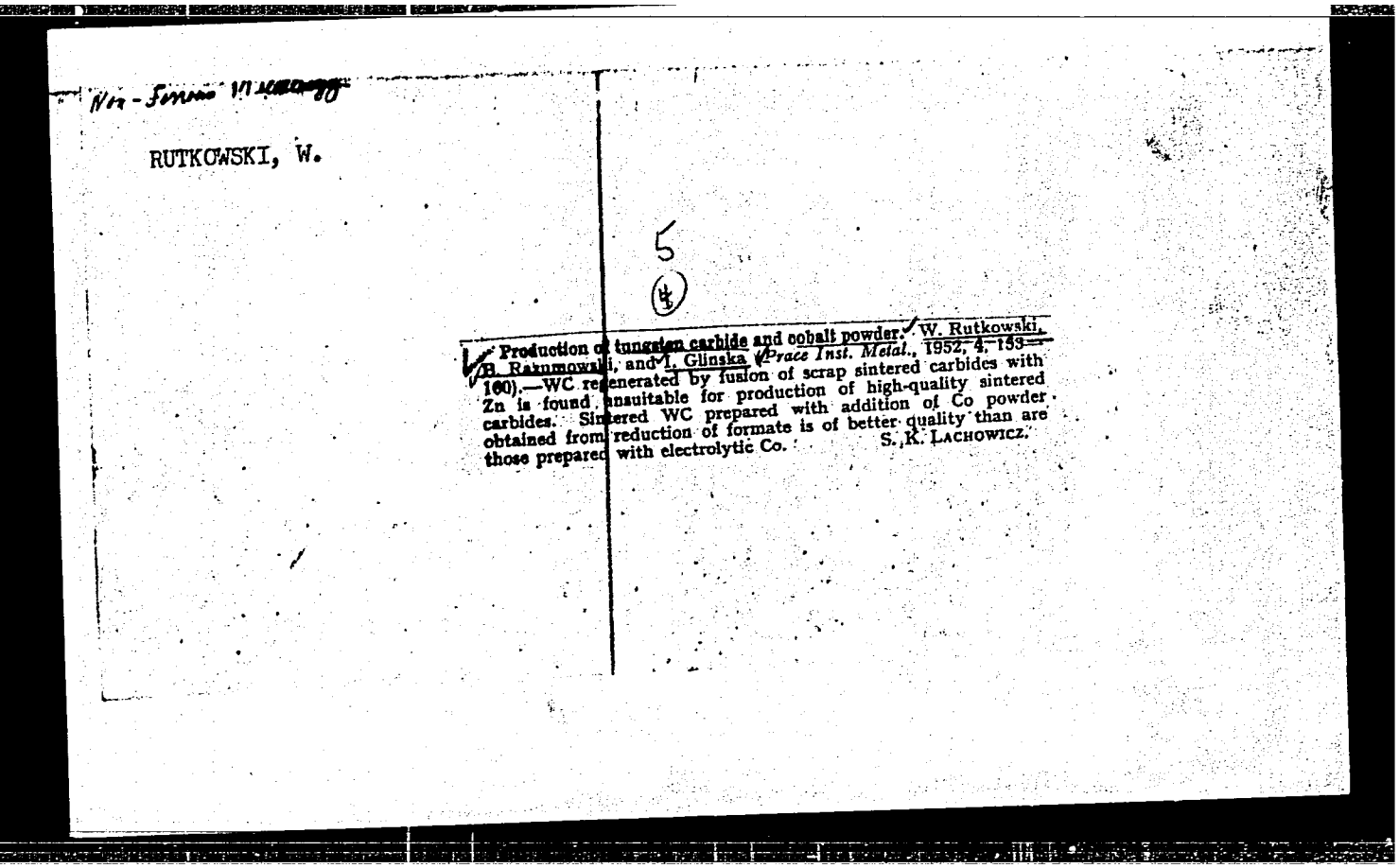


Ni - Ferrous Metallurgy

RUTKOWSKI, W.

5

Production of tungsten carbide and cobalt powder. W. Rutkowski, B. Ratajowski, and L. Glinska. (*Prace Inst. Metal.*, 1952, 4, 153–160).—WC regenerated by fusion of scrap sintered carbides with Zn is found unsuitable for production of high-quality sintered carbides. Sintered WC prepared with addition of Co powder obtained from reduction of formate is of better quality than are those prepared with electrolytic Co. S. K. LACHOWICZ.

ROTKOWSKI, W.

POL

12136 Infiltration of Porous Tungsten With Copper and Silver. (Part III of "Sintered Electric Contact Materials".) W. Rutkowski and S. Stolarz. *Henry Brutcher Translation No. 3481*, 20 p. (From *Prace Glownego Instytutu Metalurgii*, v. 4, no. 1, 1952, p. 67-81.) Henry Brutcher, Altadena, Calif.

Numerical data on influence of various factors, such as particle size of W powders, compacting pressure, sintering temperature, and infiltration time upon density of W skeletons before and after infiltration; porosity of W skeletons; amount of Cu, etc., infiltrated; hardness; electrical conductivity; loss of wt. on arcing. Tables, micrographs, 5 ref.

RUTKOWSKI, W.

(4) 9

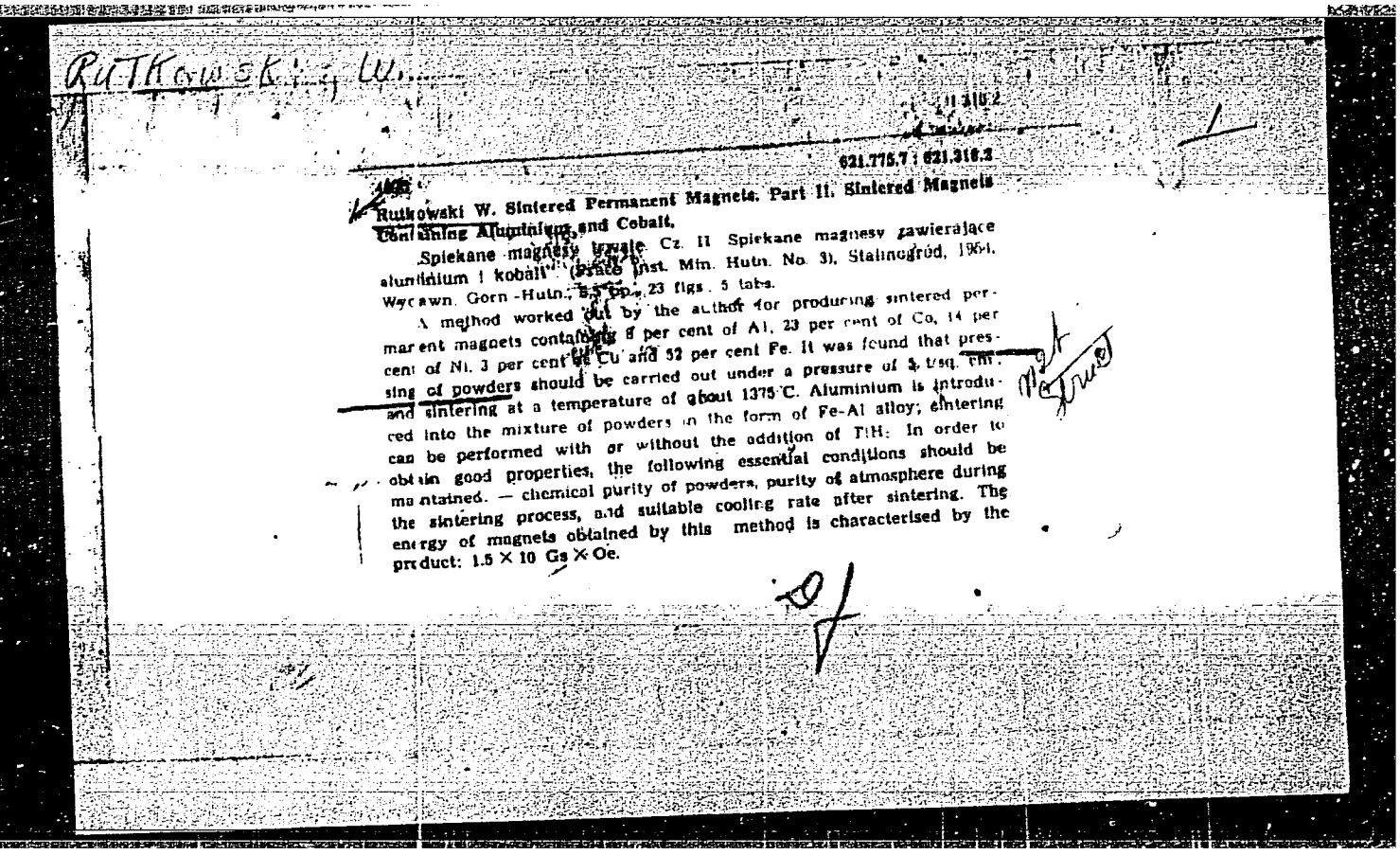
Journal of the Iron and Steel Institute
Vol. 17(
Apr. 19!4
Powder Metallurgy

Influence of Manufacturing Conditions on the Properties of Sintered Iron Powders. W. Cieklewicz, W. Rutkowski, and W. Zolkowski. [*Prace Instytutow Ministerstwa Hutnictwa*, 1953, 5, (4), 229–243]. [In Polish]. Short descriptions of the properties of sintered powders, their determination, the production of iron powders by electrolytic and mechanical methods, together with method of preparing, pressing, and sintering mixes are given. The influence of pressure and of the temperature and time of sintering on the properties of sinters made from iron powders was investigated. On the basis of experimental evidence, four stages of sintering temperatures are differentiated: Up to 600° C. (stage 1) the properties of pressed specimens remain unchanged during sintering; (2) during sintering in the 600–900° C. temperature range; and (3) above 1050° C. the properties of sinters improve with increasing temperature, whilst (4) in the 900–1050° C. range the properties deteriorate with increasing temperature. Optimum properties are obtained in the neighbourhood of 900° C., the exact temperature depending on the type of iron powder used.—v. o.

RUTKOWSKI, W.

Metallurgical Abst.
Vol. 21 May 1954
Powder Metallurgy

*Preparation of Powders of Low-Melting Metals by Atomization. W. Rutkowski and W. Cegielski (*Prace Inst. Mineral. Hutn.*, 1953, 5, (5), 291–297).—[In Polish]. Apparatus for atomization of molten Sn, Pb, and Zn by compressed air is described. Particle-size distribution, bulk *d*, and chem. compn. of the powders obtained were determined. The quality, as determined by metallographic analysis and *d* and Brinell hardness measurements, of various sintered products (anti-friction and bearing materials) that were made from these powders, compared well with the quality of other home-produced and foreign sintered materials.—S. K. L.



RUTKOWSKI, W.

621.775.7 : 621.318.2

Rutkowski W. Sintered Permanent Magnets. Part II. Sintered Magnets Containing Aluminium and Cobalt.

Spiekane magnesy trwałe. Cz. II. Spiekane magnesy zawierające aluminium i kobalt. (Prace Inst. Min. Hutn. No. 3), Stalinogród, 1964, Wydawn. Gorn.-Hutn., 5,5 pp., 23 figs., 5 tabs.

A method worked out by the author for producing sintered permanent magnets containing 8 per cent of Al, 23 per cent of Co, 14 per cent of Ni, 3 per cent of Cu and 52 per cent Fe. It was found that pressing of powders should be carried out under a pressure of 5 t/sq. cm. and sintering at a temperature of about 1375 °C. Aluminium is introduced into the mixture of powders in the form of Fe-Al alloy; sintering can be performed with or without the addition of TiH₂. In order to obtain good properties, the following essential conditions should be maintained. — chemical purity of powders, purity of atmosphere during the sintering process, and suitable cooling rate after sintering. The energy of magnets obtained by this method is characterised by the product: 1.5 × 10 Gs × Oe.

RUTKOWSKI, W.

(1)

13212* (Powdered Magnetic Materials.) Proszkowe materiały magnetyczne. W. Rutkowski and H. Rutkowska. *Prace Instytutów Ministerstwa Hutnictwa*, v. 6, no. 1, 1954, p. 20-28. Hard and soft magnets. Tables, graphs, micrographs, photographs.

10/8/54

RUTKOWSKI, W.

Metallurgical Abstracts
July 1954
Power Metallurgy

(2)

Sintered Permanent Magnets. I.—Sintered Permanent Magnets Without Aluminium. W. Rutkowski (*Prace Inst. Minist. Hutn.*, 1954, 6, (1), 50-56).—[In Polish]. Prepn. of permanent magnets by sintering Cu, Co, and Ni mixed powders is described. The powders used were produced by electrolysis and had the following purity: Cu 98·7, Co 99·7, Ni 98·3%. The best results were obtained with mixtures contg. Cu 45, Co 30, and Ni 25%. The powders were reduced in a H atmosphere for 10 hr. at 700° C. (600° C. in the case of Cu), mixed for 10 hr., and again heated in H to 650° C. for 10 hr. before compression to 5000 kg./cm.². The compressed specimens were then sintered in H for 3 hr. at 1250° C. and compressed again to 10,000 kg./cm.². This was followed by sintering in H for 2 hr. at 1200° C. The heat-treatment consisted of quenching in oil from 1100° C. and tempering at 650° C. for 6 hr. The product $BH_{max.}$ for the specimens thus prepared reached the value $1{\cdot}38 \times 10^1$ gauss-Oe., which is higher than figures quoted in the literature. Small addn. of lubricants such as paraffin, camphor, or glycerol before pressing were found to increase slightly the *d* of the products and improve their magnetic properties.—S. K. L.

RUTKOWSKI, W.

*Sintered Permanent Magnets. II.—Sintered Magnets Containing Aluminium and Cobalt. W. Rutkowski. (*Prace Inst. Mineral. Hutn.*, 1954, 6, (3), 133–141).—[In Polish].

Cf. *ibid.*, (1), 50; *M.A.*, 21, 947. Prodn. of sintered permanent magnets from powder contg. Fe 52, Ni 14, Co 23, Al 8, and Cu 3%, with and without addn. of 0·5% TiH_2, is described. The best magnets (B = 5100–5500 gauss, H_c = 510–680 Oe.) were obtained by mixing for 48 hr. the powders of Fe (44 parts) reduced in pure H for 10 hr. at 800° C., Ni (14 parts), and Co (23 parts) at 700° C., and Cu (3 parts) at 600° C., adding 16 parts of 50 : 50 Fe–Al alloy and 0·5 parts of TiH_2, mixing again for 6 hr. and pressing at 5 tons/cm.^{2} into small cylinders. The specimens so prepared were then sintered at 1350°–1450° C. in pure H for 3 hr., and furnace-cooled at a rate of 120° C./hr.—S. K. L.

RUTKOWSKI, W.

POL.

