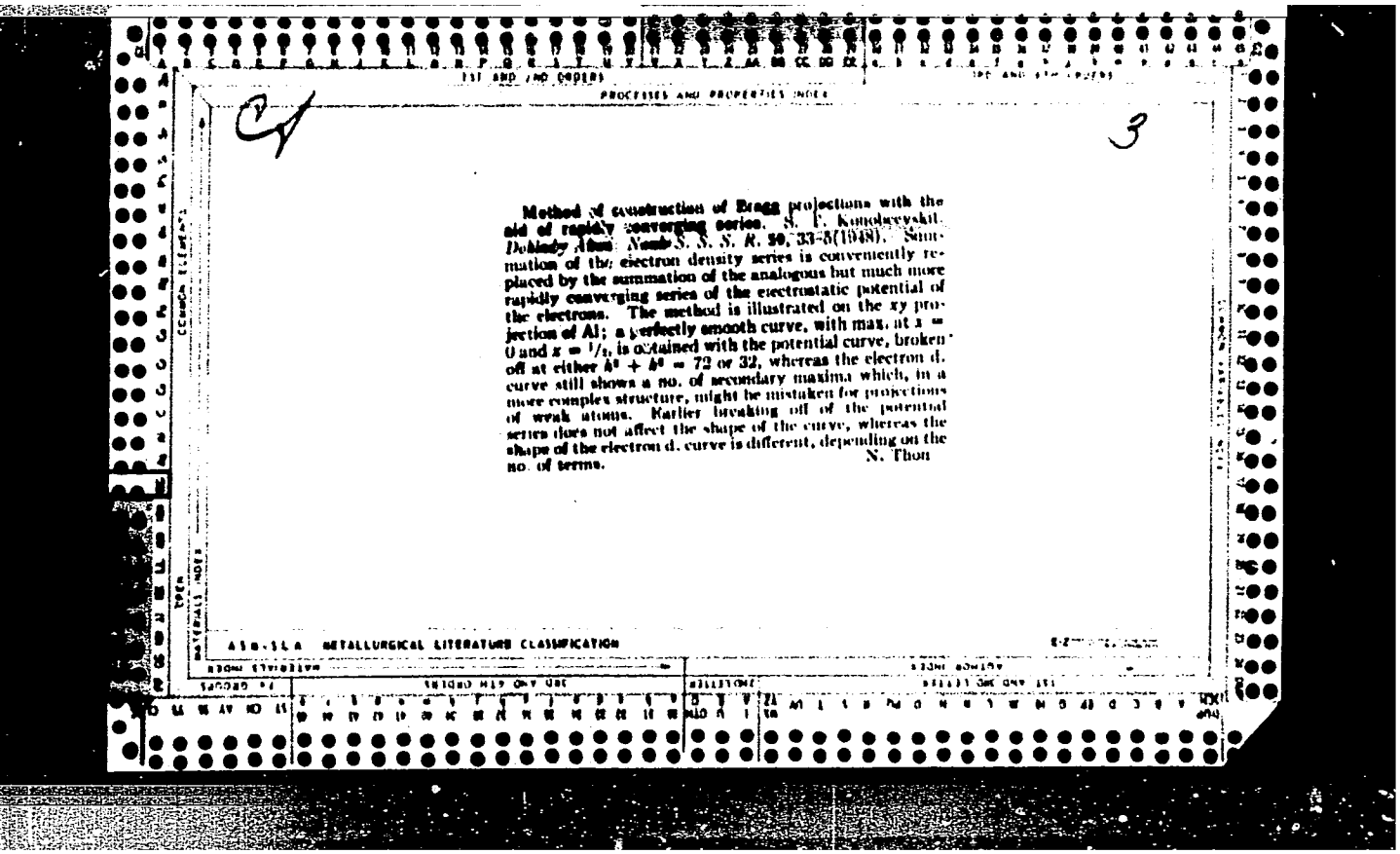
LC 53T96

KONOBEEVSKIY, S. T.

Crystallography

Solid phases of variable composition and fundamental principles of their structure. Izv. Sekt. fiz.-khim. anal. 16, no. 4, 1948.

9. **Monthly List of Russian Accessions**, Library of Congress, May 1953. Unclassified.



PROCESSES AND PROPERTIES INDEX

Method of construction of Bragg projections with the aid of rapidly converging series. S. F. Kondrevskii. *Doklady Akad. Nauk S. S. S. R.* 59, 33-5(1948). Summation of the electron density series is conveniently replaced by the summation of the analogous but much more rapidly converging series of the electrostatic potential of the electrons. The method is illustrated on the xy projection of Al; a perfectly smooth curve, with max. at x = 0 and x = 1/2, is obtained with the potential curve, broken off at either $h^2 + k^2 = 72$ or 32, whereas the electron d. curve still shows a no. of secondary maxima which, in a more complex structure, might be mistaken for projections of weak atoms. Earlier breaking off of the potential series does not affect the shape of the curve, whereas the shape of the electron d. curve is different, depending on the no. of terms.
N. Thon

A58-51A METALLURGICAL LITERATURE CLASSIFICATION

C4

Possibilities of studying experimentally the shape of an atom in a crystalline lattice. B. T. Kasarovskiĭ (M. V. Lomonosov State Univ., Moscow). *Trudy Vsesoyuz. Fiz.-Khim. Konf., Inst. Obshchei i Neorg. Khim., Akad. Nauk S.S.S.R.* 10, 19-28(1949).—If atoms be considered as spherically sym. in the free state (as in the case of true metals), then any changes in the lattice will affect either the radial or the angular distribution. The second is the more likely. The effect of the neighbors on the atom is such that its symmetry decreases in order to conform with the symmetry of the lattice node. This induces anisotropy of the atomic factor in a way that the denser directions within the atom lower the brightness of x-rays reflected by planes to which the normal lines are parallel to these directions. A math. analysis is given supporting the above considerations. M. Housh

KONOBEYEVSKIY, S. T.

PA 193T89

USSR/Nuclear Physics - Crystallography Sep 51

"Anisotropy of Atomic Scattering Factor of X-Rays in Crystals of Aluminum and of Diamond," S. T. Konobeyevskiy, K. P. Mamedov, Moscow State U

"Zhur Eksper. i Teoret Fiz" Vol XXI, No 9, pp 953-963

Authors show that a comparison of some diffractive maxima of crystal is sufficient for detn of atomic form in cryst pattern. In Al atoms a rarefaction of electron cloud was found along octahedron and a condensation along cube. In diamond "forbidden" interferences 222 and 622 were found and 420 and

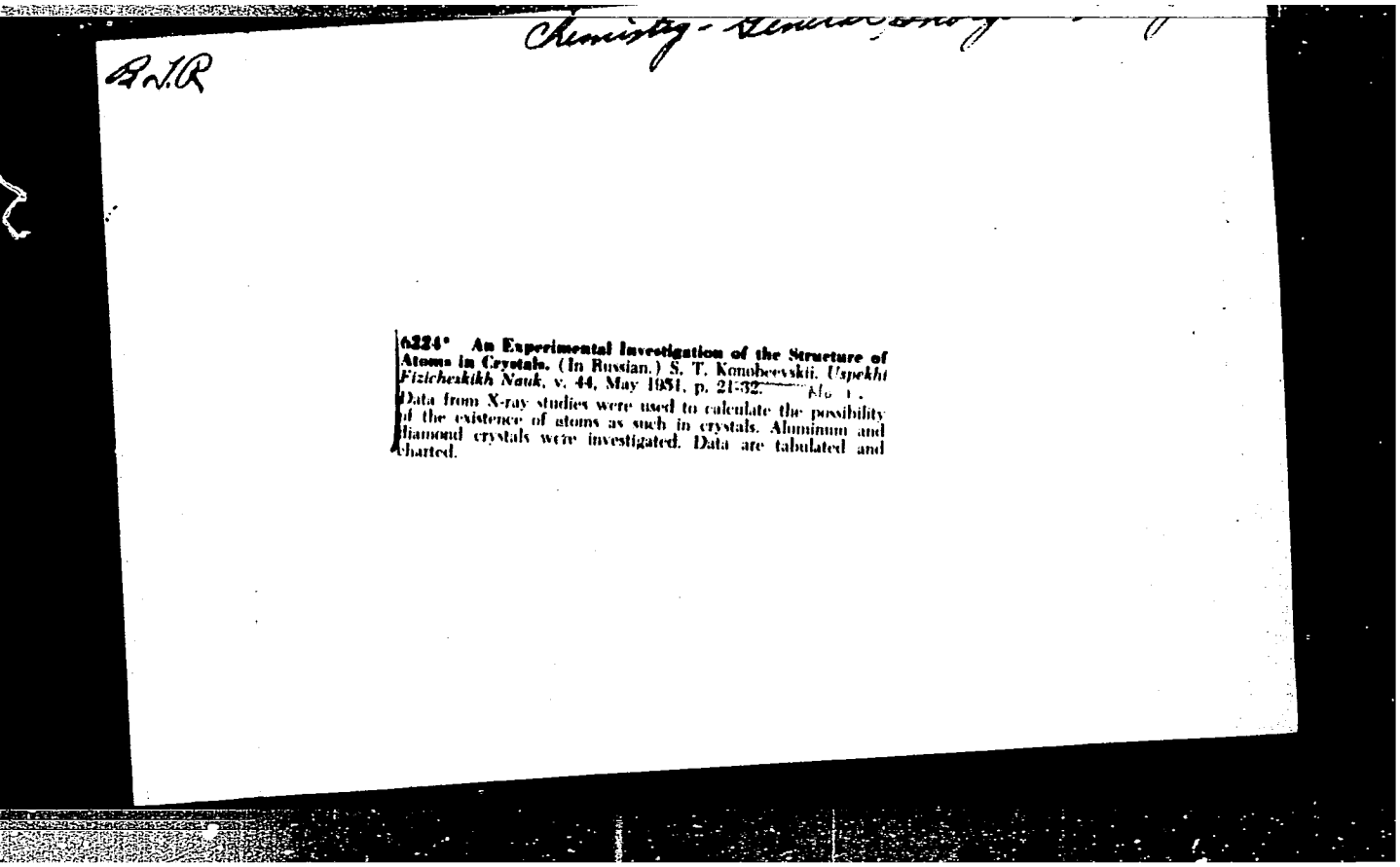
LC 193T89

USSR/Nuclear Physics - Crystallography (Contd) Sep 51

422 interferences were absent. This indicates that electron structure of diamond is similar to that of cristobalite. Submitted 2 Oct 50.

(CA 47 no.17:8507 '53)

LC 193T89



Chemistry - Atomic Structure

USSR

6224* **An Experimental Investigation of the Structure of Atoms in Crystals.** (In Russian.) S. T. Konobeevskii. *Uspekhi Fizicheskikh Nauk*, v. 44, May 1951, p. 21-32. No 1.

Data from X-ray studies were used to calculate the possibility of the existence of atoms as such in crystals. Aluminum and diamond crystals were investigated. Data are tabulated and charted.

KONOBEYEVSKIY, S. T.

183T87

USSR/Physics - Crystallography May 51

"Investigation of the Structure of Atoms in Crystals by the Method of Probes," S. T. Konobeyevskiy

"Uspekhi Fiz Nauk" Vol XLIX, No 1, pp 21-32

The old question of whether there are atoms in crystals can be rephrased to ask: Do atoms in crystal preserve their individuality, or can individual atoms be distinguished in crystal? This question deserves more detailed consideration than given previously. Investigates variation in relative intensity of crystal planes with thickness of aluminum filter.

183T87

KONOBEYEVSKIY, S. T.

