BEREZHNOY, A.I.; SHEVALDIN, I.Ye.

Tapping producing formations in the Romashkino oil field.
Neft. khoz. 38 no.10:36-42 O '60. (MIRA 13:9)
(Romashkino region--Oil well drilling fluids)

BEREZHNOY, Aleksandr Ivanovich; DUBROVINA, N.D., vedushchiy red.; FEDOTOVA, I.G., tekhn. red.

Drilling fluids and cement slurries in oil well drilling; from drilling practice in the Tatar Economic Region] Promyvochnye zhidkosti i tsementnye rastvory v burenii skvazhin; iz opyta bureniia v Tatarskom ekonomicheskom raione. Moskva, Gos. nauchno-tekhn. izd-vo neft. i gorno-toplivnoi lit-ry, 1961. 105 p. (MIRA 14:7)
(Tatar A.S.S.R.—Oil well drilling fluids)

AGISHEV, A.P.; BEREZHNOY, A.I.; DEGTEV, N.I.

Setting cement plugs into production columns. Gaz. prom. 6 no.3:4-8 '61. (MIRA 14:3)

(Gas wells)

BEREZHNOY, A.I.

Study of the use of limestone as a filler in cement solutions.
Neft. khoz. 39 no.6:24-28 Je '61. (MIRA 14:8)
(Oil well cementing)

BEREZHNOY, Aleksandr Ivanovich; BULATOV, Anatoliy Ivanovich; KULAGIN, Pavel Grigor'yevich; VATOLIN, G.N., vad. red.; VORONOVA, V.V., tekhn. red.

[Plastics in petroleum and gas industries] Plastmassy v neftianoi i gazovoi promyshlennosti. Moskva, Gostoptekhizdat, 1962. 168 p. (MIRA 15:7)

(Petroleum engineering—Equipment and supplies)
(Plastics)

BEREZHNOY, A.I., kand.tekhn.nauk; SIDOROV, I.A., inzh.

Method for cementing lost-circulation zones. Nauch. zap. Ukrniiproekta no.9:66-69 '62. (MIRA 16:7)
(Oil well cementing)

BEREZHNOY, A.I., kand.tekhn.nauk; SHEVALDIN, I.Ye., inzh.; KULAGIN, P.G., inzh.

Some problems relative to the tapping of producing layers in oil fields. Nauch. zap. Ukrniiproekta no.9:70-82 '62. (MIRA 16:7)
(Tatar A.S.S.R.—Oil well drilling)

BEREZHNOY, A.I.; KULAGIN, P.G.

Selecting the designs of wells in order to improve the sinking of producing formations in fields having high gas pools. Izv.vys. ucheb.zav.; neft' i gaz 5 no.2:19-22 '62. (MIRA 15:7)

1. Ukrainskiy zaochnyy politekhnicheskiy institut.
(Shebelinka region--Gas wells)

BEREZHNOY, A.I.; KULAGIN, P.G.

Changing the casing of the exploitation bottom of gas wells in the successive periods of their exploitation. Izv. vys. uch. zav.; neft' i gaz 5 no.9:51-56 '62. (MIRA 17:5)

1. Khar'kovskiy gosudarstvennyy universitet i UkrVNIIgaz.

BEREZHNOY, A.I.; DEGTEV, N.I.

Experimental study of the vacuum degassing of muds. Gaz. prom. 7 no.3:11-15 '62. (MIRA 17:8)

BEREZHNOY, Aleksandr Ivanovich; DEGTEV, Nikolay Ivanovich; PETROVA, Ye.A., red.; YAKOVLEVA, Z.I., tekhn. red.

[Degasification of drilling fluids in drilling] Degazatsiia promyvochnykh rastvorov v burenii. Moskva, Gostoptekhizdat, 1963. 163 p. (MIRA 16:5)
(Oil well drilling fluids)

BEREZHNOY, A.I., kand. tekhn. nauk; SVIRIDOV, V.A.; KULAGIN, P.G.