Production of zirconium powder by magnesothermic method. W. Rutkowski (Inst. Met. Niezelaznych, Poland). *Prace Inst. Hutn. Przem. Hutnicz.* 6, 179–83(1954); (English summary).—Zr powder (mixed with ZrH_2) contg. 91–4% Zr is obtained according to the reaction $ZrO_2 + 2Mg = Zr + 2MgO$ which is carried out at 900–50° in an atm. of H. Approx. values for ΔF° are as follows: at 900°K. 108.06, at 1000°K. 107.508, at 1100°K. 106.020, at 1200°K. 104.931, at 1300°K. 103.808, at 1400°K. 101.707, and at 1500°K. 95.822. These values were calcd. from a formula derived by A. Krupkowski (*Zasady nowoczesnej metalurgii w zarysie*, Warsaw, 1951) and from the molar heat capacities of Zr (C_P) for which R. derived the formula: C_P (in cal.) $= 5.17 + 6.239 \times 10^{-3} T - (1.621 \times 10^5 T^{-2})$. As a raw material $ZrSiO_4$ of the following compn. was used: SiO_2 31.20, ZrO_2 31.50, Fe_2O_3 0.45, TiO_2 0.4, MgO 0.091, Al_2O_3 1.050, calcining loss 0.200, and alkali 5.009%. ZrO_2 was obtained by 2 methods. The 1st one used a mixt. of $ZrSiO_4$, $NaHSO_4$, and CaF_2 at a ratio 1:1:1. The mixt. was melted in a graphite crucible at 1200° and after cooling and grinding it was boiled with dil. HCl 1% for 40 hrs. $Zr(OH)_4$ was pptd. in the filtrate by NH_4OH and calcined at 900° for 2 hrs. Alkalies were then removed by washing with dil. HCl (a very lengthy operation) and the product was then roasted at 900–1000°. The 2nd method used a mixt. of $ZrSiO_4$ and KHF_2 at a ratio 1:3. The mixt. was melted at 1200–1300° for 30 min. The initial heating had to be slow owing to H_2O evolution according to the reaction: $2ZrSiO_4 + 6KHF_2 \rightarrow K_2SiF_6 + K_2ZrF_6 + 2KOH + 2H_2O$. After cooling and grinding the mixt. was boiled in water (slightly acidified with HF) for 24 hrs. K_2ZrF_6 was obtained by

crystn. of the filtrate and then heated with concd. H_2SO_4 to change it to $Zr(SO_4)_2$. The latter was then dissolved in H_2O and treated with ammonia; the hydroxide was dissolved in HCl and once again pptd. by ammonia. After calcining at 950° the product had the following compn.: ZrO_2 91, SiO_2 0.12, Al traces, and loss on calcining 4.1%; the balance consisted of alkali like Ca and Ba. The latter method gave a product of greater purity (the product by the 1st method contained ZrO_2 89% only). Such products were mixed with Mg powder in a ratio 195:136.5 (by wt.) in a porcelain drum for 70 hrs. The mixt. was then placed in a horizontal alloy-steel tube of 45-mm. diam. and heated to 900–50° in an elec. oven in a H atm. for approx. 2 hrs. Although at this temp. ZrH_2 is not formed, the presence of ZrH_2 in the product should be attributed to the subsequent cooling in a H atm. (ZrH_2 forms at 300–400° and decomp. at 800-900°). The product was treated for 24 hrs. with HCl soln. through which N was bubbling and then decanted; such treatment was repeated 10 times. The particle size of the product was up to 1μ and because of such small size it was pyrophoric. It had to be kept under EtOH, ketones, or aromatic hydrocarbons. The powder reacted with water. The product obtained by the 1st method was gray and by the 2nd black-gray. A spectrographic analysis showed presence of Si, Mg, Fe, Al, Hf, and traces of Cu, Mn, and As.

Frank J. Hendel

WIECHETEK, A.

"Influence of the Cooling Process on the Quality of Greave.", p. 334, (GOSPODARKA MIĘSNA, Vol. 6, No. 11, Nov. 1954, Warszawa, Poland)

SO: Monthly List of East European Accessions, (EEAL), LC, Vol. 4, No. 5, May 1955, Uncl.

RUTKOWSKI, W.; RUTKOWSKA, H.

Powdered metals of hard and soft magnetic properties. Hutnictwo. p.8.
PWNIK (Panstwowe Wydawnictwa Techniczne) Katowice
Vol. 21, no. 2, Feb. 1954

So. East European Accessions List Vol. 5, No. 9 September 1956

RUTKOWSKI, W.

Research on thermistors, Biuletyn.

p. 13
Vol. 21, no. 4, Apr. 1954
HUTNIK
Katowice

SO: Monthly List of East European Accessions (EEAL), LC, Vol. 5, no. 2
Feb. 1956

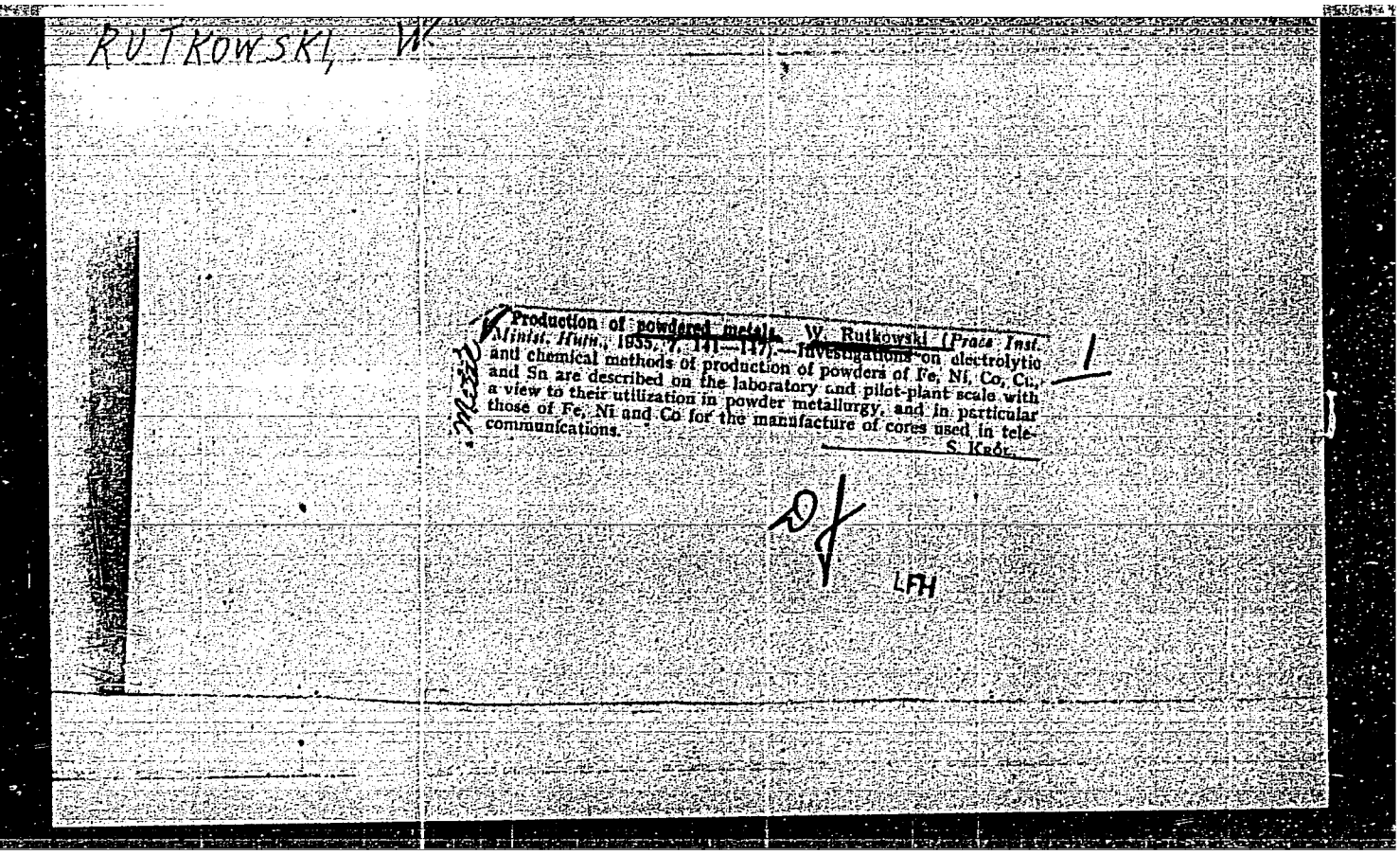
[illegible], V.

Al[illegible] in [illegible] metallurgy. p. 2[illegible]5

[illegible] vol. 21, no. 7, July 1954

Poland

SO. [illegible] ACCESSIONS LIST vol. 5, no. 10 Oct. 1956



RUTKOWSKI, W.

Metals

Production of powdered metals. W. Rutkowski (*Prace Inst. Minist. Hutn.*, 1955, 7, 141—147).—Investigations on electrolytic and chemical methods of production of powders of Fe, Ni, Co, Cu, and Sn are described on the laboratory and pilot-plant scale with a view to their utilization in powder metallurgy, and in particular those of Fe, Ni and Co for the manufacture of cores used in telecommunications. S. Król.

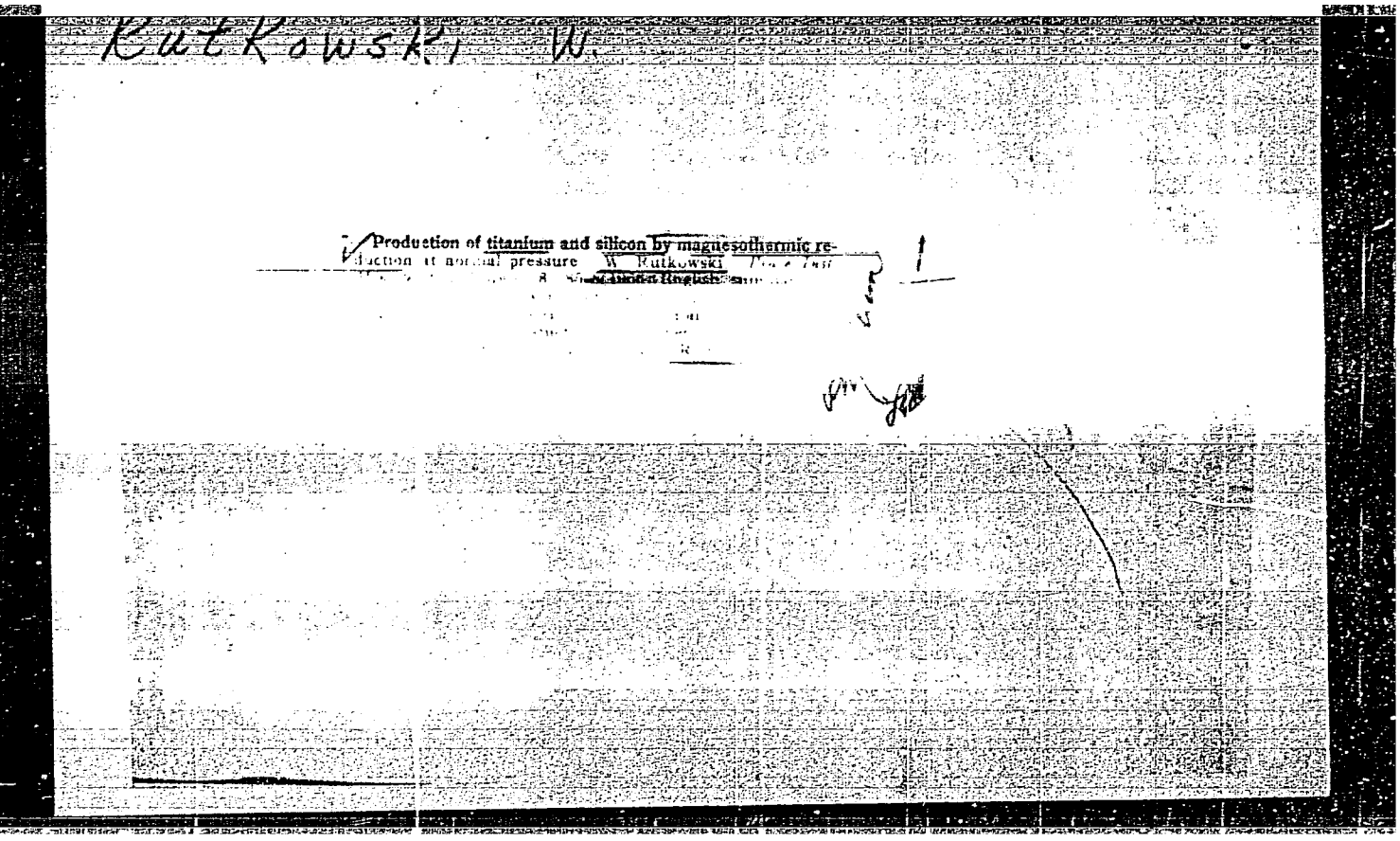
LFH

RUTKOWSKI, W.

POLON

10755* Obtaining and Sinturing of Molybdenum Silicide. Otrzymywanie i spiekanie krzemku molibdenu. (Polish.) W. Rutkowski. *Hutnik*, v. 22, no. 1, 1955; *Biuletyn Informacyjny Instytutow Ministerstwa Hutnictwa*, v. 6, no. 1, 1955, p. 1-3.

Micro-structure and hot-gas corrosion of Mo silicide sintered at 1400 C. Comparisons with other alloys. Micrographs, photographs.



RUTKOWSKI, W.

✓ [Production of] Sintered Magnets of AlNi Type. W. Rutkowski and S. Stolarz (*Prace Inst. Mintst. Hutn.*, 1956, 8, (3), 155–161).—[In Polish]. Magnets were prepared by sintering a mixture of Fe, Ni, and Al powders. To prevent oxidation of Al, a 50 : 50 Fe–Al alloy was used. Sintering was done in a reducing (H) atmosphere in specially prepared boats, and also under the conditions permitting oxidation. Some of the magnets were afterwards heat-treated. Phys. properties of the magnets were: d 6–6·6 g./c.c. (higher d for magnets weighing 3–4·5 g.; lower for magnets weighing 7·5 g.; this was due to different compressibility); shrinkage 1–4%; hardness 130–180 kg./mm.^{2}. Phys. properties varied according to chem. compn. and methods of prepn. Magnetic properties were: coercive force H_{ci} 132–570 Oe., remanence B_{ri} 1434–6450 gauss. These properties increase with time of sintering and heat-treatment, and are higher for smaller magnets than for the large ones. The best properties were obtained with a particle size <40 μ, because of better compressibility, homogenization, viscous surface-flow, and easier breakdown of the oxide film on the surface of the powders.—A. W.

RUTKOWSKI, W.

Application of electrolysis of zincates to recovery of zinc from zinciferous wastes. W. Rutkowski and B. Winsch (Inst. Metali Nieżelaznych, Gliwice, Poland). *Prace Inst. Min. Hutnic.* 8, 153 [illegible] (English summary). Zinciferous wastes (I) were leached for [illegible] hrs. with a [illegible] 250 g. NaOH/l. of H_2O at 80°. [illegible] of the above [illegible] Zn in the [illegible] was recovered from I. The optimum conditions of electrolysis [illegible] when the soln. contained Zn 25-30 g. [illegible] and NaOH [illegible], at the same time cathodic d. was 27 amp./sq. dm., [illegible] 4.1 v., and temp. 40°. The current efficiency was [illegible] 4%. The pptd. Zn is in the form of very fine powder; it has a high chem. reactivity owing to a comparatively large surface of each particle (the surface is much larger than the surface of metallurgical Zn powder). The above method also can be applied to oxidized Zn raw materials (cinders and ores). F. J. Hendel

RUTKOWSKI, W.

RUTKOWSKI, W. Up-to-dateness of periodicals and postconference materials. p. 203.

Vol. 77, no. 5, May 1956
PRZEGLAD TECHNICZNY
PHILOSOPHY & RELIGION
Warszawa, Poland

SO: East European Accession, Vol. 6, March 1957

RUTKOWSKI, Wladyslaw

Bogumila Winsch and Wladyslaw Rutkowski (GLiwice), "Rueckgewinnung von Zink aus Abfaellen durch alkalische Elektrolyse," Chemische Technik (Berlin), 9/11, November 1957, pp. 654-61.

Received on 23 September 1957.
Communication from the Institute for Nonferrous metals, Gliwice.

RUTKOWSKI, W.

6

621.318.3

✓ 696. NEW PROCEDURES FOR THE PRODUCTION OF SINTERED ALNI MAGNETS. W.Rutkowski and S.Stolarz. Mitteilungsbl. Elektrotech., Vol. 11, No. 2, 79-81 (Feb., 1957). In German.

Describes a procedure for the production of sintered Fe–Ni–Al magnets in which no special protective measures against the oxidation of the Al are required. Electrolytic iron and nickel powders are used, together with aluminium in the form of Al Fe. The powders are compacted under high pressure and sintered in a slow flow of hydrogen. The influence of cooling rate and density on the magnetic properties of alloys of composition Fe 66.5%, Ni 22%, Al 11.5% and Fe 54.5%, Ni 28%, Al 12.5% are described, and the effect of powder size and compacting pressure on the aluminium oxide films is discussed briefly.

A.E.De Barr

RUTKOWSKI, W.

W, Rutkowski (Gliwice), "Untersuchungen zum Sinterlauf und von Rekristallisationsvorgaengen," Neue Huette (Berlin), 3/1, January 1958, pp. 37-43.

Studies on the Stages of Sintering and on Recrystallization Phenomena

Received on 11 September 1957.