USSR/Metallurgy - Meetings

Aug 52

"Scientific Sessions, Conferences, and Meetings -- Meeting on the Theory of Metal Alloys," N. Kh. Abrikosov, Dr Chem Sci

Vest Ak Nauk, No 8, p 112

At a meeting at the Inst of General and Inorg Chemistry imeni N. S. Kurnakov, Acad Sci USSR, concerning metal alloys, N. V. Agayev, Corr Mem Acad Sci USSR, presented a report "Periodic Law of D. I. Mendeleyev -- Basis of the Science of Metal Alloys." Also read were reports S. T. Konobeyevskiy, Corr Mem Acad Sci USSR, on "The Nature of Combinations in Metals," and by Prof I. . Kornilov, on "Metal Chemistry and Some of Its Problems." Plans were discussed for publication of a monograph and reference book on metal alloys.

PA 252T47

KONOBEYEVSKIY, S. T.

"Equilibrium Diagrams of Certain Systems on Plutonium Bases".

Head of Physics Faculty, Moscoe State University

Report appearing in 1st Volume of "Session of The Academy of Sciences USSR on the Peaceful Use of Atomic Energy, 1-5 July 1955", Publishing House of Academy of Sciences USSR, 1955.

SO: Sum 728, 28 Nov 1955.

KONOBEYEVSKIY, S.T.; KUTAYTSEV, V.I.; PRAVDYUK, N.F.

[Effect of radiation on the structure and properties of construction materials] Vliianie obluchenila na strukturu i svoistva konstuktsionnykh materialov; doklady, predstavlennye SSSR na Mezhdunarodnuiu konferentsiiu po mirnomu ispol'zovaniiu atomnoi energii. Moskva, 1955. 10 p.
(MLRA 9:7)

1. Chlen-korrespondent Akademii nauk SSSR (for Konobeyevskiy)
(Building materials) (Radiation)

Copper, iron, nickel and aluminum were annealed at 700 C for the first two, 800 C for the third, and 400 C for the last, and subjected at temperatures of 250-300 C to neutron integrated flux of 1.1-1.4 nvt. In general the metals became stronger, with reduced elongation, area reduction, and impact strength, but increased microhardness. The effect on aluminum was different, because the tempeature is above the aluminum recrystallization temperature. Grain size was increased during irradiation. Although the material properties usually changed in a way that is usually associated with cold working, the changes are in fact quate different: the larger grains showed neither slip lines nor twinning; nor was strength decreased as would be anticipated from the larger grain size. Zirconium similarly irradiated showed increase in strength and electrical resistivity. Grain size increased, but with some twinning and recrystallization. Various austenitic steels showed the same changes as iron, due to irradiation; no tendency to change to ferritic steel was observed, if plastic deformation was avoided.

KONOBEYEVSKIY, S.T.; PRAVDYUK, N.F.; KUTAYTSEV, V.I.

[Effect of radiation on the structure and properties of fissionable materials] Vliianie obluchenilia na strukturu i svoistva delia-shchikhsia materialov. Moskva, 1955. 14 p.

(Radioactive substances) (Radiation) (MIRA 14:6)

KONOBEYEVSKIY, S.T.

4051 AEC-tr-2435((Pt. 2) (p. 207-14))
PHASE DIAGRAMS OF SOME PLUTONIUM SYSTEMS. S. T. Konobeevsky [KonobeeVskii]. p. 207-14 of CONFERENCE OF THE ACADEMY OF SCIENCES OF THE USSR ON THE PEACEFUL USES OF ATOMIC ENERGY, JULY 1-5, 1955. SESSION OF THE DIVISION OF CHEMICAL SCIENCE. (Translation). 8p.

This paper was originally abstracted from the Russian and appeared in Nuclear Science Abstracts as NSA 9-7796.

KONOBEYEVSKIY, S. T.

"Equilibrium Diagrams of Certain Systems on Plutonium Bases," Sessiya Akademii Nauk SSSR, po Mirnomu Ispol'zovaniiu Atomnoi Energii (Zasedaniya Otdeleniya Khimicheskikh Nauk), 1955, pp 362-376,

By applying different research mathods (metallographic, X-ray diffraction, thermal,etc.) worked out for quantities ranging from 10 microgrammes to 100 milligrammes of a metal the binary diagrams of plutonium with a number of metals were studied. This paper describes briefly some of the properties of metallic plutonium. Given here is a thermographic recording of six plutonium phases and the magnetic susceptibility curve in the function of temperature. The equilibrium plutonium-beryllium diagram is described. There is one intermetallic compound $PuBe_{13}$, of a cubic lattice with a = 10.253 ± 0.002 kX which melts above temperature of 595°C, its composition being close to pure plutonium. There are two intermetallic compounds in the plutonium-lead system. The first forms in the region between 30 and 50% (at) Pb. The composition of the second is $PuPb_3$. The latter is of crystalline structure: cubic Cu_3Au type, a = 4.80 kX. The melting point of the first compound is 950°C, and of the second, 815°C. Three eutectics exist: the first is between plutonium and the first compound at 610°C and the second, at 800°C with an approximate 70% (at) Pb composition. Several equalibrium diagrams of plutonium with metals of the fourth period (transitional elements) of the Mendeleyev Table (V, Cr, Mn. Fe, Ni) are given in this report. The equilibrium diagrams of plutonium with vanadium and chromium are similar to each other and are of the simple eutectic type. Metallic compounds are absent in the alloys. The melting points of the eutectics are 625°C (vanadium alloy) and 615°C (chromium alloy). One metallic compound $PuMn_2$ exists in plutonium-manganese alloys. It has a cubic lattice of the Cu_2Mg type with a = 7.27 kX and a narrow solubility region (3%) Plutonium is soluble in Mn in small amounts. Two eutectic reactions occur; the first at 2.3% Mn and 510°C and the second at 50% Mn and 1000°C. The density and microhardness of a number of alloys have been measured.

KONOBEYEVSKIY, S.T. Pravkyuk, N.F., Kutaitsev, V.I.

"Effect of Irradiation on the Sturture and Properties of Fissionable Materials," International Conference on the Peaceful Uses of Atomic Energy, 1955, A/Conf.8/P/681 (U.S.S.R.)

"The Physical changes in uranium and an uranium alloy due to fast neutron flux at 1019 nvt was reported. Uranium foils lost strength and became brittle. During irradiation, the creep rate was higher by a factor 1.5 to 2.0 Cold rolled uranium showed considerable anisotropy in the value of electircal conductivity along and transverse to the rolling direction. Irradiation caused rolled uranium specimens to increase substantially along the rolling axis. Alloys of Mo with U Containing 6% and 9% MO-U alloy shows the same type transformation from heterogeneous to homogeneous appearance under the microscope due to irradiation, as due to thermal treating by cooling not too slowly from an initial temperature over 600 C." International Conference on the Peaceful Uses of Atomic Energy, 1955, a/Conf. 8/P/681 (U.S.S.R.), Effect of Irradiation on the Structure and Properties of Fissionable Materials.

KONOBEYEVSKIY, S.T.

USSR/ Physics - Strength of materials

Card 1/1 Pub. 124 - 3/30

Authors : Konobeyevskiy, S. T., Memb. Corresp., Acad of Sc., USSR

Title : Physical bases for the strength of materials

Periodical : Vest. AN SSSR 25/7, 15 - 22, Jul 1955

Abstract : Announcement is made about the introduction of a broad research program which comprises the most important problems connected with the strength of materials. The program calls for the development of physical theories regarding brittle and plastic deformation of solid bodies (mono- and poly-crystals as well as amorphous bodies); study of elementary problems of brittle rupture and plastic deformation from the view point of the geometrical process, kinetics and dynamics, diffusion mechanism of slow deformation (creep)and other physical phenomena connected with the strength of materials. Five references: 4 USSR and 1 English (1952-1954).

Institution : .....

Submitted : .....

KONOBEYEVSKIY, S. T.

USSR/Nuclear Physics - Nuclear Engineering and Power, C-8

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 34218

Author: Konobeyevskiy, S. T.

Institution: None

Title: On the Question of the Nature of the Radiation Damage in Fissionable Materials

Original Periodical: Atom. Energiya, 1956, No 2, 63-70

Abstract: A review is given of the theory of the radiation damage to materials irradiated by fast particles. An attempt is made to describe the processes of the phase conversions during neutron irradiation of fissionable materials with the aid of the diffusion equation. An expression is obtained thereby for the diffusion coefficient D. Examination is made of the possible result of the effect of thermal peaks on the structure of the $\alpha + \gamma$ eutectoid in annealed U-Mo alloy.

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KONOBEYEVSKIY, S.T.

Category : USSR/Solid State Physics - Structural Crystallography E-3

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3692

Author : Konobeyevskiy, S.T., Levitskiy, B.M., Martynyuk, Yu, A.
Title : New Method for X-ray Structural Investigation of Radioactive Material

Orig Pub : Zh. tekhn. fiziki, 1956, 26, No 4, 870-873

Abstract : A setup for the investigation of highly radioactive materials was constructed around a Norelco type ionization x-ray speatrometer. A beam of x-rays is incident on a flat specimen. The diffraction ray, passing through the entrance slit, is reflected by a monochromator and is recorded with a counter. The kinematic setup permits automatic recording of the x-ray pattern with a potentiometer over a range of Vul'f-Bragg angles from 0° to 45°, or else to plot the diffraction lines from the number of pulses counted by a mechanical counter. Lead shields 90 cm thick protect the counter from the radioactive radiation of the specimen. The monochromator used was a rock salt crystal, bent plastically by Johann's method. If the specimen is highly active it is possible to use a second order reflection from the monochromator, thus resulting in an increase of the sheilding. If the shielding is reinforced, the setup

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Category : USSR/Solid State Physics - Structural Crystallography E-3

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3692

can be used to investigate specimens with β and γ activities up to 100 millicurie.

Card : 2/2

KONOBEYEVSKIY, S.T.

70-4-1/16

AUTHOR: Konobeyevskiy, S.T.

TITLE: On the Presentation of the Atoms in Crystals by Symmetrical Figures. (O Predstavlenii atomov v kristallakh v vide simmetrichnykh figur).

PERIODICAL: Kristallografiya, 1957, Vol.2, Nr 4, pp.447-455 (USSR).

ABSTRACT: Theoretical paper. One of the principal limitations of modern high accuracy crystal analysis is uncertainty in the atomic scattering factors. Because of the occurrence of forbidden reflections in diamond it has long been known that anisotropic correction should be made to the scattering factors. The density of electrons in an atom is expressed as $R(r)\psi(\theta,\varphi)$ electrons/cm^3 where R depends only on the radius and ψ is a characteristic angular distribution slightly modifying R. $\psi = k_0 + k_1 S_1 + k_2 S_2 \ldots$ where S_1 ... are form factors. When the S are expressed in polar coordinates as S' they can be normalised by

$$\frac{1}{4\pi}\int_0 \sin\theta\, d\theta \int_0^{2\pi} (k_0 + k_1 S_1' + k_2 S_2' + \ldots)\, d\varphi = 1 \quad ,$$

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70-4-1/16

On the **Presentation** of the Atoms in Crystals by Symmetrical Figures.

S must have definite symmetry characteristic of the crystal. Functions can be chosen for S which are the simplest for a given point group, for example, that for T_d is xyz/r^3. This function is invariant under transformations corresponding to the operations of this group. The atomic scattering factor is then (dealing in polar coordinates)

$$f(H) = \int_0^\infty R(r)4\pi r^2 dr \int_0^\pi e^{2\pi i Hr\cos\theta} \sin\theta d\theta \frac{1}{4\pi} \int_0^{2\pi} (k_0 + k_1 S_1 + k_2 S_2 + \ldots) d\varphi .$$

Taking the above example this reduces to:

$$f(H) = \int_0^\infty 4\pi R(r) r^2 \left[\frac{\sin a}{a} + \frac{ik}{\sqrt{3}} (5/6A - 1/2B) \right] dr$$

compared with $f_0(H) = \int_0^\infty 4\pi R(r)\, r^2 \frac{\sin a}{a}\, dr$

for the isotropic case.