Using silicone to decrease the formation of foam in drilling fluids. Neft. i gaz. prom. no.2:36-38 Ap-Je '63.
(MIRA 17:11)

1. Ukrainskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta prirodnogo gaza.

BEREZHNOY, A.I.; KULAGIN, P.G.; POTYUKAYEV, M.A.; SIMONOV, V.V.

Possibilities of making clayless drilling fluids from polymeric coagulants and brines. Izv. vysh. ucheb. zav.; neft' i gaz 6 no.3:29-34 '63. (MIRA 16:7)

1. Khar'kovskiy gosudarstvennyy universitet imeni A.M. Gor'kogo, Ukrainskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta gaza i iskusstvennogo zhidkogo topliva, i Khar'kovskiy sovet narodnogo khozyaystva.
(Oil well drilling fluids)

BEREZHNOY, A.I.; KULAGIN, P.C.

Circulation fluid for drilling in producing reservoirs in gas fields. Gaz. prom. 8 no.1:4-8 '63 (MIRA 17:7)

BEREZHNOY, A.I.

Interrepublic seminar on degassing oil-well muds. Neft. i gaz. prom. no.2:70 Ap-Je '64. (MIRA 17:9)

DEGTEV, N.I.; BEREZHNOY, A.I.

Measuring the specific weight of gas-cut muds. Burenie no.9:23-27 '64. (MIRA 18:5)

1. Ukrainskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta prirodnogo gaza.

AGISHEV, A.P.; BEREZHNOY, A.I.; KULAGIN, P.G.

Drilling in producing horizons of gas fields. Trudy VNIIGAZ no.19/27:113-122 '64 (MIRA 17:8)

BEREZHNOY, A.I.; DEGTEV, N.I.

Monitoring the content of gas in drilling fluid. Trudy VNIIGAZ no.19/27:122-131 '64 (MIRA 17:8)

AGISHEV, A.P.; BEREZHNOY, A.I.; DEGTEV, N.I.; ZINKEVICH, A.I.

Vacuum degassing of drilling fluids. Trudy VNIIGAZ no.19/27: 131/144 '64 (MIRA 17:8)

BEREZHNOY, A.I.; SVIRIDOV, V.A.; KULAGIN, P.G.

Investigating the antifoaming properties of polyorganosiloxane compounds used for drilling fluids. Izv. vys. ucheb. zav.; neft' i gaz 7 no.3:25-30 '64. (MIRA 17:6)

1. Khar'kovskiy gosudarstvennyy universitet i UkrVNIIgaz.

BEREZHNOY, A.I.; SIDOROV, I.A.

Cementing high-viscosity and quick-hardening mixtures obtained by the introduction of dry free-flowing material into cement slurry. Neft. khoz. 42 no.6:24-29 Je '64. (MIRA 17:8)

BERZHNOY, A.I.

Formation of an airtight cement ring in the annular space of wells. Neft. i gaz. prom. no.2:26-28 Ap-Je '65.

(MIRA 18:6)

BEREZHNOY, A.I.; KULAGIN, P.G.; SVIRIDOV, V.A.; LEVCHENKOV, A.T.; TITARENKO, N. Kh.

Foam damper on an organosilicone base for clay muds. Burenie no.3:16-17 '64. (MIRA 18:5)

1. Ukrainskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta prirodnogo gaza i trest "Poltavaneftegazrazvedka".

BEREZhNOY, A. N. Cand Tech Sci — (diss) The Use of the Similitude Method During the Investigation of Mass Transfer Processes," Moscow, 1960, 22 pp, 150 copies (Power Engineering Institute im G. M. Krzhizhanovskiy, AS USSR) (KL, 49/60, 127)

Dissertation: "Use of the Isochronic-Isothermic Potential to Evaluate Diffusion in the Gaseous Phase." Cand Tech Sci, Kazan'Chemicotechnological Inst, Kazan', 1954. (Referativnyy Zhurnal--Khimiya, Moscow, No 11, Jun 54)

SO: SUM 318, 23 Dec 1954

SOV/58-59-5-10464

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 5, p 92 (USSR)

AUTHORS: Usmanov, A.G., Berezhnoy, A.N.