(Several Polish authors are listed in the bibliography which accompanies the article.)

Direct methods in flame-photometric analysis. II. J. Malinowski, W. Rutkowski, and S. Szymczak (Inst. Badań Jądrowych, Warsaw). *Polish Acad. Sci. Inst. Nuclear Research., Rept.* No. 110/VIII, 5 pp. (1959)(in German); *cf. ibid.* No. 20/VIII (1958); *CA* 53, 11093*b*.—Interferences of SeO_3^{--} (I), $H_4TeO_6^{--}$ (II), TiF_6^{--} (III), and Ti^{4+} were studied in C_2H_2–air (Zeiss app., Model III), or oxyhydrogen (on Uvispek) flame-photometry detns. of Ca and Sr. The Na salt of EDTA was added to prevent pptn. II and III, and I in C_2H_2–air flame, suppressed the emission of Ca (at 422.7 and 622 mμ), until a 1:1 mole ratio was attained. This is believed to be a result of free metal ions combining with ionized anions. I, II, and Ti^{4+} did not interfere with Sr detn. (at 460.7 mμ). Ti^{4+} and III suppressed Ca and Sr emissions, resp., in direct proportion to concn. A. Szafrański—

RUTKOWSKI, W.

TECHNOLOGY

PERIODICAL: HUTNIK; Vol. 25, no. 10 Oct. 1958.

RUTKOWSKI, W. Pressing of brittle powder, p. 397.

Monthly List of East European Accessions (EEAI) LC Vol. 8, No. 4 April, 1959, Unclass.

18(5) POL/39-59-4-4/14

AUTHOR: Rutkowski, Wladyslaw, Doctor and Bryniarski, J, Engineers

TITLE: Problems of Powder Elastic Strain during Pressing

PERIODICAL: Hutnik, 1959, Nr 4, pp 154-158 (Poland)

ABSTRACT: One of the most interesting and important phenomena to be observed during powder pressing is the elastic strain they exhibit after pressure is released. Some pressed powders crumble after being removed from the matrix. This can be influenced both by the method adopted during pressing and by the properties of the powder itself. The external pressure applied by the press is equal to the powder's reaction. As pressure is increased elastic strain appears and finally, when external pressure passes the point of critical tension the powder is subjected to plastic strain. After pressure is removed, plastic strain remains but only elastic tension is observable. Fig. 1 shows the re-

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Problems of Powder Elastic Strain during Pressing

sults of Balshin's experiments with a Gagarin press. He is of the opinion that strain depends on: the hardness of the materials used, the weight used, its oxidation and granular shape, the role of gases which occupy 80% of the space in the matrix and finally the power of the press itself. Lichtman has found that the use of certain liquid agents decreases elastic strain by spreading tension more evenly and reducing friction. Experiments designed to confirm this were carried out with a press made by the Wolpert Werke. Pressure of from 1 to 15 tons per cm^2 were applied to about 10 mm of various powders (this being their thickness under the press). The materials used were: electrolitic iron, oxidised and non-oxidised, mechanic iron from the Hametag mills, chromium, copper, lead and silver powders. Table 1 gives the physical properties of these materials. Pressing was carried out with these powders in their normal state and again with

Problem of Powder Elastic Strain during Pressing

the powders wtted with a solution of camphor in alcohol (ethyl) and added to make up about 1.5% of the powder's weight. Measurements of the powder's shape were taken to the nearest 1/100th of a mm. Effects of the strain on the press itself were also taken into account. It was found for instance, the matrix was wider by 9/1,000ths of a mm after the experiment. Fig. 2 gives microphotographs of the powder used, Fig 3 results of the experiment without camphor and Fig 4 results with camphor. Figs 5, 6 and 7 give closeups from Figs 3 and 4. Fig 8 sums up the results of the experiment. It was found that, as a whole, elastic strain changes together with pressure. Three general ranges of pressure may be distinguished in this respect: 0-4 t/cm^2; 4-8 t/cm^2 and 8-15 t/cm^2. These are shown in Fig 8 as A,B and C. In general, elastic strain is small in range A while there is still room for compression, it is greatest in range B and again

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decreases in range C where the high pressure applied gives the powder greater cohesion. Another factor effecting strain is the size of the grains. It was found that the smaller the grains, the greater the change in the powder's measurements after removal from the press. It was also found that the degree of oxidation affects strain, increasing it especially in the A range. Finally, it was found that such agents as camphor tend to even out the differences between the three ranges of pressure and make for better all round results of pressing. There are 6 diagrams, 6 photographs, 1 table and 21 references, 9 of which are Polish, 5 Soviet, 4 English, 2 German and 1 Czech

ASSOCIATION: AGH - Krakow Katedra Metalografii (AGH- Cracow Chair of Metallurgy)

RUTKOWSKI, W.

Distr: 4E2c

2
1

Effect of oxide content on mechanical properties of sintered joint of two metal powders. W. Rutkowski (Inst. Metali Niezelaznych, Gliwice, Poland). *Prace Inst. Hutniczych* 11, 277–84(1959).—The effect of O added as CuO to Cu powder, Fe_2O_3 to Fe powder, and WO_3 to W powder on the sintering of these metals and the properties of transition layers in the 2-component specimens, 1 part of which was sintered in Cu the other in W or Fe, were examd. The oxides were admitted in the amt. of 2, 4, 8, and 16 wt. %, and the specimens were pressed at 5 tons/sq. cm., followed by sintering in H at 1000° for 20, 120, 220, or 320 min. The microhardness and elec. resistivity of the transition zone were measured, and bending strength of the specimens and d. of either part were detd. The optimum properties of sintered metals were found on relatively small addns. of oxides: CuO 4%, Fe_2O_3 2–4%, and WO_3 2–4%; however, the effect was interrelated with sintering time. The best properties in the transition zone were found in specimens of the system Cu + 4% CuO–Fe + 4% Fe_2O_3. The improvement in the quality of samples was explained by the strong activity of a freshly reduced surface. W. Tomaszewicz

JK

P/039/60/0 00/012/002/002
A221/A026

AUTHOR: Rutkowski, Władysław, Doctor of Engineering, Docent

TITLE: The Role of Heat Expansibility in the Lubrication Process of Sintered Bearings

PERIODICAL: Hutnik, 1960, No. 12, pp. 472 - 476

TEXT: In this article the author explains the selflubrication principle of bearings made of sintered metallic powders. Bearings, after being sintered, are soaked in proper hot oil, which fills all pores between the grains of sintered metallic powder. It is known that while the machine fitted with selflubricating bearings is in motion, the oil flows out and lubricates the shaft; on the other hand, when the machine stops or is at rest, the oil is drawn back into the bearing. In order to explain this phenomenon, the author established that there are only five possible patterns, in which the grains, assuming they are perfectly round, can settle against each other. Knowing the pattern he calculated the free space between the grains. These five patterns are: a) cubic, b) ortho-rombic, c) spatially central, d) tetragonal and e) rhombohedral. Maximum porosity corresponds to the first - and minimum porosity to the last pattern. However, no orderly and uniform pattern is obtained while filling the mold with metallic powder, because it settles

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P/039/60/000/012/002/002
A221/A026

The Role of Heat Expansibility in the Lubrication Process of Sintered Bearings

at random. In order to find out the average pattern and consequently the average porosity, the author carried out 1,000 experiments by filling a glass cube with accurately calibrated shot. By this way he found that the average porosity takes 31.51% of the total space. It is obvious that with increasing temperature of the bearing all grains expand and simultaneously the free space between them increases, too. Assuming temperature increases from 20 to 60°C and taking into consideration the expansion coefficient of the alloy of which the powder is made, which is 15 x 10^{-6}, the volume of pores will increase to 18 x 10^{-4} of the initial volume. However, because the expansion coefficient of oil is greater, being 0.0007 $cm^3/°C$, the oil will attain the volume 28 x 10^{-3} of the initial volume and therefore it flows out of the pores. Another aspect of this reasoning is the external pressure exerted on the bearing by its outer casing. Because of the confined space, the expanding grains of metallic powder exert some pressure against each other and sustain some deformation which causes shrinkage of pores. In this case again the oil which expands is pressed out of the pores. Lateron, the bearing cools down either because of reduced friction caused by lubrication or due to turning off the machine, the grains revert to their original shape and the oil is sucked back. There are 6 photos, 3 figures, 1 table and 16 references: 12 Polish and 3 English and 1

Card 2/3

P/039/60/000/012/002/002
A221/A026

The Role of Heat Expansibility in the Lubrication Process of Sintered Bearings

German.

ASSOCIATION: AGH - Kraków, Zakład Metalurgii Proszków (AGH-Cracow, Powder Metallurgy Department)

Card 3/3

S/137/62/000/001/046/237
A060/A101

AUTHOR: Rutkowski, Władysław

TITLE: Recrystallization of sintered silver under addition of insoluble impurities

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 1, 1962, 37, abstract 1G275 ("Arch. hutn.", 1961, 6, no. 2, 109 - 135 [Polish; Russian, English summaries]) .

TEXT: The effect of W upon the process of Ag recrystallization was studied. W was being introduced by the methods of powder metallurgy. At a W content up to 1% no effect of the W upon the recrystallization was observed. There are 19 references.

O. Padalko

[Abstracter's note: Complete translation]

Card 1/1

MALINOWSKI, Jerzy; RUTKOWSKI, Wladyslaw; SZYMCZAK, Swietlana

Indirect methods in flame analysis. Pt. 2. Chem anal 6 no.2:173-176 '61. (EEAI 10:9)

1. Department of Analytical Chemistry, Institute of Nuclear Research, Polish Academy of Sciences, Warsaw. Head of Department: Prof. dr. J. Minczewski.

(Flame photometry) (Spectrophotometry) (Calcium) (Strontium)

RUTKOWSKI, Wladyslaw; MALINOWSKI, Jerzy

Determination of lithium, sodium, potassium in nickel oxide with the use of flame photometry. Chem anal 6 no.6:1065-1069 '61.

1. Department of Analytical Chemistry, Institute of Nuclear Research, Polish Academy of Sciences, Warsaw. Head of the Department: prof. dr. J. Minczewski.

S/137/62/000/005/056/150
A006/A101

AUTHORS: Rutkowski, W., Szymanski, J.

TITLE: Measuring the specific surface of metal powders

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 5, 1962, 34, abstract 5G222 ("Rudy i metale niezel", 1961, v. 6, no. 8, 338-340, Polish; Russian, English, French and German summaries)

TEXT: A description is given of a method and equipment to measure the surface from low-temperature adsorption of N vapors with the aid of the Brunauer-Emmet-Teller equation. It is shown by the example of vortex Fe-powder that the specific surface is a linear function of the magnitude of powder particles. Low-temperature oxidation of Fe- and Cu powders at 300°C leads to an increase of the specific surface by more than twice.

R. Andriyevskiy

[Abstracter's note: Complete translation]

Card 1/1

S/137/62/000/006/075/163
A052/A101

AUTHOR: Rutkowski, W.

TITLE: The effect of oxides when sintering metal powders

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 6, 1962, 33 - 34, abstract 6G258 ("Neue Hütte", v. 6, no. 12, 1961, 788 - 790, German)

TEXT: The effect of O on the properties of sintered Fe and Cu powders was investigated. Metal samples were produced both from oxidized powders and by adding ready oxides to the initial Fe and Cu powders. The O content was varied from 1 to 1.6% for Fe and from 0 to 0.6% for Cu. The effect of the O content on the density and mechanical properties H_V and σ_{bu} of samples was studied. Curves representing the corresponding dependences are given. It is established that there is an optimum of properties at a certain O content which corresponds to 2 - 4% Fe_2O_3 for Fe and 4% CuO for Cu. It is shown that both methods of introducing O have the same effect on the properties of metals and on the sintering process (in reducing atmosphere). This fact indicates that the favorable effect of oxides is connected not only with their reduction in the process of sintering,

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The effect of oxides when sintering metal powders

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but also with the secondary oxidizing reactions of the products of oxide reduction, which leads to the formation of highly active pure metallic surfaces (contacts) promoting sintering. At a low O content a longer sintering time is needed to reach the same results as at a higher O content; this is explained by the effect of water vapor.

I. Brokhin

[Abstracter's note: Complete translation]

Card 2/2

P/039/61/000/007-8/001/001
D001/D101

AUTHORS: Rutkowski, W., Docent, Doctor of Engineering, and Pasierbek, E., Master of Engineering

TITLE: Determination of electrochemical potential changes as means of sintering process investigation

PERIODICAL: Hutnik, 28, no. 7-8, 1961, 274-280

TEXT: In this article the authors present the results of their investigations concerning the practical control of the powder sintering process. The purpose of this research was to design an apparatus for controlling the powder sintering process by means of measuring the electrochemical potential of sinters as based on the B. Bovarnick publication "Study of Sintering Carbonyl Iron by Electrochemical Potential". The aim of this work was to restrict the sintering phenomena to the formation of links between powder grains by means of pressure, temperature and time. According to the Gibbs-Helmholtz formula, there is a linear relation between free energy and the electrochemical potential, therefore, the latter can be

Card 1/4

Determination of electrochemical...

used for controlling the progress of sintering. The authors' study was divided into two parts; at first the electrochemical potential of compressed samples with the density of 4.0 - 6.0 g/cm^3 and samples compressed and sintered for 1, 2, 4 and 8 hours was measured. This was followed by checking the density and microstructure of samples. The samples, 20 of them, were made of carbonyl iron powder, compressed by 5.4, 7.2, 10.8, 14.4, 16.2 and 18 t pressure and formed into 7 x 5 x 30 mm blocks. 16 of them were sintered and the remaining 4 were examined in the raw state. The sintering was carried out in a protective atmosphere of hydrogen at 1,000°C. The only variable parameter of the sintering process was the time which was selected as 1, 2, 4 and 8 hours, respectively. Each sample in turn was connected with a calomel electrode and the EMF of the thus formed element was measured. The system was standardized by means of a Weston cell. The electrodes were kept in a nitrogen protective atmosphere; the air from the cell being removed by a vacuum pump. Each test was repeated 3 times with practically identical results. The measured potentials were influenced by samples' density and

sintering time. For samples sintered for 1 hour, the potential varied according to density from 571.5 to 566.0 mV. For samples sintered for 2 hours it varied from 569.15 to 560.2 mV; for samples sintered four hours the corresponding figures were 560.0 to 544.2 mV, and for samples sintered eight hours they were 532.0 to 527.0 mV. When, subsequently, the densities of samples were checked, it was found that the density curve rises steeply for samples sintered for shorter times, while for longer sintered ones the density curve falls. On examination of the samples' microstructure it was established that longer sintering time causes an increase of grain size and reduction of inter-grain pores. The authors arrived at the following conclusions: The measurement of electrochemical potential can be successfully applied for sintering control; this method is sensitive to variable parameters of sintering process, in particular, to sintering time; electrochemical potential measuring results are in agreement with subsequent density and microstructure check examination; the measurement results are reproducible within an approximate 4% accuracy. There are 9 photos, 2 tables, 1 figure,

Determination of electrochemical... P/039/61/000/007-8/001/001
D001/D101

2 graphs, 6 Soviet-bloc and 5 non-Soviet-bloc references. The four most recent references to English-language publications read as follows: Bovarnick, "Study of Sintering of Carbonyl Iron by Electrochemical Potential", Planseeberichte fuer Pulvermetallurgie vereinigt mit Powder Metallurgie Biulletin, August 1959, no. 2.; Goetzel, C. G. Metals a. Alloys, 12, 1940; Bookris, Herringshaw. Disc. Far. Soc. 6. 1947; Latimer. "The Oxidation States of the Elements and Their Potentials in Aqueous Solutions" New York, 1938. [Abstracter's note: The name Bovarnick is spelled in two different ways].

Card 4/4

S/226/62/000/001/014/014
I003/I201

Author. Rutkovsky, V.

Title: THE DEVELOPMENT OF POWDER METALLURGY IN POLAND.