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On the **Presentation** of the Atoms in Crystals by Symmetrical Figures.

The difference is the factor

$$\frac{ik}{\sqrt{5}} \int_0^\infty 4\pi R(r) r^2 (5/6 A - 1/2 B) dr = i\beta \quad .$$

A and B are **trigonometric** function of a which equals 2π Hr. For diamond the structure factor is

$\Sigma = A_1 + A_2 e^{\frac{\pi i}{4} \Sigma h_i}$ which, because A_1 and A_2 are equal gives extinctions of the type $\sum h_i = 4n + 2$.

Σ can now be written in the form

$\Sigma = A_0 (1 + e^{\frac{\pi i}{4} \Sigma h_i}) + i\beta (1 - e^{\frac{\pi i}{4} \Sigma h_i})$ so that reflections of the type $h_i = 4n + 2$ no longer disappear. From the intensities of these forbidden reflections in diamond the parameters of the anisotropic scattering factor can be determined. (See Ref.1)

KONOBEYEVSKIY, Sergey Tikhonovich

"Some Physical Properties of Uranium Plutonium and their Alloys"
(a paper to be presented at 1958 UN "Atoms-for-Peace" Conference, Geneva).

KONOBEYEVSKY, S. T.

"On Some Physico-Chemical Processes Occurring in Fissionable Materials Under the Influence of Irradiation", by K. P. Dubrovin, S. T. Konobeyevsky, B. M. Levitsky, L. D. Panteleyev, and N. F. Pravdyuk.

Report presented at 2nd UN Atoms-for-Peace Conference, Geneva, 9-13 Sept 1958

KONOBEYEVSKIY S. T.

BOCHVAR, A. A., KONOBEYEVSKIY, S. T., KUTAYTSEV, V. I. and CHEBOTAREV, N. T.

"

"Interaction Between Plutonium and Other Metals in Connection with their Arrangement in Mendeleev's Periodic Table."

paper to be presented at 2nd Un Intl. Conf. on the peaceful uses of Atomic Energy, Geneva, 1 - 13 Sept 58.

KONOBEYEVSKIY, S. I.

PRAVDYUK, N. F. and KONOBEYEVSKIY, S. I.

"Change in Mechanical Properties of Structural Materials Under Neutron Irradiation."

paper to be presented at 2nd UN Intl. Conf. on the peaceful uses of Atomic Energy, Geneva, 1 - 13 Sep 58.

KONOBEYEVSKIY, S. T.

AUTHORS: Konobeyevskiy, S. T., Pravdyuk, N. F., Dubrovin, K. P., 89-1-4/29
Levitskiy, B. M., Panteleyev, L. D., Golyanov, V. M.

TITLE: Investigations of Structural Changes Occurring in an Uranium-Molybdenum Alloy by Neutron Irradiation. (Issledovaniye strukturnykh izmeneniy, proiskhodyashchikh v splave urana s molibdenom pod deystviyem neytronnogo oblucheniya).

PERIODICAL: Atomnaya Energiya, 1958, Vol. 4, Nr 1, pp. 34-44 (USSR).

ABSTRACT: An U + Mo alloy with 9.05 weight percents of Mo is produced in a vacuum induction furnace. The melting charge is rolled out in a warm and cold state until a thickness of 0,1 mm is attained. From these foils the samples for measuring resistance and for radiographic investigations are produced. Before irradiation with neutrons, the samples are subjected to a homogenizing process of annealing (in the vacuum) at a temperature of 1000°C for three hours, after which they were cooled in the air.

After irradiation by neutrons the electric resistance was measured and the structure of the alloys was investigated radiographically and under the microscope.

The thermal treatment described made it possible to obtain samples

Card 1/2

AUTHORS: Bochvar, A. A., ~~Konobeyevskiy, S. T.,~~ SOV/89-5-1-1/28
Zaymovskiy, A. S., Sergeyev, G. Ya.,
Kutaytsev, V. I., Pravdyuk, N. F., Levitskiy, B. M.

TITLE: Investigations Carried out in the Field of the Metallography of Plutonium, Uranium, and Their Alloys (Issledovaniya v oblasti metallovedeniya plutoniya, urana i ikh splavov)

PERIODICAL: Atomnaya energiya, 1958, Vol. 5, Nr 1, pp. 5-23 (USSR)

ABSTRACT: In the course of the present survey the principal investigations
ABSTRACTS: The purpose of this survey is to study the metallography of nuclear fuels: plutonium, uranium, and their alloys, are [illegible]. The work concerned was carried out in connection with the development of atomic power engineering in the USSR. Three principal chapters contain data concerning the following subjects:

1.) Plutonium and its alloys:
   a) Metallic plutonium
   b) Alloys with the metals of group I ($PuCu_2$, $PuCu_4$, $PuCu_6$)
   c) Alloys with the metals of group II ($PuBe_{13}$)
   d) Alloys with the elements of group III (Pu_3Al, $PuAl_2$, $PuAl_3$, $PuAl_4$)

~~Card 1/3~~

SOV/89-5-5-9/15

AUTHORS: Bochvar, A. A., Konobeyevskiy, S. T., Kutaytsev, V. I., Men'shikova, T. S., Chebotarev, N. T.

TITLE: The Reactions of Plutonium With Other Metals With Respect to Their Position in the Periodic Table of D. I. Mendeleyev (Vzaimodeystviye plutoniya s drugimi metallami v svyazi s ikh raspolozheniyem v periodicheskoy sisteme D. I. Mendeleyeva)

PERIODICAL: Atomnaya energiya, 1958, Vol. 5, Nr 5, pp. 503-513 (USSR)

ABSTRACT: On the basis of phase diagrams the character of the interaction of plutonium with a number of other elements of the periodic table is described. Only characteristic examples are mentioned. Phase diagrams are given for the following alloys: Pu + Cu, Pu + Be, Pu + Al, Pu + Pb, Pu + Bi, Pu + Zr, Pu + Cr, Pu + Fe, Pu + Mo, Pu + Os, Pu + F, Pu + U. A detailed list of data concerning the crystal structure of some plutonium compounds is added, in which plutonium is combined with the following elements: Cu, Ag, Be, Mg, Hg, Al, In, Ta, C, Si, Ge, Sn, Pb, Ne, P, As, Bi, Te, Mn, Fe, Co, Ni, Os, Th, and Ur (Soviet and foreign data). For the compilation of the phase diagrams especially the papers by the authors mentioned above in the list

Card 1/2

The Reactions of Plutonium With Other Metals With Respect to Their Position in the Periodic Table of D. I. Mendeleyev

were used. The collaborators V. I. Bagrova, O. S. Ivanov, G. G. Smotritskiy, and Ye. S. Smotritskaya are mentioned separately. There are 12 figures and 5 references, 1 of which is Soviet.

Card 2/2

24(2)

SOV/89-5-5-15/27

AUTHORS: Konobeyevskiy, S. T., Butra, F. P.

TITLE: The Diffuse Scattering of X-Rays on Irradiated Crystals of Diamonds, Corundum, Silicon, and Germanium (Diffuznoye rasseyaniye rentgenovykh luchey v obluchennykh kristallakh almaza, korunda, kremniya i germaniya)

PERIODICAL: Atomnaya energiya, 1958, Vol 5, Nr 5, pp 572-573 (USSR)

ABSTRACT: The crystals were subjected to the action of a fast neutron flux of $5,5 \cdot 10^{19}$ n/cm^2 in the reactor RFT at a temperature of up to 80°C ($E_n > 1$ MeV). The Laue diagrams were made with the same orientation of the irradiated and non-irradiated crystals with Mo-radiation.
The X-ray pictures of an irradiated diamond which was cooled by means of liquid nitrogen showed no noticeable modification of the intensity of scattering maxima.
The Laue-diagrams of irradiated and non-irradiated silicon showed diffuse scattering maxima of the same intensity.
If a not irradiated crystal is cooled with liquid nitrogen, the maxima vanish, which was not found to be the case with

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irradiated crystals.
The lattice spacing of the diamond increased after irradiation from 3,559 kX to 3,592 kX, i.e. by 0,9 %.
The lattice spacing of silicon and germanium is modified by not more than 0,1 %.
The modification of the lattice spacing in the case of a diamond causes the double scattering in the X-ray picture to vanish. In order to find out whether this vanishing is of permanent duration the crystals were annealed. The following results were obtained:
Diamond: After annealing at 500°C for 7,5 h, the lattice spacing decreased from 3,592 kX to 3,574 kX. The intensity of the diffuse scattering maxima did not change noticeably. After further annealing at 900°C for 1 hour: 3,566 kX; the intensity of the maxima becomes noticeably lower. In the course of a further treatment at 1200°C for 1 hour the lattice spacing decreased still more. The initial value was, however, not attained.
In corundum the diffuse scattering caused by irradiation vanishes after four hours of annealing at 1200°.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000824310013-9"

In the case of silicon the corresponding values are 1000°C - 1/2 hour.
In germanium no modification of the lattice spacing and no diffuse scattering was observed.
Irradiation of the crystals was carried out by K. P. Dubrovin.
There are 3 figures and 5 references, 0 of which is Soviet.

SUBMITTED: July 12, 1958

Card 3/3

KONOBEYEVSKIY, S.T.

21(4) PHASE I BOOK EXPLOITATION SOV/2718

International Conference on the Peaceful Uses of Atomic Energy. 2nd, Geneva, 1958

Doklady sovetskikh uchenykh; yadernoye goryucheye i reaktornyye metally. (Reports of Soviet Scientists; Nuclear Fuel and Reactor Metals) Moscow, Atomizdat, 1959. 670 p. (Series: Its: Trudy, vol. 3. 8,000 copies printed.

Ed. (Title page): A.A. Bochvar, Academician, A.P. Vinogradov, Academician, V.S. Yemel'yanov, Corresponding Member, USSR Academy of Sciences, and A.P. Zefirov, Doctor of Technical Sciences; Ed. (Inside book): V.V. Pereverzev and G.M. Pchelintseva; Tech. Ed.: E.I. Mazel'.

PURPOSE: This volume is intended for scientists, engineers, physicians, and biologists working in the production and peaceful application of atomic energy; for professors and students of schools of higher technical education where the subject is taught; and for people interested in atomic science and technology.

COVERAGE: This is volume 3 of a 6-volume set of reports on atomic energy, presented by Soviet scientists at the Second International Conference on the Peaceful Uses of Atomic Energy, held in Geneva from September 1 to 13, 1958. Volume 3 consists of two parts. The first part, edited by A.I. Zubov, is devoted to geology, prospecting, concentration and processing of nuclear source material. The second part, edited by G.L. Zverev, includes 27 reports on metallurgy, metallography, processing technology of nuclear fuels and reactor metals, and neutron irradiation effects on metals. The titles of the individual papers in most cases correspond word for word with those in the official English language edition on the Conference proceedings. See SOV/2081 for the titles of the other volumes of the set.

Bochvar, A.A., V.G. Kuznetsova, and V.S. Sergeyev. Self-diffusion of Uranium in the Gamma-phase (Report No. 2306) 370

Bochvar, A.A., S.T. Konobeyevskiy, V.I. Kutaytsev, T.S. Men'shikova, and N.T. Chebotarev. Plutonium Interaction With Other Metals in Connection with Their Arrangement in Mendeleyev's Periodic Table (Report No. 2197) 376

Konobeyevskiy, S.T., A.S. Zaymovskiy, B.M. Levitskiy, Yu.N. Sokurskiy, N.T. Chebotarev, Yu. V. Bobkov, P.P. Yegorov, G.N. Nikolayev, and A.A. Ivanov. Some Physical Properties of Uranium and Plutonium and Their Alloys (Report No. 2230) 396

Ogarev, A.N., V.V. Shentyakov, N.G. Aksenov, N.B. Shtrupenina, and L.A. Stepina. Plastic

Zirconium Production by the Electrolysis of Fused Salts (Report No. 2047) 414

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Konobeyevskiy, S.T., K.P. Dubrovin, B.M. Levitskiy, L.D. Panteleyev, and N.F. Pravdyuk. Some Physico-chemical Processes occurring in Fissionable Materials Under Irradiation (Report No. 2192)

Pravdyuk, N.F., S.T. Konobeyevskiy, A.D. Amayev, and Yu.I. Pokrovskiy. The Effect of Neutron Irradiation on the Mechanical Properties of Structural Materials (Report No. 2052) [illegible]

KONOBEYEVSKIY, S.T.; PRAVDYUK, N.F.; POKROVSKIY, Yu.I.; VIKHROV, V.I.