TITLE: Generalization of Experimental Data on the Diffusion of Vapors

PERIODICAL: Tr. Kazansk. khim.-tekhnol. in-ta, 1958, Nr 22, pp 115 - 122

ABSTRACT: The dependence of mean relative diffusion flows in a gaseous medium have been obtained (A.G. Usmanov, Tr. KKhTI, 1958, Nr 22). Using the similarity method on these data, the authors arrive at a generalized dependence of the diffusion coefficient on the entropy of the system at various temperatures in the case of an isothermal process. With the aid of these generalized dependences, diffusion coefficients are determined for a series of binary and single-component mixtures in a wide range of temperatures. Deviations from the experimental data do not exceed 2% for the majority of the diffusion coefficients. It is noted that similar generalized dependences yielded a satisfactory

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SOV/58-59-5-10464

Generalization of Experimental Data on the Diffusion of Vapors

result on generalizing experimental data pertaining to viscosity and thermal conductivity in the gaseous phase. (Usmanov, A.G., Bol'shov, V.R., Tr. KKhTI, 1958, Nr 22).

L.P. Kholpanov

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26871
S/081/61/000/013/003/028
B105/B201

24.4500

AUTHORS: Usmanov A. G., Berezhnoy A. N.

TITLE: The similarity method in the thermal diffusion of gases

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 13, 1961, 45, abstract 13Б328 (Tr. Kazansk. khim.-tekhnol. in-ta, 1959, vyp. 26, 176 - 182)

TEXT: The application of methods previously recommended (RZhKhim, 1959, No. 6, 18379) for thermal diffusion is studied in order to determine the separation and the values of the thermal diffusion constant α and of the thermal diffusion ratio K_T related herewith. The relative separation of binary gas mixtures in thermal diffusion is expressed by the equation $\Delta\lambda/\Delta\lambda_{\Delta S} = 1.986\ (S_1 - S_2)/R$, where $\Delta\lambda$ is the separation of the mixture with a change of entropy at the boundaries equal to $S_1 - S_2$; $\Delta\lambda_{\Delta S}$ is the separation of the mixture proportional to the change of entropy ΔS, which is counted from the constant beginning S_1; S_1 and S_2 are the values of the entropies of the hot and cold parts of the mixture in steady state; R is

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The similarity method in the...

the gas constant. This formula comprises more than 100 binary mixtures of mono-, di-, and polyatomic gases in various combinations. The deviation of the experimental points from the straight line, which is described on the basis of the foregoing equation, is usually not higher than 3 - 4 %. The equation makes it possible to interpolate experimental data on the separation of binary mixtures by thermal diffusion to a range of temperatures and concentrations that is not covered by the experiment. [Abstracter's note: Complete translation.]

Card 2/2

5.4700

AUTHORS: Usmanov, A. G., Berezhnoy, A. N.

69664
S/153/60/003/01/002/058
B011/B005

TITLE: Generalization of Experimental Data on Thermal Diffusion of Gases

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1960, Vol 3, Nr 1, pp 8-13 (USSR)

TEXT: The authors indicate an equation: $\frac{\Delta\lambda}{\Delta\lambda_{\Delta S}} = 1.986 \frac{S_1 - S_2}{R}$ (2) to express the separation of binary gas mixtures in thermal diffusion. The separation by thermal diffusion, and other values of gas mixtures connected with it, can be determined by this equation in a wide range of temperatures and compositions. In their paper, the authors discuss the method of generalizing experimental data on molecular transport in gases (Ref 1), to determine the thermodiffusion constant α and the thermodiffusion relation k_T. By thermal diffusion, the system comes into a state in which the effects of separation and mixture counterbalance each other. The final result of the two steady processes is expressed by the above equation (2) where $\Delta\lambda$ is the separation of the mixture at a change of entropy within the limits $S_1 - S_2$; $\Delta\lambda_{\Delta S}$ is the separation of the mixture at a change of entropy ΔS calculated from a constant beginning S_1; S_1 and S_2 are entropy values of the hot and cold portions of