Periodical: *Poroshkovaya metallurgiya*, no. 1(7), 1962, 93–96

Text: Before World War II the industrial output of metal powders in Poland was small and dependent on supplies of raw materials from abroad. The rapid post-war development of industry in Poland gave a great boost to powder metallurgy, and despite numerous difficulties stemming from a severe lack of equipment and know-how, Poland has today several plants producing a relatively wide range of metal powders of which the chief producer is the "Baildon" plant in Katowice. There is a photo of the Dept. of Powder Metallurgy in the Glivits Institute of Metallurgy.

Association: Gornaya i metallurgicheskaya Akademiya, g. Krakov (Mining and Metallurgical Academy, Kracow).

Submitted: July 22, 1961

Card 1/1

MINCZEWSKI, Jerzy; RUTKOWSKI, Wladyslaw

Fluorometric determination of trace content of beryllium in silicates by means of morin. Pt. 1. Chem anal 7 no.6:1107-1118 '62.

1. Department of Analytical Chemistry, Institute of Nuclear Research, Polish Academy of Sciences, Warsaw.

RUTKOWSKI, W., doc. dr inz.; RUTKOWSKA, H., mgr inz.; HANDZLIK, J., mgr inz.

Certain physical properties of sintered iron of particularly large ferrite grains obtained by adding phosphorus. Hutnik P 29 no.6:213-218 Je '62.

BASINSKA, Maria; RUTKOWSKI, Wladyslaw

Comparison of distillation and extraction methods of separating trace amounts of germanium; application for the determination of germanium in minerals and coal. Chem anal 8 no.3:353-360 '63.

1. Department of Analytical Chemistry, Institute of Nuclear Research, Warsaw.

RUTKOWSKI, Wladyslaw

Fluorometric determination of trace quantities of beryllium in silicate minerals with morin. Pt.2. Chem anal 8 no.3: 389-394 '63.

1. Department of Analytical Chemistry, Institute of Nuclear Research, Warsaw.

RUTKOWSKI, Wladyslaw, doc. dr inz.; KOWALSKI, Jan, doc. mgr inz.;
KOZIOL, Wladyslaw, inz.

Certain conditions connected with obtaining iron powder.
Rudy i metale 8 no.6:210-213 Je '63.

RUTKOWSKI, Wladyslaw, doc. dr. inz.

Development prospects for powder metallurgy. Rudy i metale 8 no.9:335-337 S'63.

RUTKOWSKI, W., doc. dr inz.; FRYDRYCH, J., mgr inz.; LESKIEWICZ, H., mgr inz.

Specific surface calculation of powder by the methanol vapor adsorption method. Hutnik P 30 no.2:48-52 F '63.

L 10697-65 EWG(j)/EPF(c)/EPR/EWP(k)/EWP(b) Pr-4/Pr-4/Ps-4 JD/MLK

ACCESSION NR: AP4046760 Z/0000/64/000/000/0153/0161

AUTHOR: Rutkovskiy, V. (Rutkovskiy, V.)

TITLE: Sintering of the system metal-oxide

SOURCE: Medzinarodna konferencia o praskovej metalurgii. 1st, 1962. Problemy praskovej metalurgie; sbornik vedeckych prac (Problems in powder metallurgy; collection of scientific papers). Bratislava, Vyd-vo SAV, 1964, 153-161

TOPIC TAGS: oxide film, oxide grain, reduction, subsequent oxidation, phase reaction, surface energy, wettability surface area

ABSTRACT: Two alternatives of sintering metal-oxide systems are discussed: (1) when the metal particles retain surface oxide film, and (2) when the grains are composed almost entirely of oxides. In the first case, the following processes can occur: reduction, subsequent oxidation, and reaction between the existing phases. These processes are discussed, with special attention to the importance of increased surface area and surface energy. The wettability and its measurement by means of the wetting angle of the liquid component are discussed in detail for the metal-oxide sintering system. The author concludes:

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L 10697-65

ACCESSION NR: AP5046760

1. Oxygen influence the course of sintering if layers are already present on the surface of the grains or if an excess of oxide is present. 2. The effect of the oxygen content depends on the duration of sintering. At a low content the sintering takes longer. By introducing a large quantity of steam the process can be significantly accelerated. 3. The percentage of oxygen content is of great importance. 4. This optimum content is low, but depends on the metal treated. 5. The effect of oxides added to the powder mixture can be compared to that of an oxygen film. Orig. art. has: 5 figures.

ASSOCIATION: Akademia Corniczo-Hutnicza, Krakov (Mining and Foundary Academy)

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 001 OTHER: 017

Card 2/2

ACCESSION NR: AP4015320 P/0046/64/004/001/0047/0055

AUTHOR: Gauk, Wieslaw,; Kamieński, Erwin (Kamen'ski, E.); Rutkowski, Władysław (Rutkovski, V.)

TITLE: Control rods with sintered boron carbide for the "Anna" zero power level reactor

SOURCE: Nukleonika, v. 4, no. 1, 1964, 47-55

TOPIC TAGS: reacotr, Polish "Anna" reactor, boron-carbon system, reactor control, metal boride, reactor control material, boron carbide, reactor control rod, zero power level reactor

ABSTRACT: Primary purpose of work was an attempt to densify boron carbide powder to a 95% minimum and to shape rode cores. Further studies dealt with grinding of the shaped pieces, surface finish of the aluminum tubes which were to hold the boron carbide, and with welding of the end caps closing the tubes. Densification tests included hot and cold moulding of pure boron carbide and with admixtures. Individual powders as well as their blends with various

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ACCESSION NR: AP4015320

lubricants were cold mouled under a pressure of 5 to 20 tons/cm^2. Stearic acid turned out to be the best lubricant. The highest attained density in the pressed tablets was 60% of theoretical density. Hot moulding was one in an apparatus consisting of three basic parts: a 50 kilovolt amp transformer, a 2500 C Tammann furnaces; and instrumentation. The transformer can be powered by a 220 or 380 volt circuit. Hot moulding tests of B_4C powders were intended for determing the lowest moulding temperature and pressure which are required for producing core shapes with a density of 2.4 to 2.5 g/cm^3. Shaped core pieces with a height up to 100 mm had an average density of 2.0 to 2.3 g./cm^3, depending upon height, when moulded at 2000C under a pressure of 200 kg/cm^2. The density of the shapes whose height was not above that of the average was full homogeneous and almost that of the theoretical density. Based on test findings, the core shapes are produced by weighing out powder blends of 600, 800, and 1200 grain size; wet grinding with addition of stearic acid and benzene; drying or granulation and drying; cold moulding under a pressure of 5 tons/cm^2; transferring the moulded tables to graphite dies; hot moulding

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ACCESSION NR:AP4015320

from 1700 to 2100C under a pressure of 100-200kg/cm^2; removal of the shaped pieces from the graphite die; cleaning and grinding; washing, drying and density determination. Those pieces whose densities were within the prescribed limits and whose sizes were within the tolerance limits were used as the control rod cores. These were then encapsuled in aluminum tubes which were then closed by welding end caps onto them. "Authors wish to thank Mast. of Eng. E. Mizerza as well as M. Pronaszka and C. Wozniak for their participation in producing the control rods." Orig. art. has: 2 figures.

ASSOCIATION: Instytut Badan Jadrowych, Zaklad Paliw Jadrowych i Materialow Konstrukcyjnych, Warsaw-Swierk(Institute of Nuclear Research, Department of Nuclear Fuels and Construction Materials)

Card 3/4 3

RUTKOWSKI, Wladyslaw, doc.dr inz.; CYUNCZYK, Aleksander, mgr inz.

Dispersion hardened sintered materials. Hutnik P 31 no.1/2: 16-21 Ja-F'64

1. School of Mining and Metallurgy, Krakow.

L 20584-66 EWP(e)/ETC(f)/EWG(m)/EWP(t)/EWP(k) LJP(c) JD/JG/AT/WH

ACC NR: AP6012012 SOURCE CODE: PO/0046/65/010/008/0485/0492

AUTHOR: Rutkowski, Wladyslaw--Rutkovski, V.; Szteke, Witold--Shteke, V.

ORG: Department of Nuclear Fuels and Construction Materials, Institute of Nuclear Research, Swierk (Zaklad Paliw Jadrowych i Materialow Konstrukcyjnych, Instytut Badan Jadrowych)

TITLE: Some properties of boron carbide sintered under pressure

SOURCE: Nukleonika, v. 10, no. 8, 1965, 485-492

TOPIC TAGS: boron compound, carbide, nuclear reactor control equipment, hardness, tensile strength

ABSTRACT: In connection with the manufacture of the boron carbide control and safety rods for the zero-power Anna reactor, tests were made of some properties of pressure-sintered boron carbide. Hardness, and its dependence on the pressing-piston distance, tensile strength, microstructrue, and diffraction patterns were investigated. Orig. art. has: 9 figures. [NA]

SUB CODE: 18, 20 / SUBM DATE: --Dec64 / ORIG REF: 003 / OTH REF: 001
SOV REF: 001

Card 1/1

(1)

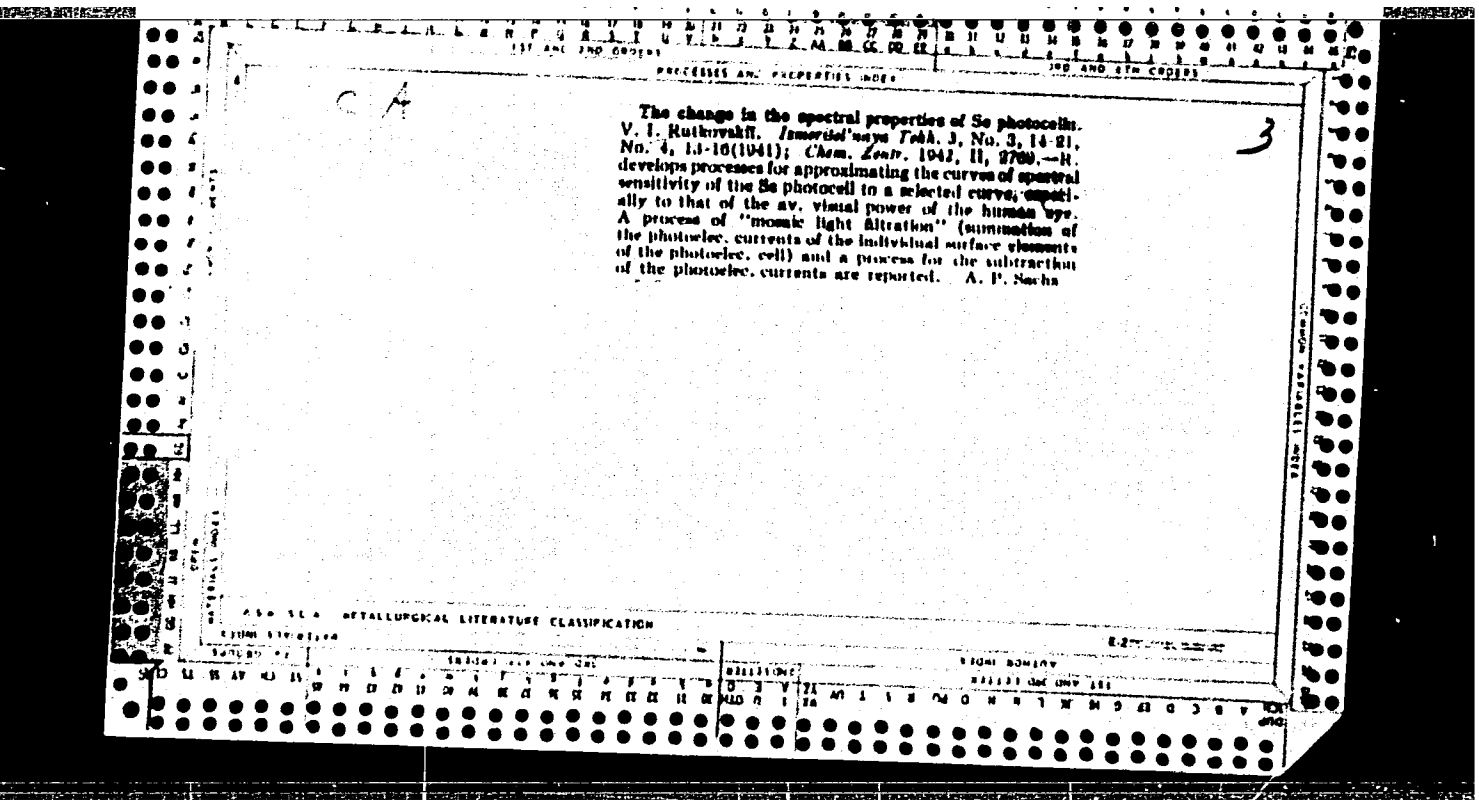
POLAND

WASOWICZ, Stanislaw, mgr; HUTKOWSKI, Wladyslaw, mgr

Dept. of Analytical Chemistry, Nuclear Research Institute (Zaklad Chemii Analitycznej Instytutu Badan Jadrowych), Warsaw (for both)

Warsaw, Chemia analityczna, No 3, May-June 1966, pp 603-610

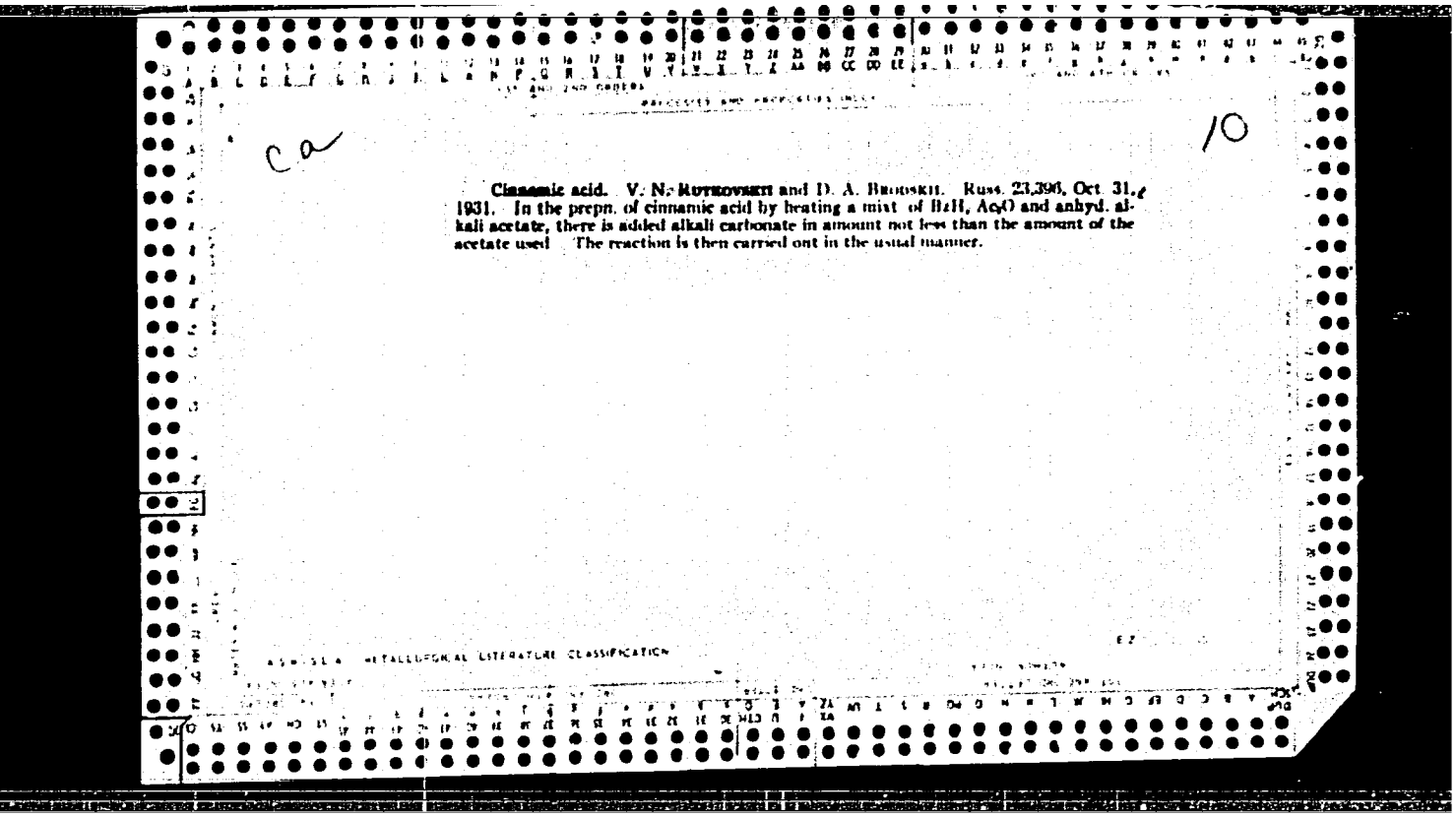
"Studies on application of distillation for concentration of traces of impurities in hydrochloric acid and high-purity germanium."