[Effect of neutron irradiation on internal friction in zinc monocrystals and polycrystals] Vliianie neitronnogo oblucheniia na vnutrennee trenie mono- i polikristallov tsinka. Moskva, In-t atomnoi energii AN SSSR, 1960. 15 p. (MIRA 17:1)

S/089/60/008/06/01/021
B006/B063 82302

21.1910

AUTHORS: Feynberg, S. M., Konobeyevskiy, S. T., Dollezhal', N. A., Yemel'yanov, I. Ya., Tsykanov, V. A., Bulkin, Yu. M., Zhirnov, A. D., Filippov, A. G., Shchipakin, O. L., Perfil'yev, V. P., Samoylov, A. G., Ageyenkov, V. I.

TITLE: The CM(SM) Research Reactor With a Capacity of 50 Mw

PERIODICAL: Atomnaya energiya, 1960, Vol. 8, No. 6, pp. 493-504

TEXT: The present article gives a detailed description of the Russian 50-Mw research reactor which has a neutron flux of $2.2 \cdot 10^{15}$ n/cm^{2}sec. It is used both for research work in nuclear physics and reactor engineering; obtaining of new transuranic elements, testing of fission and building materials under neutron and gamma bombardment, within the temperature range 20°K - 2000°C, and in various media; spectrometric examination of intermediate neutrons; examination of the gamma spectrum of the (n,γ) reaction; examination of short-lived isotopes and neutron diffraction analyses. The authors first discuss some characteristic data.

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The CM (SM) Research Reactor With a Capacity of 50 Mw

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The water-cooled, reflected reactor works with U^{235} enriched to 90%. The critical mass (without the experimental holes) is 7.3 kg of U^{235}, and including the experimental holes, it amounts to 9.5 kg (loading: ~11.7 kg). The maximum heat flow from the fuel element attains $5.5 \cdot 10^6$ kcal/m^2.h; the surface temperature does not exceed 195°C. Fig. 1 shows the distribution of the neutron flux in the cross section of the reactor; the flux has two maxima, one in the center of the cooling-water cavity ($2.2 \cdot 10^{15}$), and the other in the lateral reflector ($5 \cdot 10^{14}$ n/cm^2sec). The flux/power ratio is $4.4 \cdot 10^{10}$ n/cm^2.sec.kw. With a 25% submersion depth of the fuel elements, the reactor can be in continuous operation for a period of 60-65 days. Several details are dealt with next. Experimental holes: The reactor has five horizontal and fifteen vertical holes. The horizontal ones are in the central part of the active zone, whose longitudinal and cross sections are shown in Figs. 2,3. At the output of the holes the neutron flux amounts to ~$3 \cdot 10^{10}$ n/cm^2sec. The vertical holes are located in the reflector with the exception of the central ones. Three of them serve for obtaining transuranic elements (one of these being in the center), two low-temperature holes serve for metal

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tests, two high-temperature holes for the testing of fuel elements, chemical analyses of the cooling water, and corrosion tests. All of these holes are water-cooled. Furthermore, five gas-cooled holes serve for testing fission and building materials in the range of 0 - 600°C; one hole (cooled with helium gas or liquid H_2) serves for material tests at low temperatures; one gas-cooled hole for material tests at ~2000°C; one hole cooled with liquid metal (1000°C) for testing fuel elements and coolants. Construction: The following demands were made on construction: creation of a small active zone that would withstand high thermal loads for a long time, and its cooling; application of a maximum number of experimental holes (their distribution is shown in Fig. 3); possible exchange of fuel assemblies without pressure drop. Figs. 2-5 illustrate particulars of the construction. Reactor body and cover: Fig. 2 is described. The cylindrical part is made of 36 mm thick stainless steel of the grade 1Х18Н9Т (1Kh18N9T). The reflector consists basically of beryllium oxide; it is made up of blocks comprising about 65 different types, which are enclosed by steel plates on top and at the bottom. Fuel element assemblies: The element itself has the shape of a plate with a

core, pressed from uranium oxide powder and electrolytic nickel; the core is contained in a nickel can. Fig. 6 shows a section through the assembly, Fig. 7 another through a fuel element. Data of one such element are compiled; every element contains 12.5 g U^{235}. The cylindrical body shield (Fig. 2) divides the inner reactor cavity into two zones. The functions of this shield are briefly discussed, and the cooling water circulation is described next. The control system is described in greater detail. This system consists of two automatic regulators with two regulation rods each, four shim rods, and four safety rods which can also be used as shim rods. The automatic regulation is operated by 13 ionization chambers located outside the reactor body; it covers the power range from 0.5 to 100%. Several details concerning safety and shim rods are thoroughly discussed. Reactor shield: Fig. 8 shows a cross section through reactor plus shield. The latter consists of steel and heavy concrete. A few details are described, and the process of fuel extraction is briefly dealt with. The cooling system is finally discussed. It consists of four closed, separate loops. The water is kept flowing by circulating pumps (500 t/h, 10 atm); the heat exchange power is 15 Mw.

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S/089/60/009/003/004/014
B006/B063

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AUTHOR: Konobeyevskiy, S. T.

TITLE: Relaxation of Elastic Stresses Under the Action of Neutron Bombardment

PERIODICAL: Atomnaya energiya, 1960, Vol. 9, No. 3, pp. 194-200

TEXT: The author discusses the results of an investigation of the effect of neutron bombardment on the relaxation of elastic stresses in flat springs of uranium-molybdenum alloy as well as on the relaxation of microstresses which lead to a broadening of the lines of an X-ray diagram of rolled uranium. First of all, the author gives a survey of experimental studies and their results which have been described in detail in a previous paper (Ref. 1). The samples - flat springs of U-Mo alloy 30·1.5·0.1 mm large - were tempered at 570°C for one hour, after which some of the samples were exposed to a flux of $1.5 \cdot 10^{13}$ n/cm^{2}sec, while the remaining samples were subjected to a continuous heating (200°C). The sag of the springs was measured before and after neutron bombardment. Uranium alloys with molybdenum admixtures of 0.91 and 9.0% were examined.

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82955

Relaxation of Elastic Stresses Under the Action of Neutron Bombardment

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The sag of both samples was reduced by irradiation; the greatest change was found within the first two hours (integral flux: $0.5 \cdot 10^{17}$ - $1.0 \cdot 10^{17}$ n/cm^3). The effect of irradiation on elastic stresses is shown in Fig. 1. After a jump-like drop, the stress decreases more slowly. These two stages take a different course for the two samples (α-uranium with 0.91% Mo and γ-uranium with 9.0% Mo). The former sample shows a less jump-like decrease of stress and later only a slow decrease (by 25 - 30% within 100 hours), whereas the stress of the latter first drops very rapidly, followed by a slow decrease (from 24 to 2 - 3 kg/mm^2 within 10 hours). Numerical sag values, measured for two samples of U-Mo alloy (9.0% Mo) of the type YM-9 (UM-9), are compiled in a table. The observed variations of the line widths in the X-ray diagram with time, and the corresponding values of the microstresses σ are shown in Fig. 2, for α-uranium and in Fig. 3 (UM-9 alloy) for γ-uranium (for the lines 114 and 222, respectively, at $2 \cdot 10^{13}$ n/cm^2·sec). In the first case, σ decreases rapidly during the first hour, after which it shows a slight linear rise. In the second case, there is an exponential decrease. A discussion of these experimental observations is followed by the theory of relaxation

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Relaxation of Elastic Stresses Under the Action of Neutron Bombardment

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effects. Experiment and theory indicate that relaxation is primarily due to the occurrence and displacement of atomic defects (interstitial atoms and vacancies). The fact that bombarded α-uranium shows anomalous creeping, is known. The accelerated relaxation studied by the author may be interpreted as a primary radiation effect. Fission events producing thermal peaks in uranium and its alloys have two effects in this case: 1) Volume expansion occurring in the region of the peaks produces a large number of point defects and facilitates natural diffusion of atoms of the bombarded substance. 2) Heat liberated in this region increases atomic mobility and causes displacements. The accumulation of point defects plays the main part in the region of reversible relaxation. Irreversible relaxation effects, occurring in α-uranium at an integral flux of $5 \cdot 10^{17}$ n/cm^2, are closely connected with radiative activation of the natural diffusion of defects in the field of stress. K. P. Dubrovin is mentioned in this paper. There are 5 figures, 1 table, and 7 references: 3 Soviet and 4 US.

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21.3000 (1138, 1565)

S/089/60/010/001/007/020
B006/B063

AUTHORS: Konobeyevskiy, S. T., Chebotarev, N. T.

TITLE: Structure and Thermal Expansion of δ- and η -Plutonium

PERIODICAL: Atomnaya energiya, 1960, Vol. 10, No. 1, pp. 50-57

TEXT: A study has been made of the structural changes causing a drop in the temperature of plutonium, as well as of the transitions of modifications, proceeding from the high-temperature (body-centered) ε-phase to the face-centered tetragonal η -phase and further on to the face-centered cubic δ-phase. In accordance with the conception on the growth of covalent binding components with dropping temperature, the problem as to which are the most probable structural changes in allotropic $\varepsilon \rightarrow \eta \rightarrow \delta$ transitions in plutonium is discussed. It is assumed that ideal face-centered lattices for η- and δ-plutonium describe the true structure in first approximation only. The actual structure of these phases is much more complicated, and is characterized by displacements of atoms from their ideal locations by 3-4% of d_{mean}. These displacements reduce the

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Structure and Thermal Expansion of δ- and η-Plutonium

process plays the leading role and the coefficient of thermal expansion becomes negative. The first process prevails in δ-phase undercooling, where the coefficient of thermal expansion is vanishing at first and later assumes positive values. If the δ-phase is alloyed, the part played by the second process would then be weakened, and the coefficient of thermal expansion should be positive also at both high and low temperatures. There are 4 figures, 1 table, and 8 references: 3 Soviet, 3 US, and 2 British.

SUBMITTED: April 11, 1960

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KONOBEYEVSKIY, S.T.

KONOBEYEVSKIY, S.T.

International Conference on Reactor Materials and the Effects of Irradiation. Atom.energ. 11 no.5:462-465 N '61. (MIRA 14:10)

(Materials, Effect of raidation on—Congresses)
(Nuclear reactors—Congresses)

SOV/6176

PHASE I BOOK EXPLOITATION

Konobeyevskiy, S. T., Corresponding Member, Academy of Sciences USSR, Resp. Ed.

Deystviye vadernykh izlucheniy na materialy (The Effect of Nuclear Radiation on Materials). Moscow, Izd-vo AN SSSR, 1962. 383 p. Errata slip inserted. 4000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Otdeleniye tekhnicheskikh nauk; Otdeleniye fiziko-matematicheskikh nauk.

Resp. Ed.: S. T. Konobeyevskiy; Deputy Resp. Ed.: S. A. Adasinskiy; Editorial Board: P. L. Gruzin, G. V. Kurdyumov, B. M. Levitskiy, V. S. Lyashenko (Deceased), Yu. A. Martynyuk, Yu. I. Pokrovskiy, and N. F. Pravdyuk; Ed. of Publishing House: M. G. Makarenko; Tech. Eds: T. V. Polyakova and I. N. Dorokhina.

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SOV/6176

PURPOSE: This book is intended for personnel concerned with nuclear materials.

COVERAGE: This is a collection of papers presented at the Moscow Conference on the Effect of Nuclear Radiation on Materials, held December 6-10, 1960. The material reflects certain trends in the work being conducted in the Soviet scientific research orginization. Some of the papers are devoted to the experimental study of the effect of neutron irradiation on reactor materials (steel, ferrous alloys, molybdenum, avial, graphite, and nichromes). Others deal with the theory of neutron irradiation effects (physico-chemical transformations, relaxation of internal stresses, internal friction) and changes in the structure and properties of various crystals. Special attention is given to the effect of intense γ-radiation on the electrical, magnetic, and optical properties of metals, dielectrics, and semiconductors.

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The Effect of Nuclear Radiation (Cont.)

TABLE OF CONTENTS:

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KONOBEYEVSKIY, S. T., PRAVDYUK, N. F., ASTRAKHANTSEV, S. M., KARPUKHIN, V. I., SKVORTSOV, V. V., NIKOLAYENKO, V. A.,

"Investigation of Certain Processes in UO_2 Dispersed in a Matrix"

Report submitted for the Conference on New Nuclear Materials Technology including Non-Metallic Fuel Elements (IAEA), Prague, 1-5 July 1963

KONOBEYEVSKIY, S.T.; KUTAYTSEV, V.I.

Plutonium alloys. Issl. splav. tsvet. met. no.4:17-24 '63.
(Plutonium alloys) (MIRA 16:8)

KONOBEYEVSKIY, S.T.

G/025/63/005/002/001/005
B163/B102

AUTHOR: Konobeevskiy, S. T.

TITLE: Present state of investigations on the nature of radiation damages in solids

PERIODICAL: Kernenergie, v. 5, no. 2, 1963, 49-55

TEXT: First the capacity of various types of particles to produce defects in crystals is discussed. The theories and calculations of Seitz, Kinchin and Pease, Silsbee, Gibson and Vineyard treating cascade processes produced by neutron irradiation, are reviewed. The difference between dynamical (cold) and statistical (hot) damages is discussed. It is explained how defects are cured and adsorbed on dislocation lines, pinning the dislocations and affecting the mechanical properties of the solid. By transmission electron microscopy, it has been shown that the defects are inclined to unite as plane groups, forming dislocation loops, stacking faults, and spatial structures. Radiation growth and its annealing are described. Some X-ray Laue diagrams of irradiated crystals

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KONOBEYEVSKIY, S.T.; INDENBOM, V.L.

Comparing microscopic and phenomenological creep theories. Fiz. met. i metalloved. 16 no.4:639-640 O '63. (MIRA 16:12)

KONOBEYEVSKIY, S.T.; KORNILOV, I.I.

Colloquy on the effect of physical metallurgy on technology. Vest. AN SSSR 33 no.3:122-123 Mr '63. (MIRA 16:3)

1. Chlen-korrespondent AN SSSR (for Konobeyevskiy).
(Physical metallurgy--Congresses)

PRAVDYUK, N. F.; KONOBEYEVSKIY, S. T.; ORLOV, M. L.

"Effect of some factors on hydrogenization and properties of zirconium alloys used for jackets of heat-producing elements in water cooled power reactors."

report submitted for 3rd Intl Conf, Peaceful Uses of Atomic Energy, Geneva, 31 Aug-9 Sep 64.

L 40004-65 EPA(s)-2/EWT(m)/EWP(v)/T/EWP(t)/EWP(k)/EWP(b)/EWA(h)/EWA(c)
PT-4/Peb JD/HM/GS
ACCESSION NR: AT4049819 S/0000/64/000/000/0104/0108

AUTHOR: Konobeyevskiy, S. T.; Levitskiy, B. M.; Sokurskiy, Yu. N.; Andreyev, G. A.

TITLE: The possibilities and prospects of hardening metals and alloys by irradiation

SOURCE: Soveshchaniye po uprochneniyu detaley mashin, 1962. Protsessy uprochneniya detaley mashin (Processes of the hardening of machine parts), doklady soveshchaniya. Moscow, Izd-vo Nauka, 1964, 104-108

TOPIC TAGS: metal irradiation, alloy irradiation, gamma irradiation, beta irradiation, corpuscular bombardment, metal hardening, metal surface hardening, radiation hardening

ABSTRACT: It is well known that irradiation may cause not only [illegible] of metal properties but also their improvement. Thus, radiation sharply increases the yield point and moderately increases the ultimate strength and wear resistance. Hardening under irradiation is accompanied by lowering of plasticity. Different types of radiation act differently on the atoms of the irradiated [illegible]. After the primary contact with the atoms of metals, energy is transmitted to the metal atoms whose energy exceeds about 25-35 electronvolts. [illegible] displaced from the lattice. The energy of the first displaced atom may be sufficient for the displacement

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ACCESSION NR: AT4049819

of other atoms. Thus, clusters of displaced atoms are formed. This displacement affects the properties of alloys considerably. The number of secondary displaced atoms [illegible] on the energy of the primary displaced atom. Under neutron bombardment, when the energy of the primary displaced atoms is great this number may be several hundred. [illegible] and beta irradiation only produces 1 to 2. Point defects arise under [illegible], changing the properties of the metals (increasing electrical resistance [illegible] internal friction, increasing the modulus of [illegible] dislocations [illegible] by irradiation, resulting in hardening, which can in some cases be increased by additional irradiation. The future of radiation hardening lies in a combination of [illegible] with subsequent heat treatment, irradiation being the initiating factor. It [illegible] that new elements are created by [illegible] of development of [illegible] neutron bombardment, [illegible] been through gamma irradiation [illegible] used in the future since the [illegible] Electron [illegible] changes in structure [illegible] [illegible] increasing surface hardening [illegible] [illegible] disc being

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L 40004-65

ACCESSION NR: AT4049819

used for irradiation, resulting in even better hardening of materials. The layers arising under irradiation differ from diffusion layers and may be irregular, but the stability may be increased and the bond with the base metal is better only the first steps have been taken in this direction. Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 21May64 ENCL: 00 SUB CODE: MM

NO REF SOV: 004 OTHER: 003

Card 3/3

L 9236-66 EWT(m)/EPF(n)-2/T/EWP(t)/EWP(b)/EWA(h)/EWA(c) JD/JG/GG/GS
ACC NR: AT5023799 SOURCE CODE: UR/0000/62/000/000/0194/0208

AUTHOR: Konobeyevskiy, S. T. (Corresponding member AN SSSR); Levitskiy, B. M.; Panteleyev, L. D.; Dubrovin, K. P.; Kutaytsev, V. I.; Konev, V. N.

ORG: none

TITLE: X-ray diffraction analysis of transformations in a copper-tin alloy subjected to neutron irradiation

SOURCE: Soveshchaniye po probleme Deystviye yadernykh izlucheniy na materialy. Moscow, 1960. Deystviye yadernykh izlucheniy na materialy (The effect of nuclear radiation on materials); doklady soveshchaniya. Moscow, Izd-vo AN SSSR, 1962, 194-208

TOPIC TAGS: neutron irradiation, copper alloy, tin containing alloy, alloy irradiation, plutonium containing alloy, phase transformation, irradiation induced transformation

ABSTRACT: To determine the mechanism of homogenization which takes place in uranium-molybdenum and uranium-niobium alloys under the effect of neutron irradiation, specimens of two copper-base alloys, one containing 9 at% tin and the other 9 at% tin and 1 at% plutonium, were irradiated with an integrated flux of up to 6×10^{19} n/cm^2. Prior to irradiation, specimens of both alloys were homogenized and strain-hardened by cold rolling with a total reduction of 85—95%; half of the specimens were then aged (annealed at 220 ± 5C for 500 hr) to induce a decomposition

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ACC NR: AT5023799

of the solid solution and thus obtain a heterogeneous structure. Subsequent neutron irradiation had no effect on the structure of either the strain-hardened or annealed copper-tin alloy specimen. In the annealed specimens (heterogeneous structure) of the copper-tin-plutonium alloy, irradiation brought about a partial homogenization, i.e., a dissolution of secondary phases precipitated under the effect of aging. In the strain-hardened (homogeneous) specimens of the copper-tin-plutonium alloy, a partial decomposition of the solid solution under the effect of irradiation was observed. These results confirm the assumption that the phenomenon of homogenization in uranium-molybdenum and uranium-niobium alloys is a result of a rapid deceleration of fission fragments and not a result of a similar deceleration of primary atoms knocked out by fast neutrons (as suggested by some researchers), since in this case the copper-tin alloy would have been affected to the same degree as the copper-tin-plutonium alloy. Orig. art. has: 9 figures, 3 tables, and 4 formulas. [DV]

SUB CODE: 11,20/ SUBM DATE: 18Aug62/ ORIG REF: 006/ OTH REF: 004

Card 2/2

L 8158-66 EPF(n)-2/EWT(d)/EWT(m)/EWP(z)/EWP(h)/T/EWA(d)/EWP(w)/EWI(t) IJP(c)

ACC NR: AT5023801 EM/GG/MJW/JD/HW/GS SOURCE CODE: UR/0000/62/000/000/0219/0234

AUTHOR: Konobeyevskiy, S. T. (Corresponding member AN SSSR); Pravdyuk, N. F.; Pokrovskiy, Yu. I.; Vikhrov, V. I.

ORG: none

TITLE: The effect of neutron irradiation on the internal friction of metals

SOURCE: Soveshchaniye po probleme Deystviye yadernykh izlucheniy na materialy. Moscow, 1960. Deystviye yadernykh izlucheniy na materialy (The effect of nuclear radiation on materials); doklady soveshchaniya. Moscow, Izd-vo AN SSSR, 1962, 219-234

TOPIC TAGS: copper, aluminum, magnesium, chromium steel, nickel containing steel, metal internal friction, metal fatigue, neutron irradiation, irradiation effect

ABSTRACT: The internal friction (1/Q) and the normal elasticity modulus have been investigated in solution-heat-treated copper, aluminum, and magnesium prior to and after irradiation at 80C with an integrated flux of 2.0×10^{16}—5.0×10^{20} thermal n/cm^2 (the number of fast neutrons with an energy of more than 1 Mev was 35%). The 1/Q was measured at a stress of 2—20,000 g/mm^2. The plotted internal friction-strain amplitude curves showed the existence of a critical strain (σ_{cr}) under which the 1/Q begins to be affected by the applied stress. The 1/Q and σ_{cr} were found to be very sensitive to irradiation (see Fig. 1.). For example, the σ_{cr} for irradiated copper increased 280 times and the minimum value of 1/Q decreased by two times compared with the initial value before irradiation. The changes in the value of 1/Q and

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σ_{cr} with irradiation doses equal to or less than 10^{17} n/cm^2 are caused by the interaction of dislocations and point defects which resulted from elastic scattering of neutrons. In the case of plastic deformation of up to 27%, the point defects resulted from interaction between dislocations, and the increase in the value of 1/Q was considerably smaller. In distilled magnesium subjected to fatigue with a cyclic stress of various amplitude before irradiation with an integrated flux of 10^{19} n/cm^2 (thermal neutrons and about 10% fast neutrons with an energy above 1 Mev), the value of σ_{cr} was found to increase from the initial 5 g/mm^2 to 100 g/mm^2 after irradiation. In fatigue testing under a cyclic stress of 1600—4500 g/mm^2, distilled magnesium irradiated with an integrated flux of 10^{19} n/mm^2 (thermal) had an endurance limit 10% higher than unirradiated magnesium. The effect of irradiation on the natural vibration frequency of specimens (the square of which determines the normal elasticity modulus) was investigated on irradiated copper and unirradiated 1Kh18N9T [AISI 321] stainless steel. The observed irradiation-induced behavior of the normal elasticity modulus can be explained by a manifestation of both the elastic and "nonelastic" properties of the metal, depending on the magnitude of the stress applied in dynamic measurement of the modulus. The "nonelastic" properties of the metal can be caused by migration of dislocations, while pure elastic properties manifest themselves only in the region of stresses $\sigma \leq \sigma_{cr}$.