C A

3

The change in the spectral properties of Se photocells. V. I. Rutkovskiĭ. *Izmeritel'naya Tekh.* 3, No. 3, 14-21, No. 4, 13-16(1941); *Chem. Zentr.* 1942, II, 2709.—R. develops processes for approximating the curves of spectral sensitivity of the Se photocell to a selected curve, especially to that of the av. visual power of the human eye. A process of "mosaic light filtration" (summation of the photoelec. currents of the individual surface elements of the photoelec. cell) and a process for the subtraction of the photoelec. currents are reported. A. P. Sachs



Ca

10

Cinnamic acid. V. N. Rozhkovskii and D. A. Brodskii. Russ. 23,396, Oct. 31, 1931. In the prepn. of cinnamic acid by heating a mixt. of BzH, Ac$_2$O and anhyd. alkali acetate, there is added alkali carbonate in amount not less than the amount of the acetate used. The reaction is then carried out in the usual manner.

ZARVA, V., BIRSTYN', V., RUTKOVSKIY, YU.

Radio -Interference

The struggle against interference. Radio, 29, No. 3, 1952.

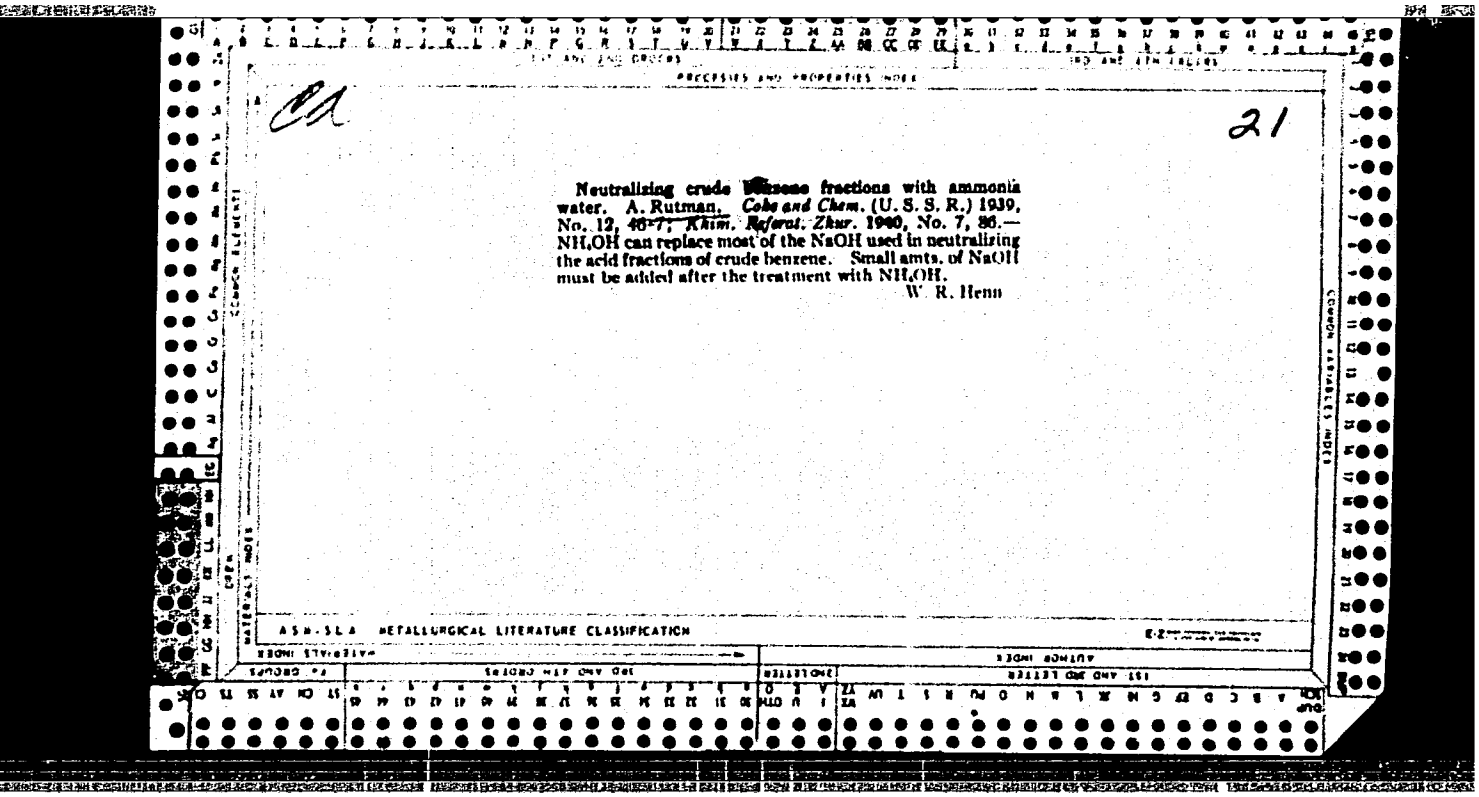
Monthly List of Russian Accessions, Library of Congress, June 1952. Unclassified.

1. SOSYKIN, N.F., RUTKOZSKIY V.I.

2. USSR (600)

Water Balance of Forest Soils. State Timber and Paper Industry Press, Moscow Leningrad, 1948, 32 pages.

9, Meteorologiya i Gidrologiya, no.3, 19[redacted]9. Report U-2551, 30 Oct 52

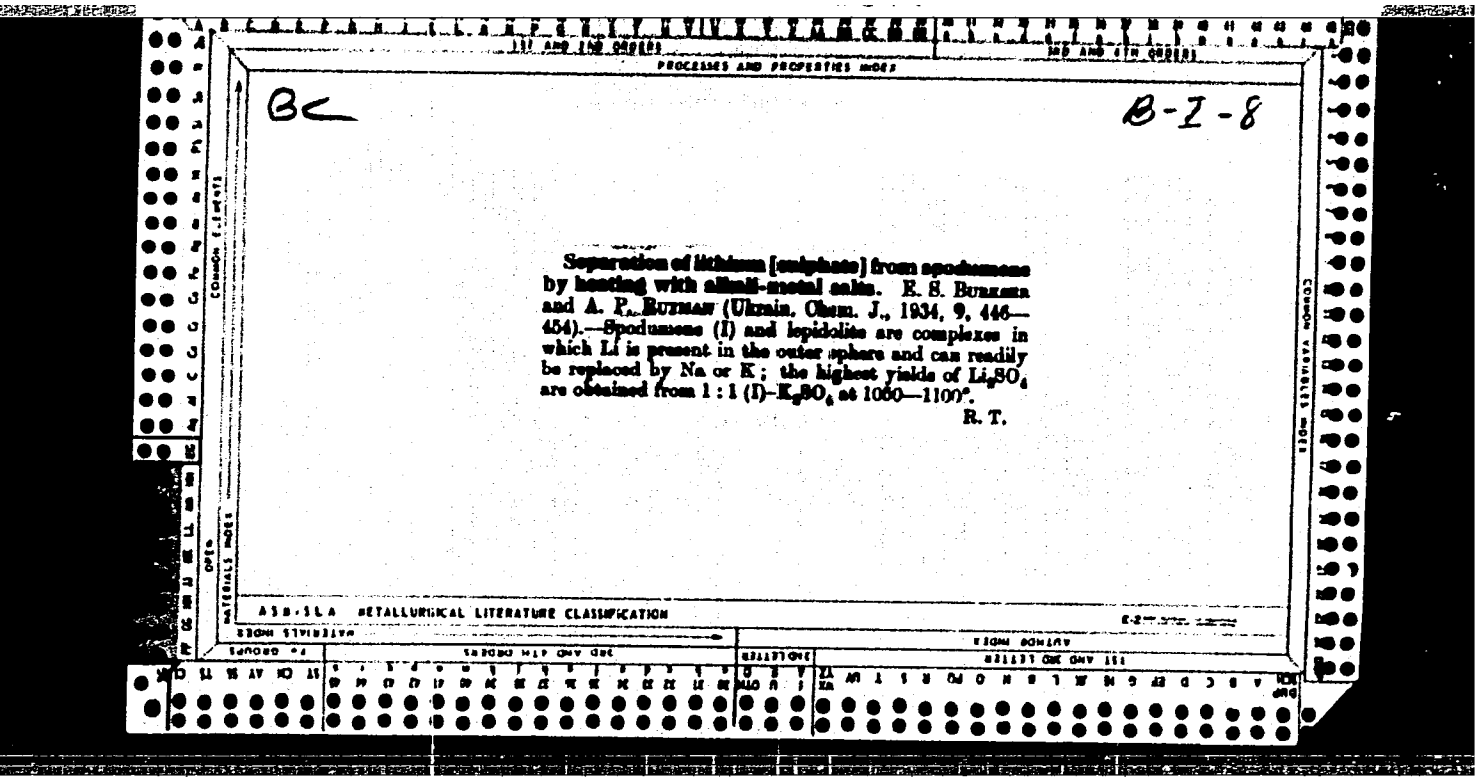


21

Neutralizing crude benzene fractions with ammonia water. A. Rutman. *Coke and Chem.* (U. S. S. R.) 1939, No. 12, 46-7; *Khim. Referat. Zhur.* 1940, No. 7, 86.—NH_4OH can replace most of the NaOH used in neutralizing the acid fractions of crude benzene. Small amts. of NaOH must be added after the treatment with NH_4OH.

W. R. Henn

A S M - S L A METALLURGICAL LITERATURE CLASSIFICATION

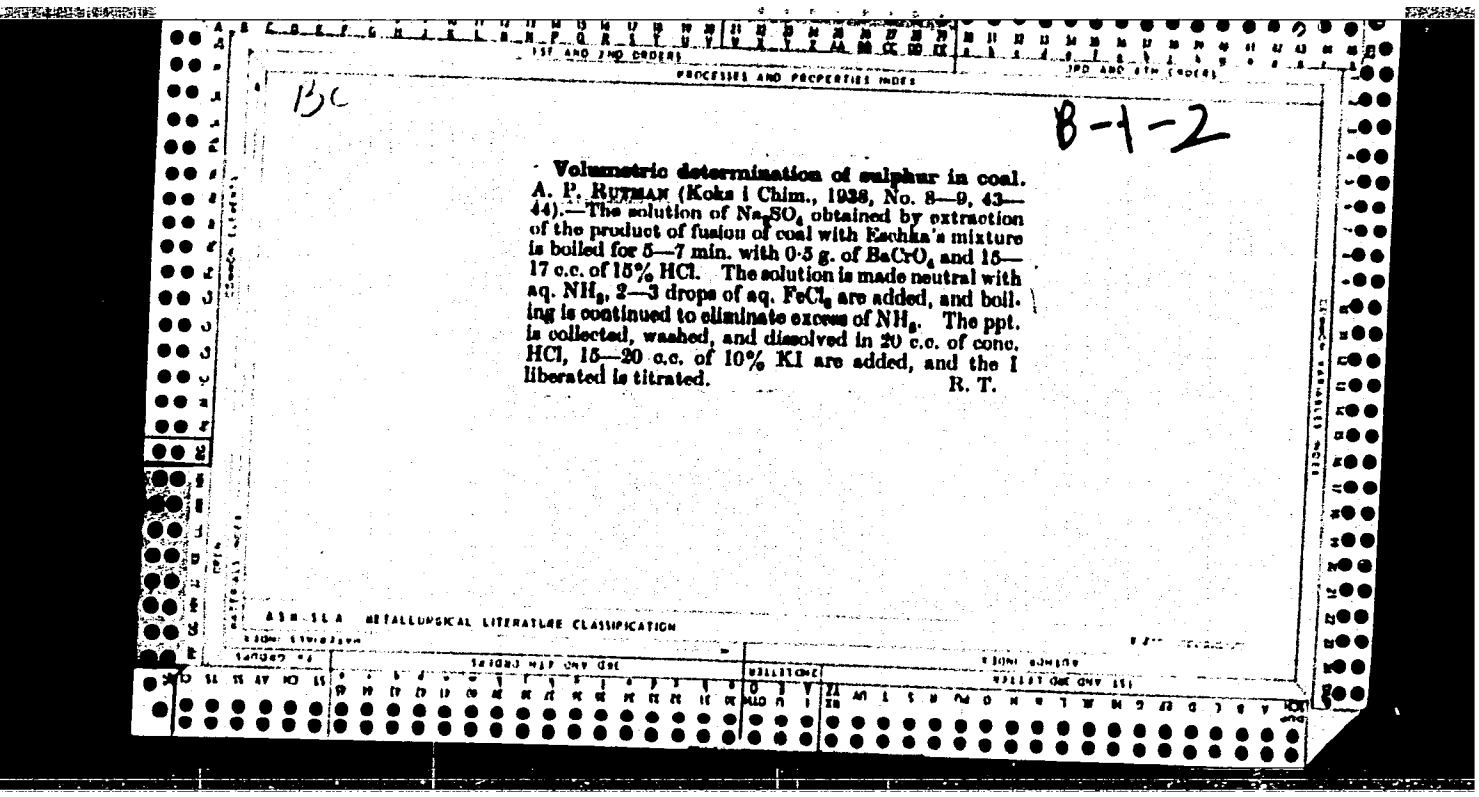


Bc

B-I-8

Separation of lithium [sulphate] from spodumene by heating with alkali-metal salts. E. S. Burkser and A. P. Rutman (Ukrain. Chem. J., 1934, 9, 446—454).—Spodumene (I) and lepidolite are complexes in which Li is present in the outer sphere and can readily be replaced by Na or K; the highest yields of Li_2SO_4 are obtained from 1 : 1 (I)–K_2SO_4 at 1050—1100°.