jw

L 2731-66 EWP(e)/EPA(c)-2/EWT(m)/EPF(c)/EWP(i)/EPF(n)-2 GG/GS/WH
ACCESSION NR: AT5023804 UR/0000/62/000/000/0251/0256

AUTHOR: Konobeyevskiy, S. T. (Corresponding member AN SSSR); Butra, F. P. 63 B41

TITLE: X-ray diffraction effects in neutron-irradiated crystals 19

SOURCE: Soveshchaniye po probleme Deystviye yadernykh izlucheniy na materialy. Moscow, 1960. Deystviye yadernykh izlucheniy na materialy (The effect of nuclear radiation on materials); doklady soveshchaniya. Moscow, Izd-vo AN SSSR, 1962, 251-256

TOPIC TAGS: x ray diffraction analysis, diamond, molybdenum, corundum, silicon, germanium, aluminum, fast neutron, irradiation effect, x ray scattering, neutron irradiation

ABSTRACT: The effect of fast neutron irradiation in fluxes of (0.5-1.23) 10^{20} n/cm^2 was studied in diamond, corundum, silicon, germanium, aluminum, and molybdenum bombarded at temperatures up to 100C. Diffuse scattering of x rays was studied on single crystals, and changes in lattice spacing were followed in polycrystals. It was found that neutron irradiation increases the lattice spacing and causes the appearance of a temperature-independent diffuse scattering on the radiograms of the irradiated crystals. Annealing leads to a smaller increase in the lattice parameter and to a gradual attenuation of the diffuse

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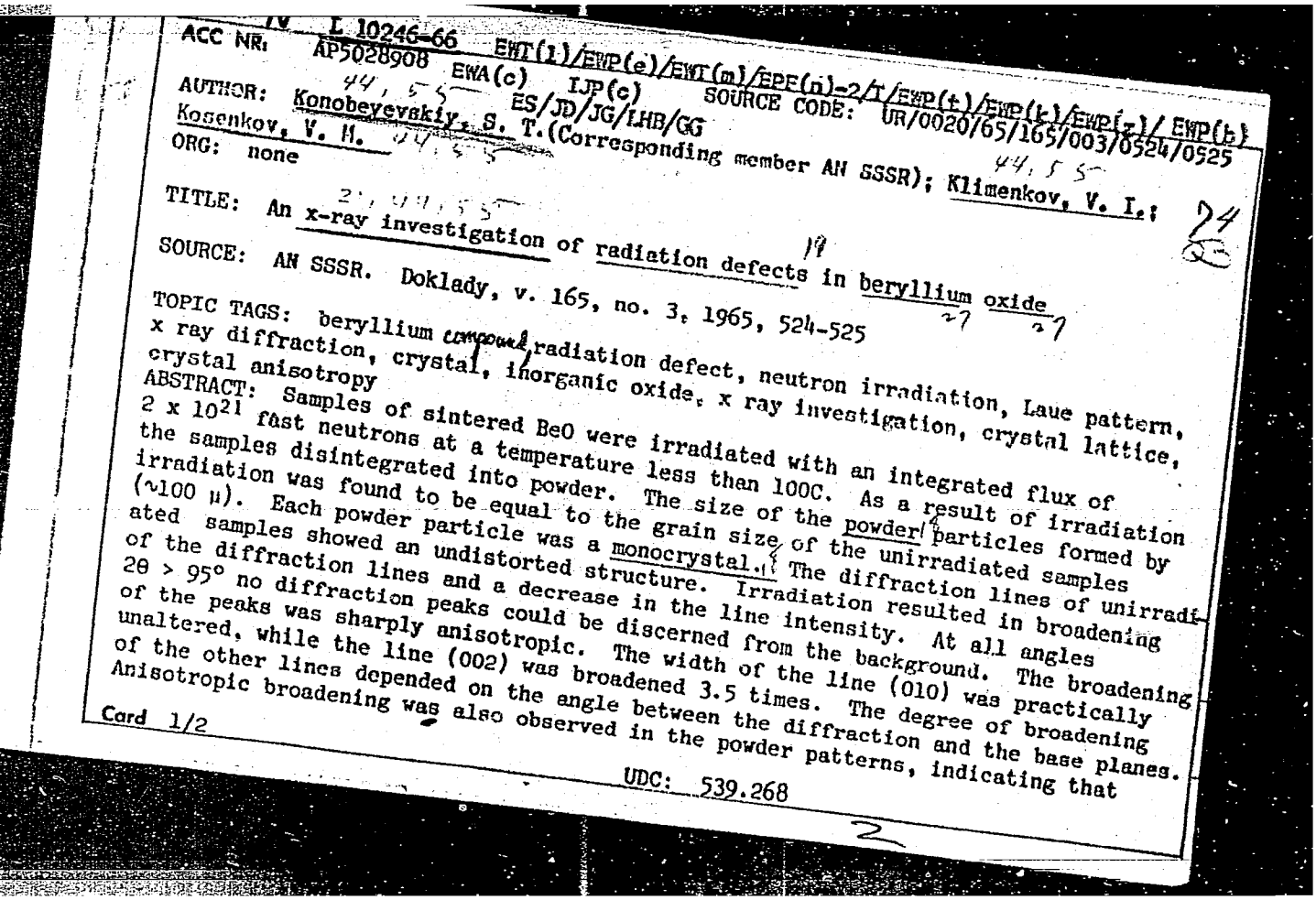

L 10246-66 EWT(l)/EWP(e)/EWT(m)/EPF(n)-2/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)
ACC NR: AP5028908 EWA(c) IJP(c) SOURCE CODE: UR/0020/65/165/003/0524/0525
44,55
AUTHOR: Konobeyevskiy, S. T. (Corresponding member AN SSSR); Klimenkov, V. I.; Kosenkov, V. M. ES/JD/JG/LHB/GG 44,55
ORG: none 44,55
TITLE: An x-ray investigation of radiation defects in beryllium oxide
SOURCE: AN SSSR. Doklady, v. 165, no. 3, 1965, 524-525
TOPIC TAGS: beryllium compound, radiation defect, neutron irradiation, Laue pattern, x ray diffraction, crystal, inorganic oxide, x ray investigation, crystal lattice, crystal anisotropy
ABSTRACT: Samples of sintered BeO were irradiated with an integrated flux of 2×10^{21} fast neutrons at a temperature less than 100C. As a result of irradiation the samples disintegrated into powder. The size of the powder particles formed by irradiation was found to be equal to the grain size of the unirradiated samples (~100 μ). Each powder particle was a monocrystal. The diffraction lines of unirradiated samples showed an undistorted structure. Irradiation resulted in broadening of the diffraction lines and a decrease in the line intensity. At all angles $2\theta > 95°$ no diffraction peaks could be discerned from the background. The broadening of the peaks was sharply anisotropic. The width of the line (010) was practically unaltered, while the line (002) was broadened 3.5 times. The degree of broadening of the other lines depended on the angle between the diffraction and the base planes. Anisotropic broadening was also observed in the powder patterns, indicating that
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UDC: 539.268

KONOBIYEVSKIY, I.D. [Konobiievs'kyi, I.D.]

System for investigating the dependence of the electric resistance of polymeric materials on the temperature. Khim. prom. [Ukr.] no.3:74-76 Jl-S '63. (MIRA 17:8)

1. Ukrainskiy nauchno-issledovatel'skiy institut plasticheskikh mass.

ACCESSION NR: AP4041784 S/0191/64/000/007/0046/0048

AUTHOR: Konobiyevskiy, I. D.; Kagan, G. T.

TITLE: Temperature dependence of the electric resistance of polyester resins

SOURCE: Plasticheskiye massy*, no. 7, 1964, 46-48

TOPIC TAGS: polyester resin, modified polyester resin, cyclopentadiene, anthracene, electric resistance, electric resistance temperature dependence, dielectric

ABSTRACT: The temperature dependence of the electric resistance of polyester resins modified with cyclopentadiene or anthracene has been studied at 25 to 200C. Formulas of the resins studied are given in Table 1 of the Enclosure. It was shown that polyester resins exhibit at 25—60C a resistance of 10^{13}—10^{15} ohm-cm and should thus be used as dielectrics in this temperature range. At temperatures above 60C the resistance of polyester resins drops sharply (e.g., to 10^{10}—10^{12} ohm-cm at 175C), probably owing to an increased mobility of sections

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ACCESSION NR: AP4041784

of macromolecules. Decomposition of the resins at higher temperatures makes their use impossible above 200C. Preliminary heating of specimens in an electric field to 175C considerably increases their insulating properties, possibly as a result of crosslinking and removal of volatile impurities. Orig. art. has: 2 figures and 3 tables.

ASSOCIATION: none

SUBMITTED: 00

SUB CODE: MT, EM

ATD PRESS: 3055

NO REF SOV: 002

ENCL: 01

OTHER: 000

Card 2/3

L 21753-65 EPA(a)-2/EWT(m)/EPF(c)/EWP(j)/T-2 Pc-4/Pr-4/Pt-10 ASD(a)-5/
AS(mp)-2/ESD(ga)/ESD(t) RM

ACCESSION NR: AP5000754 S/0191/64/000/012/0047/0048

AUTHOR: Konobiyevskiy, I. D.

TITLE: Measurement of the tangent of the dielectric loss angle and the dielectric permeability of polymers at sonic frequencies by a resonance technique

SOURCE: Plasticheskiye massy*, no. 12, 1964, 47-48

TOPIC TAGS: polymer electrical property, dielectric loss angle, dielectric permeability, polyester resin, Q factor meter

ABSTRACT: The author describes an instrument and technique for determining the dielectric loss angle and dielectric permeability of polymers. The apparatus is usable at 10^3-10^5 cps, consists basically of the quality tester IDN-1, described in the instruction manual "Izmeritel'dobrotnosti, nizkochastotny*y, tipa IND-1," RSFSR, Upravleniye radiotekhnicheskoy promy*shlennosti sovnarkhoza, 1960, and of auxiliary parts to this tester (designed originally for testing of induction coils or condensers), including standard induction coils, a sample holder with disc electrodes, and wire connections. Samples are prepared with exactly parallel surfaces, polished to a mirror finish, and measured by tuning to resonance with the quality meter. Approximate and exact equations for calculating the dielectric loss angle and the dielectric permeability are presented. A table is included

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L 21753-65

ACCESSION NR: AP5000754

showing data on these factors for polymer PNTs-1E6 (7), i.e. unsaturated polyester resin modified with cyclopentadiene and crosslinked with styrene, and PNA-D type resin, i.e., unsaturated polyester resin modified with antracene and crosslinked with styrene, at 105 cps, 20C, 65±5% relative humidity, and an accuracy of 10-15% and 5-10% for the tangent of the loss angle and the permeability, respectively. Orig. art. has: 1 table, 1 figure and 4 formulas.

ASSOCIATION: None

SUBMITTED: 00

ENCL: 00

SUB CODE: OC, MT

NO REF SOV: 005

OTHER: 000

Card 2/2

KONOBIYEVSKIY, I.D.

Measurement of the angle tangent of dielectric losses and dielectric permittivity of polymeric materials at audio-frequency with the resonance method. Plast. massy no.12:47-48 '64.

(MIRA 18:3)

KONOBIYEVSKIY, I.D. [Konobiievs'kyi, I.D.]

Temperature dependence of the electric resistance of glass reinforced plastics. Khim. prom. no.4:45-46 O-D '64.
(MIRA 18:3)

L 54956-65 EPA(s)-2/EWT(m)/EPF(c)/EPR/ENP(j)/T Pc-4/Pr-4/Ps-4/Pt-7 WW/RM

ACCESSION NR: AP5012102 UR/0191/65/000/005/0010/0012

678.674.01:537.311 677.521.01:

AUTHOR: Konobliyevskiy, I. D.; Nesolenaya, L. G.

TITLE: Temperature dependence of the electric strength of unsaturated polyester resins and fiberglass reinforced plastics based on them

SOURCE: Plasticheskiye massy, no. 5, 1965, 10-12

TOPIC TAGS: polymer electric strength, breakdown voltage, unsaturated polyester resin, glass plastic, fiberglass reinforced plastic, cyclopentadiene modifier, anthracene modifier

ABSTRACT: Cyclopentadiene-(PNTs-2E-6) and anthracene modified unsaturated polyester resins (PNA D-E 2) were tested at 20-200C. The decrease in electric strength of the [illegible] with a rise in temperature is [illegible] increase in heat mobility. At 20 [illegible] under DC voltage than [illegible] and 50 cycles) is [illegible] higher. This is explained by [illegible] the material is low and the power [illegible] current. [illegible] a slight decrease in electric [illegible] the breakdown strength of the [illegible] voltage, and decreases by 10 to 15% under DC voltage.

L 54966-65
ACCESSION NR: AP5012102

In the glass plastic based on the PNA-D-E-2 resin, the decrease in electric strength under DC voltage reaches approximately 30%. Thus, the resins and [illegible] be used in DC and AC devices at temperatures [illegible]. The polyester resins PNTs 2E-6 and PNA [illegible] without traces of undesirable volatile matter and [illegible] the technological ad[illegible] Each of them can be molded at low pressures and temperatures). Orig.

ASSOCIATION: None

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

NO REF SOV: 006 OTHER: 001

Card 2/2

KONOBIYEVSKIY, I.D.

Methods of studying the relationship of the dielectric properties of nonpolar polymers to temperature at high frequencies. Plast. massy no.11:38-39 '65. (MIRA 18:12)

KONOBRITSKAYA, YE. M. (reporter)

Jul/Aug 53

USSR/Geography - Conference

"Alma-Ata Conference of Geographers," Ye. M. Konobritskaya (reporter)

Iz Ak Nauk SSSR, Ser Geog, No 4, pp 111,112

Reports on the conference, held May 1953 in Alma-Ata, devoted to the study of the geography of Kazakhstan. N. V. Pavlov, Active Mem of Acad Sci Kaz SSR, presided over conference. Reports were presented by N. N. Pal'gov, G. G. Muravlev, V. Ya. Dvoskin, N. F. Samokhavlov, A. V. Marakuyev, Ye. M. Konobritskaya, V. I. Korovin, S. P. Kavetskiy, A. Zh. Mashanov, Corr Mem Acad Sci Kaz SSR, G. K. Konkashpayev, and M. E. Grudzinskiy.

Source #264T78

KONOBRITSKAYA, Yevgeniya Mitrofanovna

[Karaganda Province; economical and geographical characteristics] Karagandinskaia oblast'; ekonomiko-geograficheskaia kharakteristika. Alma-Ata, 1954. 253 p. (MLRA 9:3)
(Karaganda Province--Description and travel)

KONOBRITSKAYA, Yevgeniya Mitrofanovna, kandidat geograficheskikh nauk; USPENSKAYA, N.V., redaktor; ISLENT'YEVA, P.G., tekhnicheskiy redaktor

[Natural resources of Kazakhstan in the service of national economy] Prirodnye bogatstva Kazakhstana na sluzhbe narodnogo khoziaistva. Moskva, Izd-vo "Znanie," 1955. 39 p. (Vsesoiuznoe obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii Ser. 3, no.59)

(MLRA 8:12)

(Kazakhstan--Natural resources)

CHUGAY, A.

A new bppk pm Karaganda Province ("Karaganda Province." E.M. Konobritskaia. Reviewed by A.Chugai). Vest. AN Kazakh. SSR 11 no.6:100-103 Je '55. (MLRA 8:8)
(Karaganda Province--Geography, Economic) (Konobritskaia, E.M.)

KONOBRITSKAYA, Ye.M., kand. geogr. nauk; KLYUCHNIKOV, Yu.I., kand. geogr.

New collection of articles ("Problems in the geography of Kazakhstan," no.2, 1957. Reviewed by E.M. Konobritskaia and YU.I. Kliuchnikov). Vest. AN Kazakh. SSR 14 no.3:101-103 Mr '58. (MIRA 11:5)
(Kazakhstan--Physical geography)

VASIL'YEVA, M.S.; CHIGARKIN, A.V.; KONOBRITSKAYA, Ye.M., kand.geogr.nauk, otv.red.; POTAPOV, I.Ye., red.; VELICHKO, G.N., tekhn.red.

[Nature and economy of the Dzhezkazgan industrial region] Priroda i khoziaistvo Dzhezkazganskogo promyshlennogo raiona. Alma-Ata, Izd-vo Akad.nauk Kazakhskoi SSR, 1959. 96 p. (MIRA 13:1)

(Dzhezkazgan District--Economic conditions)

IVANCHIKOVA, E.I.; KOLESNIKOVA, M.T.; KONOBRITSKAYA, Ye.M.; KUDRYASHOVA, M.M.; KUL'BAYEVA, Sh.N.; MEDVEDEVA, S.G.. Prinimali uchastiye: ABDULLINA, M.N.; KLIMENKO, K.M.; OVSYANKINA, V.I.; SOKOLOV, M.V.; URAZOVA, M.I.; VOROB'YEVA, G.P.. AKHMEDOVA, N.B., otv.red.; NOVOKHATSKIY, I.P., red.; SHEVCHUK, T.I., red.; AYTMUKHAMBETOVA, S.; RODIONINA, Z.P., tekhn.red.

[The Karaganda Economic Administrative Region; bibliography] Karagandinskii ekonomicheskii administrativnyi raion; bibliograficheskii ukazatel' literatury. Alma-Ata, 1959. 458 p. (MIRA 13:2)

1. Akademiya nauk Kazakhskoy SSR. Alma-Ata. TSentral'naya nauchnaya biblioteka.
(Bibliography--Karaganda Economic Region)
(Karaganda Economic Region--Bibliography)

KONOBRITSKAYA, YE.M.

Karagandinskaya Oblasti; Ekonomiko-Geograficheskaya Kharakteristika.
Alma-Ata, Izd-vo Academy of Science, Kazakh SSR, 1954.
255p., illus., maps 23 cm.
At head of title, Academy of Science Kazakhskoy SSR.

KONOBRITSKAYA, Ye.M.

The tenth anniversary of the Kazakhstan Branch of the Geographical Society of the U.S.S.R. Izv. Vses. geog. ob-va 95 no.4:390-392 Jl-Ag '63. (MIRA 16:9)

(Kazakhstan--Geographical societies)

SMIRNOV, V.V., podpolkovnik meditsinskoy sluzhby; KONOBRITSKIY, I.S., kapitan meditsinskoy slushby.

Changes of ocular refraction after atropinization in flying school candidates. Voen.-med. zhur. no.8:65-66'62. (MIRA 16:9)
(EYE--ACCOMODATION AND REFRACTION)
(ATROPINE--PHYSIOLOGICAL EFFECT)

KONOBRITSKIY, YE. G., Cand Chem Sci — (diss) "Investigation of the mutural solubility in the quatermary system H_3BO_3 - Na_2SO_4 - $MgSO_4$ - H_2O," Alma-Ata, 1960, 15 pp, 200 cop. (Kazakh State U im Kirov, Chemistry Faculty) (KL, 44-60, 128)

KONOBRITSKIY, Ye.G.; BEKTUROV, A.B.

Mutual solubility in the Quaternary system H_3BO_3 – Na_2SO_4 – $MgSO_4$ – H_2O at 50° C. Izv. AN Kazakh. SSR Ser. Khim. no. 2:10-15 '60. (MIRA 14:5)

(Boric acid) (Sodium sulfate) (Magnesium sulfate)

KONOBRITSKIY, Ye.G.; BEKTUROV, A.B.

Mutual solubility in the quaternary system H_3BO_3 - Na_2SO_4 - $MgSO_4$ - H_2O at 25° C. Izv. AN Kazakh. SSR Ser. khim. no. 2:16-20 '60. (MIRA 14:5)

(Boric acid) (Sodium sulfate) (Magnesium sulfate)

BEKTUROV, A.B., KONOBRITSKIY, Ye.G.

Mutual solubility in the quaternary system H_3BO_3 - Na_2SO_4 - $MgSO_4$ - H_2O at 60°. Zhur. neorg. khim. 5 no.4:945-949 Ap '60. (MIRA 13:7)

1. Institut khimicheskikh nauk AN KazSSR, Laboratoriya mineral'nykh udobreniy.
(Boric acid) (Sodium sulfate) (Magnesium sulfate)

BEKTUROV, A.B.; KONOBRITSKIY, Ya.G.

Mutual solubility in the quaternary system H_3BO_3 - Na_2SO_4 - $MgSO_4$ - H_2O at 35°C. Zhur.neorg.khim. 7 no.1:1704-1707 Jl '62. (MIRA 16:3)
(Systems (Chemistry)) (Solubility)

KONOBRITSKIY, Ye.G.

Mutual solubility in the quaternary system H_3BO_3 - Na_2SO_4 - $MgSO_4$ - H_2O at 5°. Trudy Inst.khim.nauk AN Kazakh.SSR 10:143-148 '64.
(MIRA 17:10)

KONOBRITSKIY, Ye.G.

Mutual solubility in the quaternary system H_3BO_3 - N_2SO_4 - $MgSO_4$ - H_2O from 15 to 60°. Trudy Inst.khim.nauk AN Kazakh.SSR 10:149-166 '64.
(MIRA 17:10)

KORCHENKO, N.