R. T.

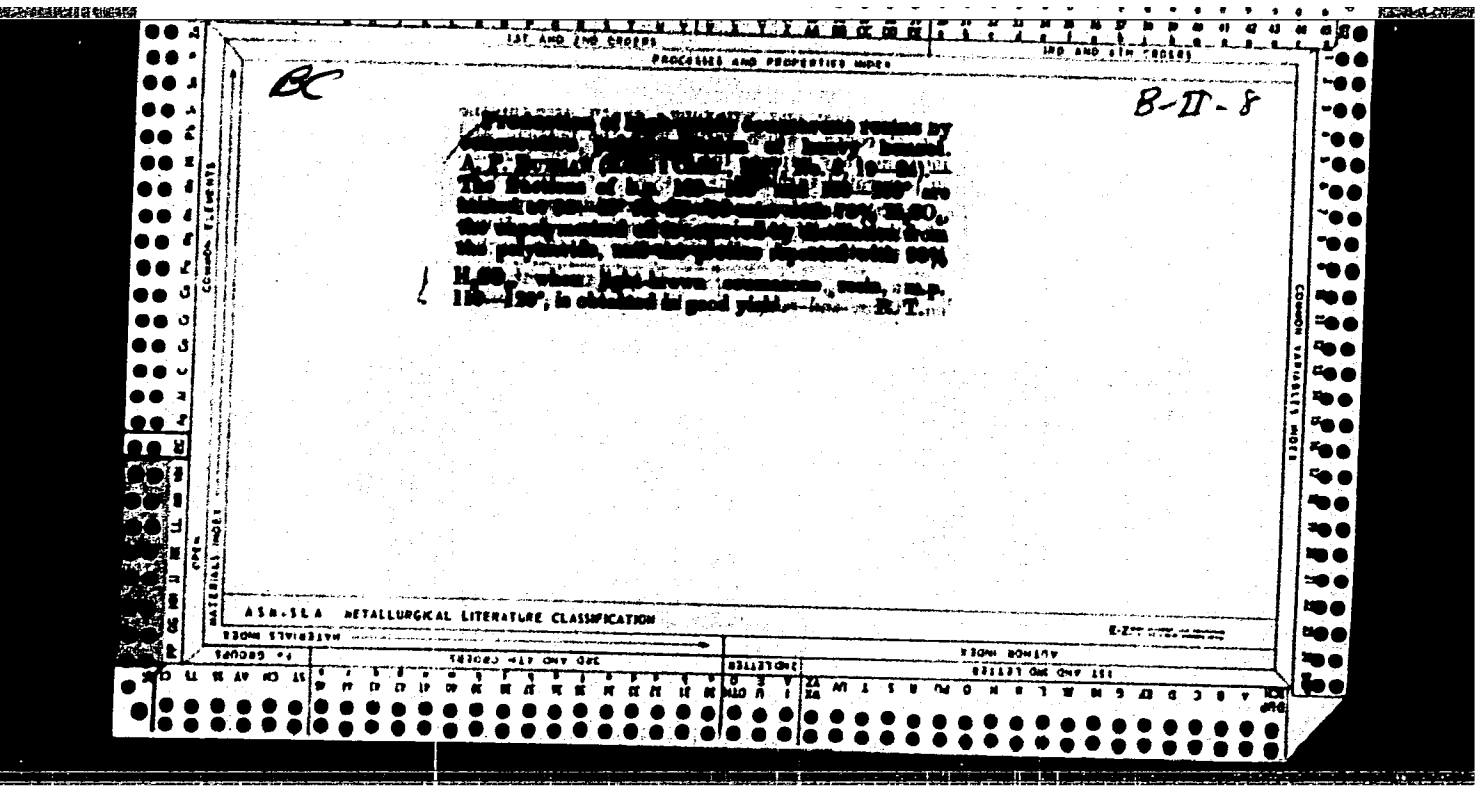


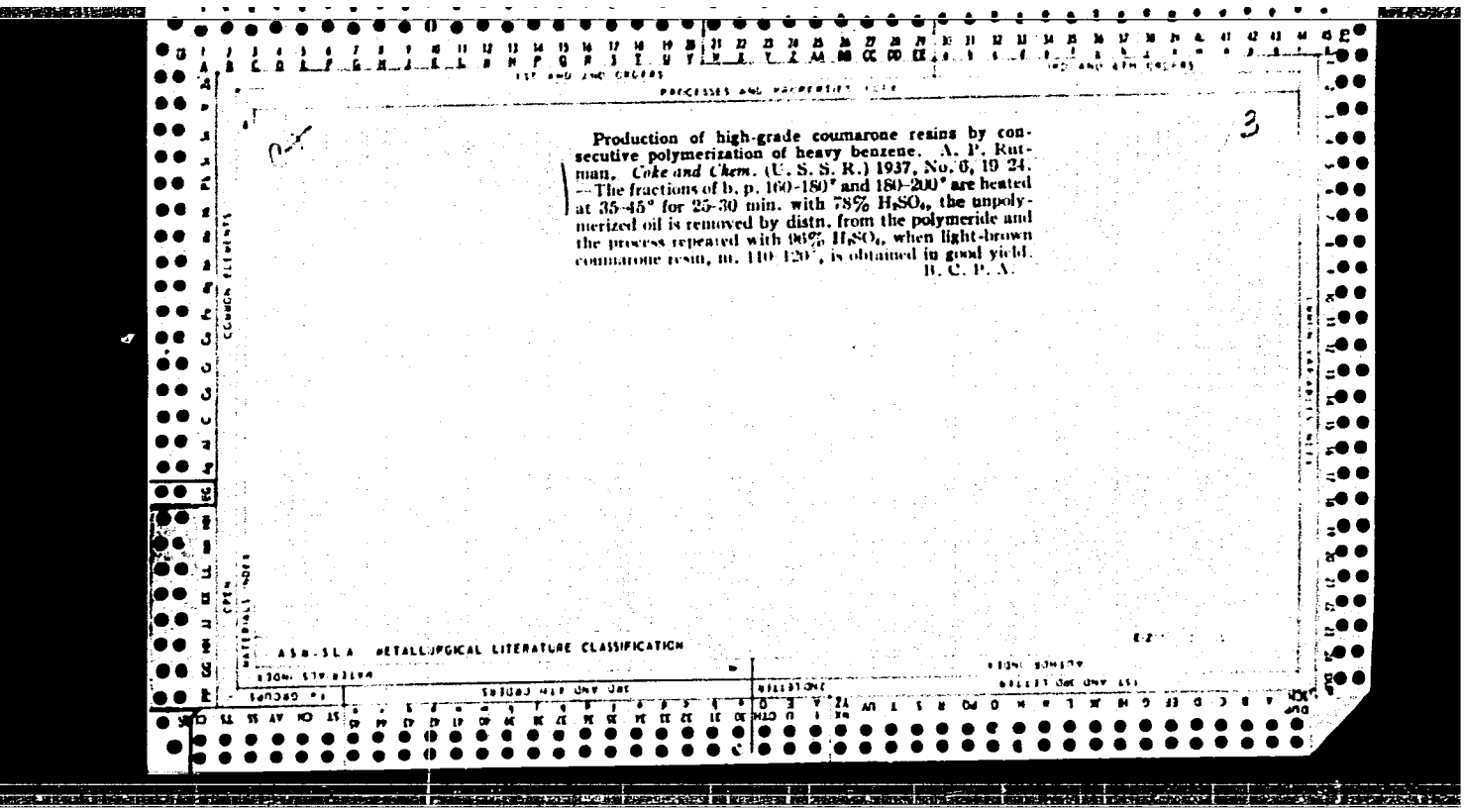
BC

B-1-2

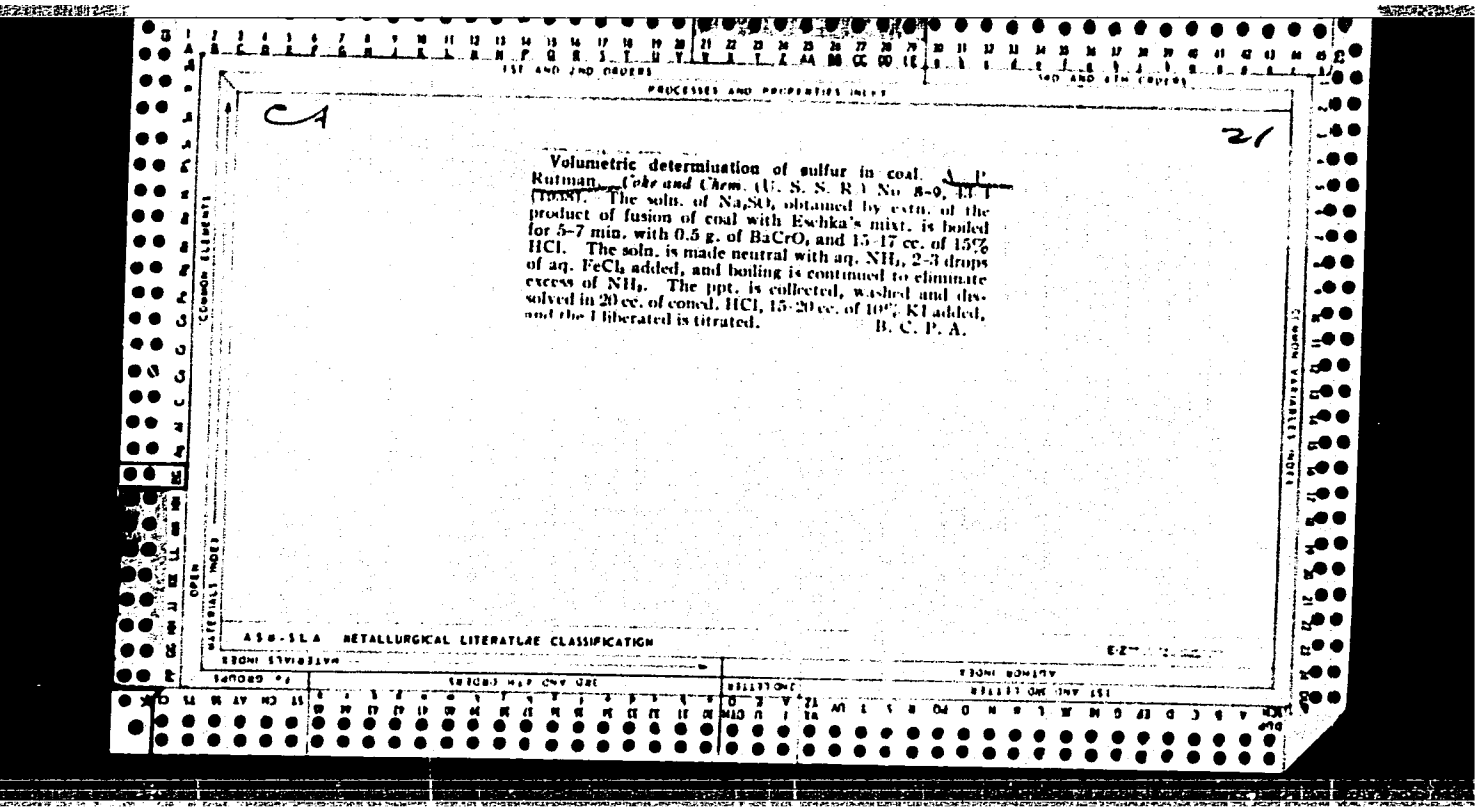
Volumetric determination of sulphur in coal. A. P. RUTMAN (Koks i Chim., 1938, No. 8—9, 43—44).—The solution of Na_2SO_4 obtained by extraction of the product of fusion of coal with Eschka's mixture is boiled for 5—7 min. with 0·5 g. of $BaCrO_4$ and 15—17 c.c. of 15% HCl. The solution is made neutral with aq. NH_3, 2—3 drops of aq. $FeCl_3$ are added, and boiling is continued to eliminate excess of NH_3. The ppt. is collected, washed, and dissolved in 20 c.c. of conc. HCl, 15—20 c.c. of 10% KI are added, and the I liberated is titrated.

R. T.





Production of high-grade coumarone resins by consecutive polymerization of heavy benzene. A. P. Rutman. *Coke and Chem.* (U. S. S. R.) 1937, No. 6, 19–24. —The fractions of b. p. 160–180° and 180–200° are heated at 35–45° for 25–30 min. with 78% H_2SO_4, the unpolymerized oil is removed by distn. from the polymeride and the process repeated with 96% H_2SO_4, when light-brown coumarone resin, m. 110–120°, is obtained in good yield. B. C. P. A.

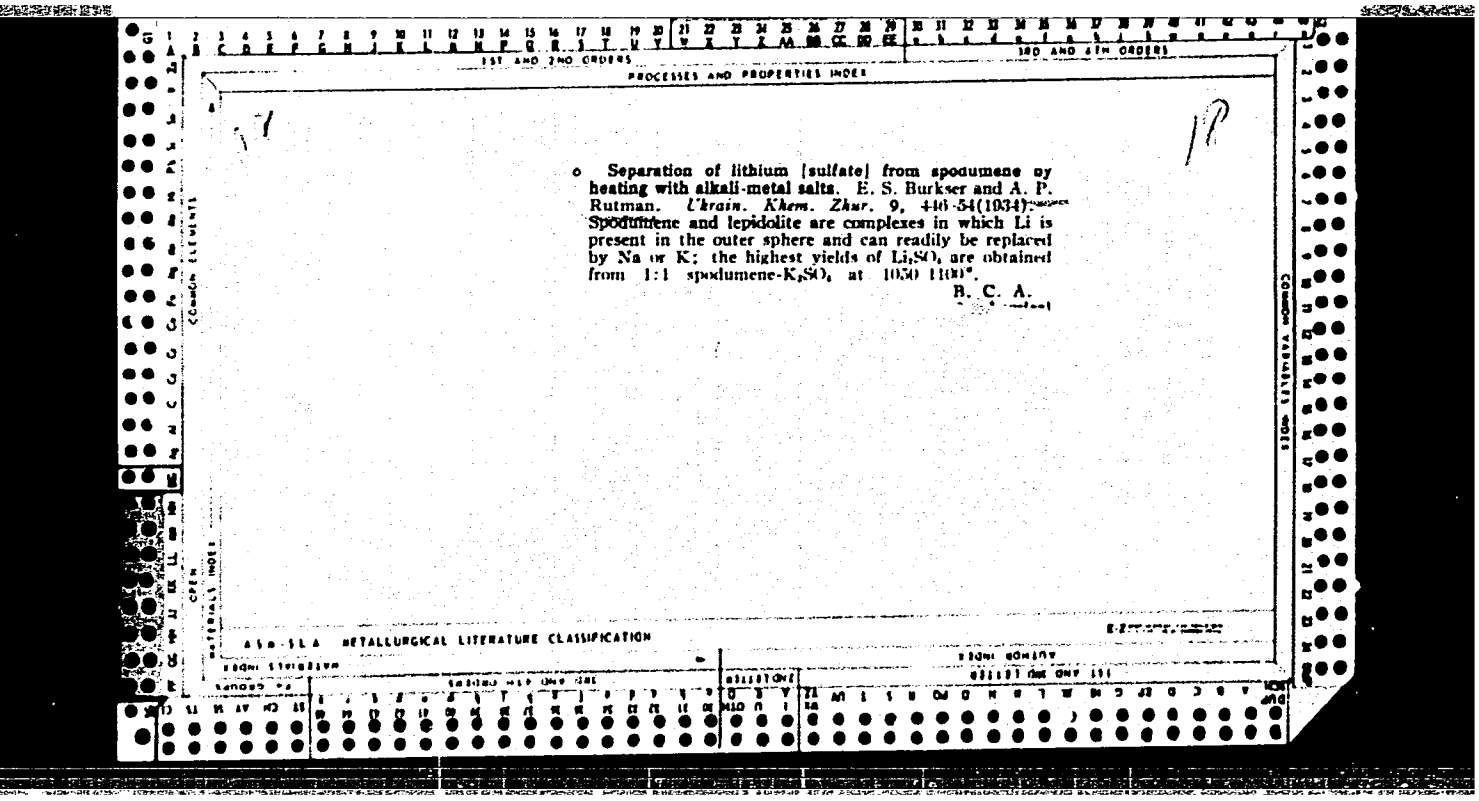


C1

21

Volumetric determination of sulfur in coal. A. P. Rutman. *Coke and Chem.* (U. S. S. R.) No. 8-9, 11-1 (1938). The soln. of Na_2SO_3 obtained by extn. of the product of fusion of coal with Eschka's mixt. is boiled for 5–7 min. with 0.5 g. of $BaCrO_4$ and 15–17 cc. of 15% HCl. The soln. is made neutral with aq. NH_3, 2–3 drops of aq. $FeCl_3$ added, and boiling is continued to eliminate excess of NH_3. The ppt. is collected, washed and dissolved in 20 cc. of concd. HCl, 15–20 cc. of 10% KI added, and the I liberated is titrated. B. C. P. A.

A58-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

o Separation of lithium [sulfate] from spodumene by heating with alkali-metal salts. E. S. Burkser and A. P. Rutman. *Ukrain. Khem. Zhur.* 9, 446-54(1934): Spodumene and lepidolite are complexes in which Li is present in the outer sphere and can readily be replaced by Na or K; the highest yields of Li_2SO_4 are obtained from 1:1 spodumene-K_2SO_4 at 1050-1100°.

B. C. A.

BCJ

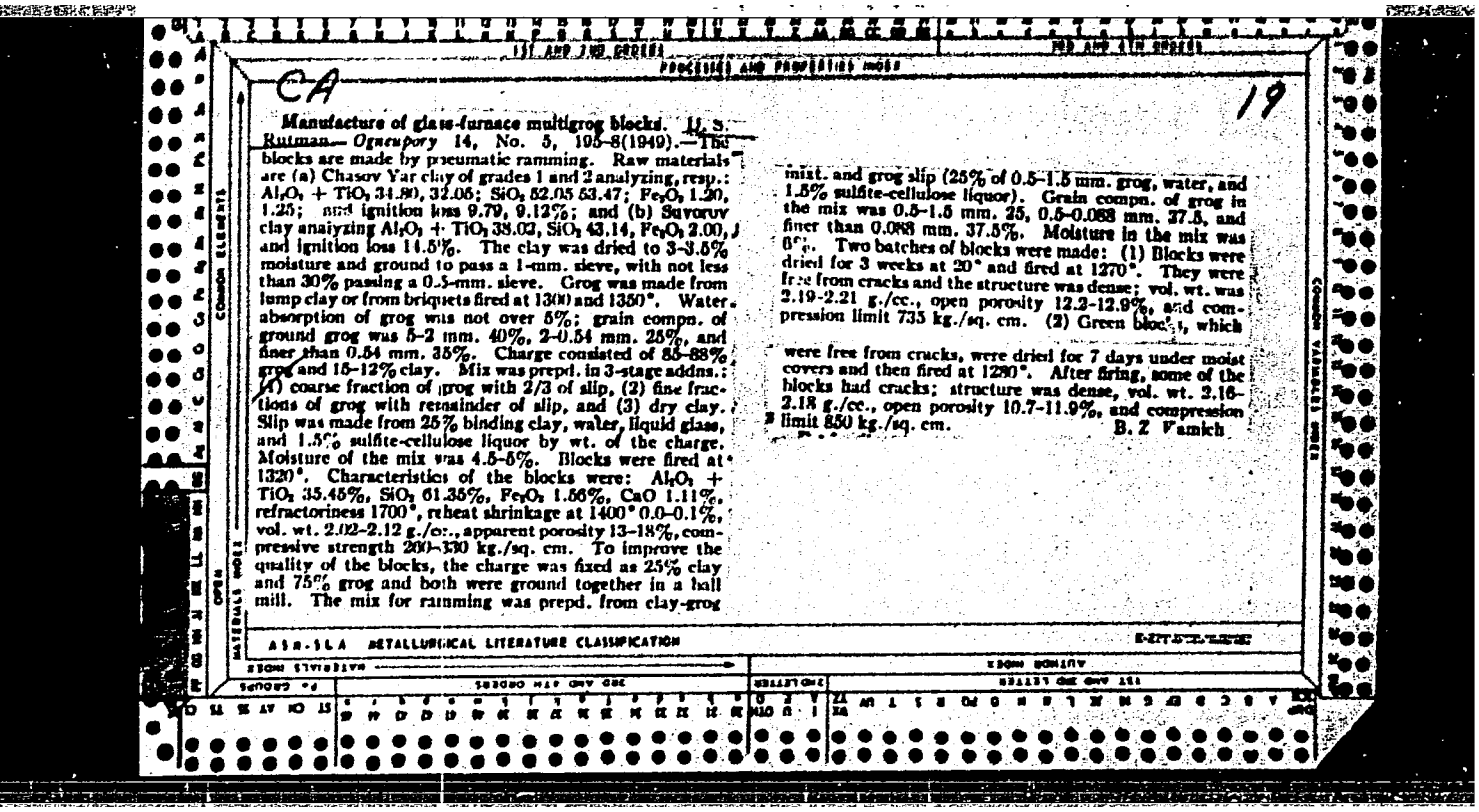
Refractories

1,143. The problem of producing highly aluminous refractories from diaspore concentrate. —YA. A. ORLOVSKY and D. S. RUTMAN (*Ogneupory*, 16, 435, 1951). Refractories were made from diaspore concentrate obtained by flotation. The concentrate is a finely dispersed material containing >70% Al_2O_3, and has a refractoriness of 1,880° C. and s.g. 3·1 g/ml. Wetted concentrates can be easily pressed into small specimens. The firing shrinkage of the concentrate is low. With increasing firing temp. the bulk density is slightly increased, porosity reduced and the mechanical strength considerably increased. The fired body consists predominantly of corundum bonded with mullite and a small amount of glass. Expts. were made with the addition of 2 types of plastic clay as bond; the firing shrinkage remained low; the porosity decreased with an addition of 20–35% plastic clay and with increasing firing temp. With 8% clay added the refractoriness under load was 1,600° C. and the temp. at which 4% subsidence occurred varied between 1,630° and 1,710° C. The following data are given on the manufacturing process finally established. Part of the material (a mixture of clay and concentrate) is fired for grog. The amount of grog with a < 3 mm. grain is 30–50%, depending on the plasticity of the clay used and the size of the ware. Concentrate and clay are fed into a ball-mill lined with quartz and ground for 2 hr. The amount of clay is determined by the desired Al_2O_3 content in the product. A part of such ground material is fired as briquettes in a rotary kiln at 1,650° C. The water absorption of grog is < 3%. The grog is ground in jaw and hammer crushers, magneted and sieved. The grog and the ball mill product of the same comp. are then mixed in an edge runner mill, the moisture content being 6–7%. The firing is carried out in a periodic kiln at 1,450° C. with a soaking time of 30 hr. The final products with 58·6% Al_2O_3 and 1·06% Fe_2O_3 have an apparent porosity of 18·6–22%, bulk density 2·19–2·24 g/ml., crushing strength 14,000–14,700 lb/sq. in.; refractoriness under load: beginning of softening, 1,520° C.; 4% subsidence, 1,580° C.; and 40% subsidence, 1,650° C. (3 tables.)

CA

19

Grog brick for furnace crowns. D. S. Rutman. *Ogneupory* 13, 69–73(1948); *Chem. Zentr.* 1949, 348.—Corrugated grog brick are recommended. A mix of 80% grog and 20% ball clay, burned at 1300°, withstands 1700°, has a porosity of 18% and a mech. strength of 252 kg./sq. cm. The compn. is: SiO_2 61.4, Al_2O_3 + TiO_2 34.67, and Fe_2O_3 1.25%.
M. G. Moore



CA

19

Manufacture of glass-furnace multigrog blocks. U. S. Rutman.— *Ogneupory* 14, No. 5, 195–8(1949).—The blocks are made by pneumatic ramming. Raw materials are (a) Chasov Yar clay of grades 1 and 2 analyzing, resp.: Al_2O_3 + TiO_2 34.80, 32.05; SiO_2 52.05 53.47; Fe_2O_3 1.20, 1.25; and ignition loss 9.79, 9.12%; and (b) Suvoruv clay analyzing Al_2O_3 + TiO_2 38.03, SiO_2 43.14, Fe_2O_3 2.00, and ignition loss 14.5%. The clay was dried to 3–3.5% moisture and ground to pass a 1-mm. sieve, with not less than 30% passing a 0.5-mm. sieve. Grog was made from lump clay or from briquets fired at 1300 and 1350°. Water absorption of grog was not over 5%; grain compn. of ground grog was 5–2 mm. 40%, 2–0.54 mm. 25%, and finer than 0.54 mm. 35%. Charge consisted of 85–88% grog and 15–12% clay. Mix was prepd. in 3-stage addns.: (1) coarse fraction of grog with 2/3 of slip, (2) fine fractions of grog with remainder of slip, and (3) dry clay. Slip was made from 25% binding clay, water, liquid glass, and 1.5% sulfite-cellulose liquor by wt. of the charge. Moisture of the mix was 4.5–5%. Blocks were fired at 1320°. Characteristics of the blocks were: Al_2O_3 + TiO_2 35.45%, SiO_2 61.35%, Fe_2O_3 1.56%, CaO 1.11%, refractoriness 1700°, reheat shrinkage at 1400° 0.0–0.1%, vol. wt. 2.02–2.12 g./cc., apparent porosity 13–18%, compressive strength 200–330 kg./sq. cm. To improve the quality of the blocks, the charge was fixed as 25% clay and 75% grog and both were ground together in a ball mill. The mix for ramming was prepd. from clay-grog mixt. and grog slip (25% of 0.5–1.5 mm. grog, water, and 1.5% sulfite-cellulose liquor). Grain compn. of grog in the mix was 0.5–1.5 mm. 25, 0.5–0.088 mm. 37.5, and finer than 0.088 mm. 37.5%. Moisture in the mix was 6%. Two batches of blocks were made: (1) Blocks were dried for 3 weeks at 20° and fired at 1270°. They were free from cracks and the structure was dense; vol. wt. was 2.19–2.21 g./cc., open porosity 12.2–12.9%, and compression limit 735 kg./sq. cm. (2) Green blocks, which were free from cracks, were dried for 7 days under moist covers and then fired at 1280°. After firing, some of the blocks had cracks; structure was dense, vol. wt. 2.16–2.18 g./cc., open porosity 10.7–11.9%, and compression limit 850 kg./sq. cm.

B. Z Vamich

RUTMAN, A.P.

Selecting the coal mixture for coking. Soob. DVFAN SSSR no.7:6-11 '55. (MLRA 10:4)

1. Dal'nevostochnyy filial im. V. L. Komarova AN SSSR. (Coke)

S/124/63/000/001/005/080
D234/D308

AUTHORS: Bychkov, A.I., Rutman, A.Sh. And Sergeyev, P.V.

TITLE: Comparison of indirect methods of analysis of automatic control systems on the basis of I.A. Vyshnegradskiy's problem

PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 1, 1963, 18, abstract 1A117 (Tr. Omskogo mashinostroit. in-ta, 1959, no. 3, 33-47)

TEXT: For the choice of optimum parameters of a system of direct control, methods are applied which become widely popular for estimation of the quality of the transient process: the method of distribution of roots, integral criteria and the method of choice of parameters, based on minimizing the deviations. The results obtained are compared with the data of direct numerical computation. In this way I.A. Vyshnegradskiy's problem is used for verifying the indirect methods of quality estimation. Comparison shows that all methods give the general tendency in the position of the zone of

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D234/D308

Comparison of indirect methods ...

optimum parameters with sufficient accuracy. The largest inaccuracy is found in a version of the method of root distribution which uses the notion of relative damping. 13 references.
[Abstracter's note: Complete translation]

Card 2/2

RUTMAN, D.L.; MAKARENKO, V.A.

Changing production procedures for chain links. Sbor.rats.predl. vnedr.v proizv. no.5:33 '60. (MIRA 14:8)

1. Pervoural'skiy Novotrubnyy zavod.
(Forging)

89691
S/131/61/000/003/001/001
B105/B206

15.2000 1454, 1153, 1155

AUTHORS: Vinogradova, L. V., Makarova, T. S., Rutman, D. S., Poluboyarinov, D. N., Popil'skiy, R. Ya., Serova, G. A.

TITLE: Manufacture of sintered ceramics from magnesium oxide

PERIODICAL: Ogneupory, no. 3, 1961, 123-124

TEXT: This article describes the process of manufacturing thin-walled, sintered crucibles and shield tubes for thermocouples from magnesium oxide. This process was elaborated at the Podol'skiy zavod ogneupornykh izdeliy (Podol'sk Plant for Refractories) jointly with the kafedra keramiki (Department of Ceramics) of the Khimiko-tekhnologicheskiy institut im. Mendeleyeva (Institute of Chemical Technology imeni Mendeleyev). The crucibles are intended for metal smelting. The initial material was commercial magnesium oxide with a content of ~98% MgO, the preparation of which (firing temperature and mode of crushing) was worked out according to previous studies. Commercial magnesium in powdery form is first fired in molds at 1300°C and then finely ground in a vibrating mill by means of steel balls. The powder was plasticized by

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means of paraffin with an addition of oleic acid. The shaping of crucibles and shield tubes for thermocouples from magnesium oxide by the "freezing-on" method permits the manufacture of products with a wall thickness of 5-0.3 mm. After partial burning out of the paraffin at a temperature of about 200°C, the products were fired in a regenerative medium (H_2) at 1700°C in an electric furnace with a molybdenum coil. The firing time was 5 to 6 hr (2 hr in the high-temperature zone). After sintering, the average weight by volume of the products was 3.36 to 3.38 g/cm^3, and their apparent porosity 0 to 0.4%; the white products showed good translucence. Pyrometric ceramics produced from magnesium oxide in the form of shield tubes for thermocouples and capillary tubes, permits temperature measurement up to more than 2000°C. The relatively simple process permits the manufacture of products for use at high temperatures, the waste being very small. There are 1 figure and 1 Soviet-bloc reference.

89691

Manufacture of sintered ceramics ... S/131/61/000/003/001/001
B105/B206

ASSOCIATION: Podol'skiy zavod ogneupornykh izdeliy (Podol'sk Plant for Refractories) Vinogradova, L. V., Makarova, T. S., Rutman, D. S.; Khimiko-tekhnologicheskiy institut im. Mendeleyeva (Institute of Chemical Technology imeni Mendeleyev) Poluboyarinov, D. N., Popil'skiy, R. Ya., Serova, G. A.

X

Card 3/3

ACC NR: AT6036925 SOURCE CODE: UR/0000/66/000/000/0021/0039

AUTHORS: Rutman, D. S.; Vinogradova, L. V.; Makarova, T. S.

ORG: none

TITLE: Advancements in the technology of pure oxide ceramics under industrial conditions

SOURCE: Nauchno-tekhnicheskoye obshchestvo chernoy metallurgii. Moskovskoye pravleniye. Vysokoogneupornyye materialy (High refractory materials). Moscow, Izd-vo Metallurgiya, 21-39

TOPIC TAGS: oxide ceramic, refractory oxide, corundum refractory, magnesium oxide, refractory product

ABSTRACT: Fundamentals of the industrial technology of ceramic products made of pure oxides are presented. The developments in aluminum, magnesium, and zirconium oxide product technology, described by D. S. Rutman and L. V. Vinogradova (Trudy NTO ChM, t. 27, 1961, 142--147) and D. S. Rutman and Ye. R. Skuye (Issledovaniye v oblasti glubinnykh protsessov. Izd. AN SSSR, 1962, 228--238), at the Podolsk Plant of Refractory Products are summarized, and further advancements in these fields are reported. Practical production methods for corundum articles with maximum durability and minimal flaws attainable at optimal firing temperature, and methods for chemical

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ACC NR: AT6036925

enrichment and strengthening of water-based castings are described. Possible means for producing zirconium dioxide articles without prior stabilization of the material, conditions for the stabilization process, and the effect of the raw zirconium dioxide quality upon the production technology and properties of the products are discussed. Production of magnesium oxide articles has been investigated for the possibilities of MgO dispersion without subsequent chemical enrichment, and the conditions for molding the products by using aqueous suspensions with minimal hydration are described. Mass production of refractory ceramic products such as crucibles, pipes, pyrometric equipment, etc is explained. Orig. art. has: 7 tables.

SUB CODE: 11/ SUBM DATE: 02Nov65/ ORIG REF: 020/ OTH REF: 002

Card 2/2

ACC NR: AT6036928 SOURCE CODE: UR/0000/66/000/000/0063/0071

AUTHORS: Rutman, D. S.; Yudina, A. S.; Malikova, T. V.

ORG: none

TITLE: The problem of optimum manufacturing parameters for the manufacture of dense, mullite-corundum refractories

SOURCE: Nauchno-tekhnicheskoye obshchestvo chernoy metallurgii. Moskovskoye pravleniye. Vysokoogneupornyye materialy (Highly refractory materials). Moscow, Izd-vo Metallurgiya, 1966, 63-71

TOPIC TAGS: clay refractory product, refractory product, fire clay

ABSTRACT: The effects of degree of alumina pulverization, the clay composition, the proportion of clay to alumina, and the firing temperature on the properties of fire clay were investigated. This investigation supplements the results of D. S. Rutman and L. V. Vinogradova (Ogneupory, 1954, No. 3, 105--113). Fire clay specimens were prepared from different initial alumina-clay fractions, extending from 90 to 30% alumina, and were fired at three different temperatures--1330, 1410, and 1520C. The apparent porosity, shrinkage, homogeneity, and water-carrying capacity of the specimens were determined. The experimental results are summarized in graphs and tables (see Fig. 1). It was found that best results were obtained for a ratio of 90% fire clay, particle size < 0.09 mm, and 10% clay (80% alumina + 20% clay),

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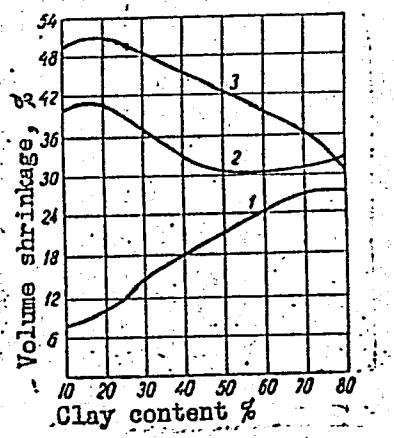
ACC NR: AT6036928

Fig. 1. Dependence of volume changes on the clay content in the fire clay and on the firing temperature. 1 - 1330C; 2 - 1410C; 3 - 1520C.



and a firing temperature of 1520C. Microscopic studies were performed by V. V. Lapin and N. I. Gaynanova. Orig. art. has: 4 tables and 8 graphs.