Sericulture

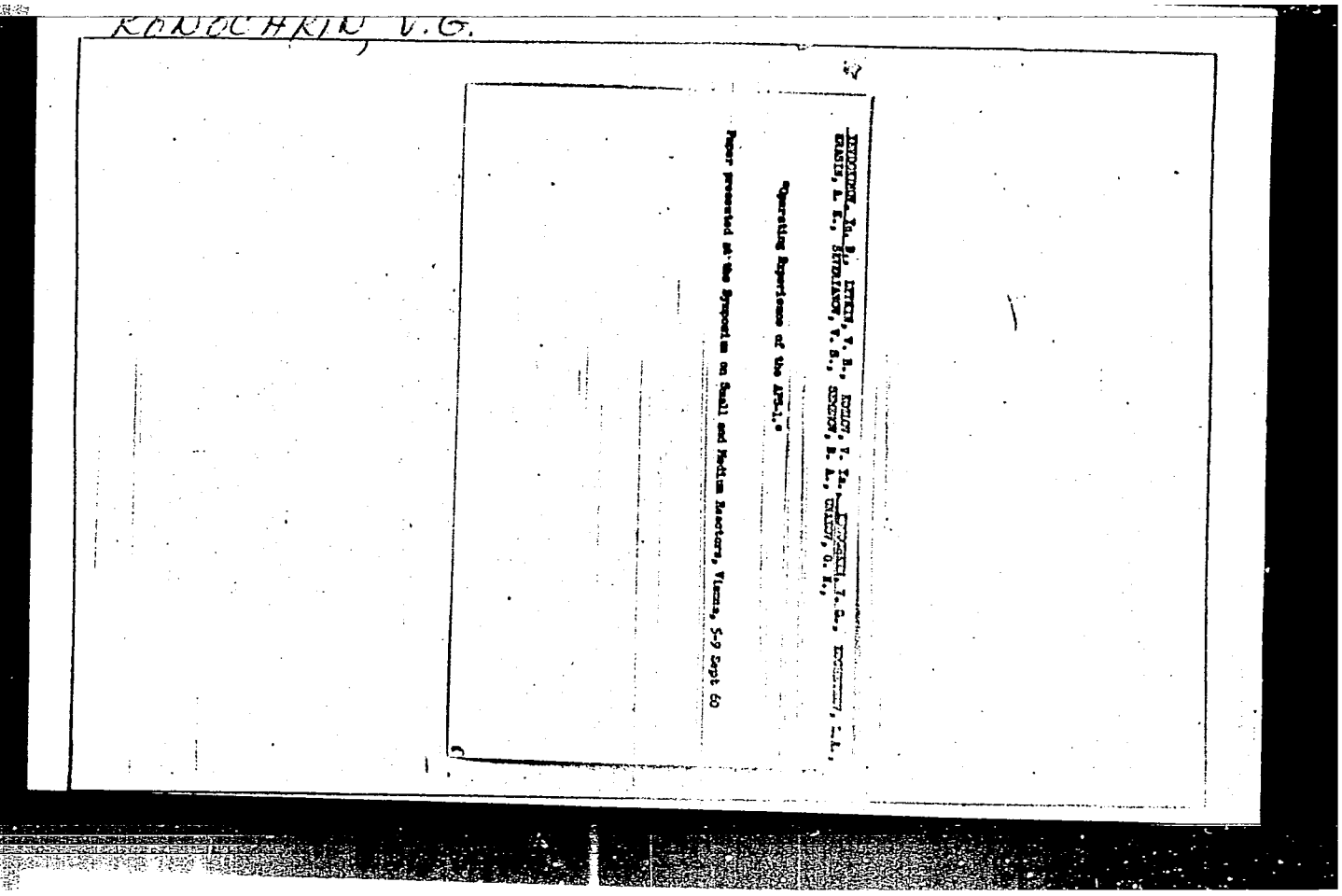
103 kilograms of cocoons from a box of silkworm eggs. Kolkh. proizv, 12, no.8, 1952.

Monthly List of Russian Accessions, Library of Congress, November 1952. UNCLASSIFIED.

FEDICHKIN, I.K., prof.; OVCHARENKO, I.KH., inzh.; AVTONOMOV, B.P., inzh.; KONOCHKIN, F.G., inzh.

Features of water intake from a river during the low-water period by port-type water intakes. Izv. vys. ucheb. zav.; energ. 6 no.6:111-114 Je '63. (MIRA 16:11)

1. Novocherkasskiy inzhenerno-meliorativnyy institut. Predstavlena nauchno-tekhnicheskoy konferentsiyey.



RODOCHKIN, V.G.

"Operating Experience of the APS-1."

Paper presented at the Symposium on Small and Medium Reactors, Vienna, 5-9 Sept 60

25373
S/089/61/011/001/002/010
B102/B214

21.1000

AUTHORS: Yevdokimov, Yu. V., Kozlov, V. Ya., Konochkin, V. G. Kochetkov. L. A., Krasin, A. K., Lytkin, V. V., Sever'yanov, V. S., Semenov, B. A., Ushakov, G. N.

TITLE: Experience from work with the First Nuclear Power Plant

PERIODICAL: Atomnaya energiya, v. 11, no. 1, 1961, 12 - 18

TEXT: The First Nuclear Power Plant in the USSR, which was the first in the world, has been successfully operated for seven years; this paper presents a short survey of the experiences accumulated during the first six years at this station. The station itself possesses all the eqipment available at a large research reactor. The construction of the Beloyarskaya GRES (Beloyarsk State Regional Electric Power Plant) represents a further development of the First Nuclear Power Plant. The working of the reactor at different power levels: In the so-called "cold state", at 0.01% of the nominal power, the reactor has the lowest power level at which the automatic power regulator can still function; the rise in this level is checked by measuring the neutron flux; the power level can be doubled within 20 sec.

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Experience from work with ...

Heating begins with a rise of the power level to 5% of the nominal power (first cycle: 160-170°C, pressure in the second cycle: 7 - 8 atm), then to 10% of the nominal power (temperature at the entrance to the reactor: 190°C, steam pressure 12.5 atm); these parameters remain unchanged on further increase of power. The total heating time for the system is 3.5 - 4 hours; during this time, nitrogen is blown in the graphite system to remove oxygen. The parameters of the power station for 50, 75, and 100% of the nominal power are given in Table 1. On shutting the reactor, it is first cooled, by utilizing the natural loss of heat, to the temperature of water in the first cycle (110-120°C), which requires 1.5-2 hours. The cooling water is then removed from circulation and cooled; this enables the reactor to be cooled rapidly. Reliability and duration of the reactor's operation depend on the quality of the fuel element; the station works with tube type elements. The fuel is contained between two tubes of nonrusting steel (the inner is 0.4 mm thick and the outer 0.2 mm thick). This kind proved to be particularly reliable: Not a single element has been dislocated during the whole period the station has been in operation. The system of partial renewal of the fuel element is used for guaranteeing the deepest possible burning. (N. A. Dollezhal et al. reported on this at the Second Geneva

Experience from work with ...

Conference, 1958). Numerical data about the consumption are given in Table 2. Deformation of the fuel elements were checked, a deformation of 14.20 ± 0.02 mm of the element jackets was found. Experiments relating to the boiling of water in the fuel channels and determination of the hydrodynamic characteristics of the fuel elements in the reactor were started in 1956. The preliminaries were completed in September 1956, and one channel was brought to boiling operation. This first boiling channel worked for 400 hours at thermal loads of $(0.45 - 0.85) \cdot 10^6$ kcal/m^2·hr (steam content 5 - 20% by weight, flow rate 250 kg/hr). As the system proved satisfactory, more channels were brought to boiling operation; in the middle of 1957 there were 70 such channels, more than half of the total. The boiling operation was characterized by the following parameters: Steam content at the exit of the channels: 5 - 25% by weight, thermal load $(0.6 - 1.3) \cdot 10^6$ kcal/m^2·hr, water flow rate 0.7 - 1 m/hr at 100 atm and 190°C at the exit. Since superheating of steam constitutes one of the most important methods for increasing efficiency, experiments in this connection were carried out in the following years with a special experimental loop (Fig. 1) to study the methods of bringing the steam to a superheated state. For this, a method of

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Experience from work with ...

starting was perfected which requires only such equipment as is used in normal operation. During the period of transformation of the superheating operation, the superheating channel could either be closed, or it could work without cooling ("dry operation"), or with water cooling. The last named method had a number of advantages. The following starting methods were studied: Starting with continuous increase of the reactor power, starting with decrease of the reactor power, and combined methods (first the former, and then the latter but lowering the power only for about 60 - 70%). To increase the safety of the reactor, a special system was built in 1959 which prevents the escape of the gas - steam mixture into the ventilation system when the tubes of the experimental holes break down. This system "for localizing the damage due to accident" (Fig. 2) not only serves this purpose but also helps to purify the gas after the accident has occurred. The system consists of a cylindrical tank (6.2 m^3) whose lower part (1.8 m^3) is filled with water; in it are placed the cooling coils and special nozzles through which the steam - gas mixture streams into the water in the case of an accident. The gas is introduced in a sensitive gas container. The whole system is placed in a protective container equipped with manometers, thermometers, and dosimeters. There

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APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000824310013-9

Experience from work with ...

S/089/61/011/001/002/010
B102/B214

2 figures and 2 tables.

SUBMITTED: February 6, 1961

ACCESSION NR: AP4037630 S/0096/64/000/006/0005/0007

AUTHOR: Ushakov, G. N. (Candidate of Technical Sciences); Kochetkov, L. A. (Engineer); Konochkin, V. G. (Engineer); Sever'yanov, V. S. (Engineer)

TITLE: Operating experience of the first atomic power plant

SOURCE: Teploenergetika, no. 6, 1964, 5-7

TOPIC TAGS: atomic reactor, atomic power plant, reactor operation, direct flow reactor

ABSTRACT: The authors present data demonstrating the high reliability of plant equipment after ten years of operation. Seventy per cent of fuel elements operated 1.5 to 3.5 times longer than design expectations, while channels and reactor operated normally even with channel flows between 100-1000 g/hr. Compensation capacity of the uncooled, heat-resistant boron-steel rods was 80% that of the previously used boron carbide rods; increasing the boron content beyond 2.5--3.0% did not increase compensation. Life of the fully inserted rods was 54 days at a reactor power of 15 Mw. Filling the graphite pile with nitrogen enabled it to operate at 700-800C. In the beginning of 1960 all channels began operation under

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APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000824310013-9

ACCESSION NR: AP4037630

boiling conditions, and the entire reactor was converted to qualitatively new operating conditions. Prolonged experiment with superheated steam proved the feasibility of starting a direct-flow reactor by gradual displacement of water with steam, and the reliability of cooling it durin emergency shutdown. Orig. art. has: 4 tables.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 22Jun64 ENCL: 00

SUB CODE: NP NO REF SOV: 000 OTHER: 000

Card 2/2

ACCESSION NR: AP4041445 S/0089/64/016/006/0484/0488

AUTHORS: Ushakov, G. N.; Kochetkov, L. A.; Konochkin, V. G.; Sever'yanov, V. S.; Kozlov, V. Ya.; Sudnitsyn, O. A.

TITLE: Operating experience of the first atomic electric station in the world

SOURCE: Atomnaya energiya, v. 16, no. 6, 1964, 484-488

TOPIC TAGS: reactor control rod, reactor feasibility study, reactor hazard, reactor operation, boiling water reactor

ABSTRACT: Several preliminary tests aimed at ascertaining the feasibility of an atomic power station with the steam heated directly in the reactor are described. These included tests to determine the degree of throttling of thin parallel boiler tubes directly cooling the fuel elements at loads up to 10^6 kcal/m^2 hr with up to 30% steam by weight; tests to prevent pulsations of flow in the

Card 1/4

ACCESSION NR: AP4041445

parallel boiler tubes; experiments on nuclear superheating of the steam in an experimental single-circulation loop. The description covers experiments on the boiling and steam superheat modes in the reactor, tests on the operation of the uncooled control rods, and reactor safety tests. The original control rods made of boron carbide clad with stainless steel and cooled with water. Various shortcomings of these rods have necessitated the development of control rods made of tubular steel carrying equally spaced sleeves of boride steel (18 sleeves in a control rod 1500 mm long). Rods of this type had sufficient absorbing ability and service life to operate at 850C and an integral neutron flux 5 x 10^{20} neut/cm^2. The use of these control rods increased the reactivity margin by 0.8%, the operating period by 15 days, and the reactor efficiency by 1%. Other advantages and disadvantages of uncooled boron carbide scram rods are briefly discussed. The safety problems considered involve hermeticity of the fuel element cladding and of the fuel element internal tube which is under pressure. The effects of each

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ACCESSION NR: AP4041445

type of failure are discussed. In the former type the contamination of the first loop by radioactive corrosion products is relatively low even after 10 years of operation. A special system, which prevents the steam-gas mixture from entering the ventilation system in the case of energency of the latter type, is described. It is claimed that all the safety precautions cause the personnel exposure to radiation to be below the-established norm. Orig. art. has: 1 figure.

ASSOCIATION: None

SUBMITTED: 11Apr64 ENCL: 01

SUB CODE: NP, IE NR REF SOV: 000 OTHER: 000

Card 3/4

USHAKOV, G.N., kand. tekhn. nauk; KOCHETKOV, L.A., inzh.; KONOCHKIN, V.G., inzh.; SEVER'YANOV, V.S., inzh.

Experience in the operation of the first atomic power plant. Teploenergetika 11 no.6:5-7 Je '64. (MIRA 18:7)