SUB CODE: 11/ 13/ SUBM DATE: 02Nov65/ ORIG REF: 006

Card 2/2

ACC NR: AT6036929 SOURCE CODE: UR/0000/66/000/000/0072/0081

AUTHORS: Rutman, D. S.; Vinogradova, L. V.; Makarova, T. S.

ORG: none

TITLE: High-temperature protective ceramic sheathing for thermocouples

SOURCE: Nauchno-tekhnicheskoye obshchestvo chernoy metallurgii. Moskovskoye pravleniye. Vysokoogneupornyye materialy (Highly refractory materials). Moscow, Izd-vo Metallurgiya, 1966, 72-81

TOPIC TAGS: refractory product, refractory oxide, refractory coating, thermocouple

ABSTRACT: This paper is a short survey of the development and research work carried out since 1958 in the Podolsk Refractories Plant (Podol'skiy zavod ogneupornykh izdeliy) with the aim of producing high-temperature protective sheathing for thermocouples. It is desired to manufacture: 1) protective thermocouple [illegible] mixture of alumina and metalloceramic additives; 2) protective [illegible] made from alumina, zirconium dioxide, and magnesium oxide; 3) protective ceramic sheathing for thermoelectric materials made from aluminum and magnesium oxides. The chemical composition of the various ceramic materials and the mechanical stability and electrical resistivity of the ceramic sheathing are shown in graphs and tables (see Fig. 1). On the basis of the experimental results, ceramic high-temperature

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ACC NR: AT6036929

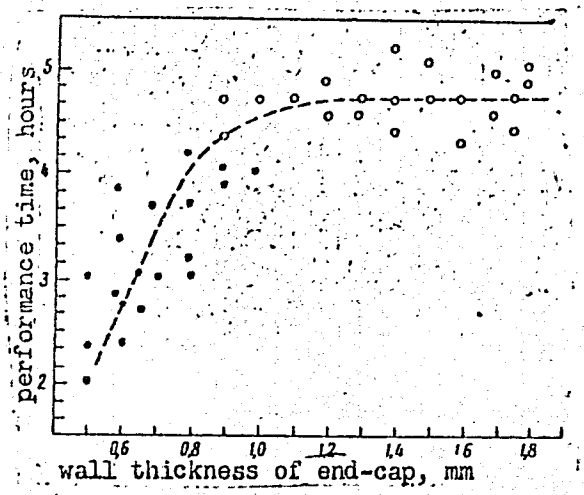

Fig. 1. Dependence of stability of refractory end-caps for thermocouples on the wall thickness of caps. Open circles, end-cap intact; shaded circles, end-cap destroyed

protective thermocouple sheaths are being mass-produced at the Podolsk Refractories Plant. Orig. art. has: 4 tables and 2 graphs.

SUB CODE: 11, 13, 09 SUBM DATE: 02Nov65/ ORIG REF: 006

Card 2/2

ACC NR: AT6036938 SOURCE CODE: UR/0000/66/000/000/0159/0177

AUTHORS: Rutman, D. S.; Osintseva, O. G.

ORG: none

TITLE: Technology, properties, and means of improving the manufacture of electrical silicon carbide heaters

SOURCE: Nauchno-tekhnicheskoye obshchestvo chernoy metallurgii. Moskovskoye pravleniye. Vysokoogneupornyye materialy (Highly refractory materials). Moscow, Izd-vo Metallurgiya, 1966, 159-177

TOPIC TAGS: silicon carbide, electric device, electric equipment

ABSTRACT: This paper is a review of the properties and present-day Soviet methods of manufacturing electrical silicon carbide heaters. The following topics are discussed: 1) physicochemical processes occurring during the thermal treatment of silicon carbon heating elements; 2) methods developed to increase the density of the elements; 3) influence of the quality of raw materials on the properties of the heating elements; 4) obtaining elements with positive thermal resistance coefficients; 5) factors that affect the high-temperature stability of heating elements; 6) improvements in the construction of heating elements. Each topic is accompanied by pertinent graphs and tables taken from the literature (see Fig. 1).

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ACC NR: AT6036938

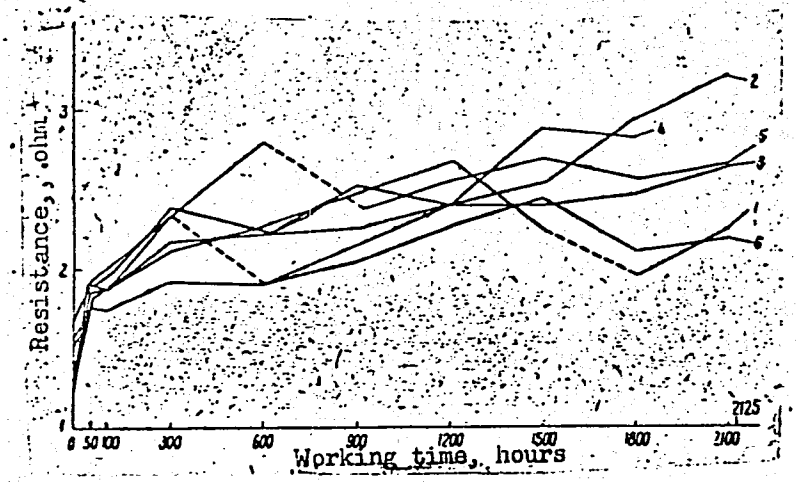

Fig. 1. Change in the electrical resistance of large-grain heaters with positive thermal resistance coefficient TKES. Measurements in a six-rod furnace at 1300C. 1 to 6 - number of rod

It is concluded that the research results obtained to date will, eventually, yield better electrical heaters of improved stability for industrial applications. Orig. art. has: 10 tables and 4 graphs.

SUB CODE: 13,09,11 SUBM DATE: 02Nov65/ ORIG REF: 007

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L 51075-65 EWG(j)/EWP(e)/EPA(s)-2/EWT(m)/EPF(c)/EWP(i)/EPF(n)-2/EWA(d)/EPR/
EPA(w)-2/T/EWP(t)/EWP(b) Pab-10/Pr-4/Pe-4/Pt-7/Pu-4 IJP(c) JD/WW/JG/
WB/WH

ACCESSION NR: AP5010417 UR/0131/65/000/004/0042/0044

AUTHOR: Lyapin, V.P.; Frolov, A.G.; Vishkarev, A.F.; Yavoynkiy, V.I.; Vinogradova, L.V.; Rutman, D.B.

TITLE: Nature of the conductivity of MgO and alumina

SOURCE: Ogneupory, no. 4, 1965, 42-44

TOPIC TAGS: metal oxide conductivity, magnesium oxide, alumina, high temperature conductivity, sintered magnesia, sintered corundum, liquid metal oxidation, casting control

ABSTRACT: To determine the nature of the conductivity of the solid oxides MgO and Al_2O_3 at high temperatures, use was made of sintered MgO and sintered corundum which acted as electrolytes in the following galvanic concentration cell: Fe-O-C MgO or Al_2O_3 Fe-O-C saturated (see Fig. 1 of the Enclosure). With MgO as the solid electrolyte, the measurements were made at 1600C; at this temperature the fraction of n-type conductivity was found to be only 3%. The conductivity of MgO is therefore almost entirely ionic. In the case of Al_2O_3, its conductivity was 29% n-type at 1600C and 24% n-type at 1650C. On the basis of the galvanic concentration cell thus tested, a sensing device was constructed

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for determining the oxidizability of a liquid metal in the course of melting, discharge, and casting. Determination of the activity (content) of oxygen in a melt offers extensive prospects for the control of industrial processes and makes it possible to exert a considerable influence on the quality of the metal, which depends substantially on the oxygen content. Orig. art. has: 1 figure, 1 table, and 6 formulas.

ASSOCIATION: [Luzgin, Frolov, Vishkarev, Yavoyskiy] Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys); [Vinogradova, Rutman] Podol'skiy zavod ogneuporynykh izdeliy (Podol'sk Refractory Materials Plant)

SUBMITTED: 00 ENCL: 01 SUB CODE: MT, MM

NO REF SOV: 006 OTHER: 003

Card 2/3

RUKOSUYEVA, A.V.; RED'KINA, N.V.

Some uses of the linear absorption method. Izv. vys. ucheb. zav.; fiz. 8 no.2:90-93 '65. (MIRA 18:7)

1. Sibirskiy fiziko-tekhnicheskiy institut imeni Kuznetsova.

RUTMAN, D.S.

"Casting zirconium refractory articles" by G.P. Kaliga. Reviewed by D.S. Rutman. Ogneupory 30 no.4:46 '65.
(MIRA 18:6)

RUTMAN, D.S.; VIKTOROVA, I.V.; MARKOVA, T.S.; KALLIGA, G.P.; [illegible]; SHILKO, Ye.I.

Improving the technology of zirconia articles by casting prestabilized ZrO_2 from water suspensions. Ogneupory 26 no.7:301-302 '61. (MIRA 14:7)

1. Podol'skiy zavod ogneupornykh izdeliy (for Rutman, Viktorova, Markova). 2. Khimiko-tekhnicheskiy institut im. D.I. Mendeleyeva (for Kalliga, Kolbasova, Shilko).
(Zirconia)

BORISOVSKIY, Ye.S.; RUTMAN, D.S.; MIN'KOV, D.B.

High-alumina inserts for the continuous casting of steel. Ogneupory 27 no.2:59-63 '62. (MIRA 15:3)

1. Vsesoyuznyy institut ogneuporov (for Borisovskiy). 2. Fodol'skiy zavod ogneupornykh izdeliy (for Rutman, Min'kov).
(Continuous casting) (Refractory materials)

RUTMAN, D.S.; MAYKHROVSKIY, Yu.V.; GROMOV, V.I.

A 5000 T. hydraulic press for making large elements.
Ogneupory 26 no.8:345-350 '61. (MIRA 14:9)

1. Podol'skiy zavod ogneupornykh izdeliy.
(Hydraulic presses) (Refractory materials)

RUTMAN, D.S.

AUTHORS: Rutman, D.S., Vinogradova, L.V., Krasotin, K.A., Min'kov, D.B. 131-12-4/9

TITLE: Refractories in the Hands of the User (Ogneupory u potrebitelya). Refractory Highly Aluminous Bricks for Ladles and Arresting Tubes Made of a Substance Composed of Mullite and Corundum (Termostoykiy vysokoglinozemistyy kovshevoy kirpich i stopornyye trubki mullito-korundovogo sostava)

PERIODICAL: Ogneupory, 1957, Nr 12, pp. 546-549 (USSR)

ABSTRACT: According to a working method developed sets of ladle bricks and arresting tubes manufactured by the industry were tested in practice. The durability of these bricks was found to be 50% greater than that of ordinary fireclay bricks. Furthermore, the manufacture and practical testing of a set of refractory highly aluminous ladle bricks made of a mullite-corundum composition is described in detail, in which steel of different melts was cast. In conclusion it is stated that:

1.) The ladles lined by highly aluminous bricks are able to stand 18 melts instead of the average of 11.8 in the case of ordinary fireclay bricks, and that with these bricks no cracking or

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Refractories in the Hands of the User. Refractory Highly Aluminous Bricks for Ladles and Arresting Tubes Made of a Substance Composed of Mullite and Corundum 131-12-4/9

shearing damage was found to occur.
2.) These bricks are highly resistant against slag.
Some industrially produced sets of arresting tubes were also manufactured, which is described in detail. They were tested in practice under the most difficult conditions (vacuum casting) and showed highly satisfactory results. There are 5 Slavic references.

ASSOCIATION: Podol'sk Plant for Refractories (Podol'skiy zavod ogneuporov)

AVAILABLE: Library of Congress

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RUTMAN, D.S.; POLUBOYARINOV, D.N.; VINOGRADOVA, L.V.; POPIL'SKIY, R.Ya.; MIN'KOV, D.V.

Production of corundum refractories at the Shcherbinka plant.
Ogneupory 19 no.4:237-238 '54. (MIRA 11:9)
(Shcherbinka (Moscow Province)-Refractories industry)
(Corundum)

USSR/Chemical Technology. Chemical Products and their Application. J-12
Glass. Ceramics. Building Materials.

Abs Jour: Referat Zh.-Kh., No 8, 1957, 27695

3.0 mm) of chamotte and 51% of fine grained (below 0.09 mm) mixture of clay and filler in crusher rolls. The moisture of the paste at pressing is 5.2%, the pressure is about 240 kg per sq.cm, the burning temperature is 1500 to 1550°, duration 24 hours. Product properties: Al_2O_3 + TiO_2 content - 77%, porosity - 15.2%, volumetric weight - 2.76 g per cub.cm, σ compr = 682 kg per sq. cm; temperature of start of softening under load = 1520°; 40% of compression at 1750°, additional shrinkage at 1750° = 1.2%. The test of the refractory material at 1700 to 1750° in an intermittently working furnace and in a coal dust fireplace of a boiler at 1600° showed that it possessed a good stability under these conditions.

Card : 2/2 -80-

VINOGRADOVA, L.V.; MAKAROVA, T.S.; RUTMAN, D.S.; POLUBOYARINOV, D.N.; POPIL'SKIY, R.Ya.; SEROVA, G.A.

Production of sinteted ceramic from magnesium oxide. Ogneupory 26 no.3:123-124 '61. (MIRA 14:4)

1. Polol'skiy zavod ogneuporpykh izdeliy (for Vinogradova, Makarova, Rutman). 2. Khimiko-tekhnologicheskiy institut im. Mendeleyeva (for Poluboyarinov, Popil'skiy, Serova).
(Sintering) (Magnesium oxide)

24739
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B105/B206

21.2110
15.2230

AUTHORS: Rutman, D.S., Vinogradova, L.V., Makarova, T.S., Kalliga, G.P., Kolbasova, V.A., Shal'nov, Ye.I.

TITLE: Improvement of the technology of zirconium products for casting from aqueous suspensions of the pre-stabilized ZrO_2

PERIODICAL: Ogneupory, no. 7, 1961, 301-302

TEXT: Experiments are described here which were conducted at the Podol'skiy zavod ogneupornykh izdeliy (Podol'sk Plant of Refractory Products) to investigate the possibility of avoiding the previous grinding of zirconium dioxide and, thus, shorten the technology of zirconium products. Industrial zirconium dioxide with a content of 97.5% ZrO_2 + HfO_2 and chemically pure calcium carbonate were used for the experiment. A mixture of 93% ZrO_2 and 7% CaO was prepared. Briquets were pressed from it at a pressure of 500 kg/cm^2 and burned at temperatures of 1600°C and 1700°C respectively. The microscopic and X-ray structural analysis showed a stabilization degree of 93-95% of ZrO_2 in the briquets. The effect of the pH of the

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Improvement of the technology ...

medium on the viscosity index of the crude zirconium mass was also tested. The particles are characterized by high values of the ζ potential, which cause the stability of the crude mass. With the parameters mentioned, an experimental batch of crucibles with a content up to 300 cm^3 was cast. The characteristic values of the blanks and of the products burned for 9 hr at 1600°C are compared in the table with the characteristic values for previous grinding of ZrO_2 and rinsing before stabilization. The duration of the production cycle is shortened by about ten days and grinding and rinsing of ZrO_2 previous to preparation for stabilization are omitted. The use of stabilized ZrO_2 without previous grinding showed that the sintering ability of the material was slightly improved. There are 1 figure and 1 table.

ASSOCIATION: Podol'skiy zavod ogneupornykh izdeliy (Podol'sk Plant of Refractory Products) D.S. Rutman, L.V. Vinogradova, T.S. Makarova; Khimiko-tekhnologicheskiy institut im. Mendeleyeva (Chemical-technological Institute imeni Mendeleyev) G.P. Kalliga, V.A. Kolbasova, Ye.I. Shal'nov.