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the mixture in a stationary state; R is the universal gas constant. The generalization comprises more than 100 binary mixtures of 1-, 2-, and polyatomic gases in various combinations. The results obtained are represented in the coordinate system $\frac{\Delta\lambda}{\Delta\lambda_{\Delta S}}$ and $\frac{S_1-S_2}{R}$ in figures 1-4. They are satisfactorily described by equation (2). Table 1 shows, as an example, the values of separation for the mixtures He - Kr and He - Xe calculated by equation (2). They are in good agreement with the experimental results. Table 2 gives average values of α for mixtures with equal content of components before separation. Table 3 gives the values of $\Delta\lambda$, k_p and α for the H_2 - D_2 mixture in a wide range of concentrations and temperatures. Similar results can be obtained for other binary mixtures. On the basis of this paper, data can be calculated by interpolation in a temperature- and concentration range which is not covered by the experiment. There are 4 figures, 3 tables, and 8 references, 4 of which are Soviet.

ASSOCIATION: Kazanskiy khimiko-tekhnologicheskiy institut im. S. M. Kirova; Kafedra teplotekhniki (Kazan' Institute of Chemical Technology

69664
S/153/60/003/01/002/058
B011/B005

Generalization of Experimental Data on Thermal Diffusion of Gases

imeni S. M. Kirov; Chair of Heat Engineering)

SUBMITTED: October 2, 1958

Card 3/3

S/196/61/000/005/002/004
E073/E535

11.9400

AUTHORS: Usmanov, A.G. and Berezhnoy, A.N.

TITLE: Investigation of the Molecular and Thermal Diffusion by the Similarity Method

PERIODICAL: Referativnyy zhurnal, Elektrotekhnika i energetika, No.5, 1961, p.5, abstract 5G38. (Konvektivn. i luchistyy teploobmen, M., AS, USSR, 1960, 188-204)

TEXT: A generalization is given of experimental data on the diffusion coefficient in the gas phase based on the conceptions on similarity of molecular processes. If all the calculations are made on the basis of parameters that correspond to an arbitrary value of the entropy S, the relations for the densities of the diffusion flows are unequivocal functions of the entropy

$$\frac{I}{I_{\Delta S}} = \varphi\left(\frac{S_1 - S_2}{R}\right)$$

where I - density of the diffusion flux through a unit of thickness of the gas layer on changing the entropy at the

boundaries by $S_2 - S_1$; $I_{\Delta S}$ - same for $\Delta S = S_1^1 - S_1$; R - universal gas constant. Applied to the coefficient of isothermal diffusion with a concentration gradient equalling unity, the above equation can be written as follows:

$$\frac{D}{D_{\Delta S}} = \varphi\left(\frac{S_1 - S_2}{R}\right)$$

This formula was verified for the diffusion of vapours from the surface of a number of liquids into a volume filled by other gases. The calculated values are in agreement with experimental data within 2%. In a table, which is included, data are given which were obtained by calculation according to the general relationship governing the diffusion coefficient for a number of temperatures. A similar assumption of the generalization was applied for the process of thermodiffusional separation of binary gas mixtures within wide ranges of temperatures and concentrations. The generalized relation for the process of thermal diffusion is

described by the straight line equation

$$\frac{\Delta\lambda}{\Delta\lambda_{\Delta S}} = 1.986 \frac{S_1 - S_2}{R}$$

where $\Delta\lambda$ - magnitude of the thermodiffusional separation of the mixture on changing the entropy at the boundaries by $S_1 - S_2$; $\Delta\lambda_{\Delta S}$ - magnitude of the size separation of the mixture on changing the entropy ΔS counted from the constant value S_1; S_1 and S_2 - entropy values of the hot and cold parts of the mixture in the stationary state. The separation values are calculated for the mixtures helium-xenon, helium-krypton and hydrogen-deuterium within wide ranges of concentrations and temperatures. 42 references.
Abstracted by V. Lyusternik.

[Abstractor's note: Complete translation.]

Card 3/3

S/076/60/034/04/33/042
B010/B009

AUTHORS: Usmanov, A. G., Bereshnoy, A. N. (Kazan')

TITLE: Application of the Similarity Method in the Investigation of Mass Transfer Processes

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 4, pp. 907 - 920

TEXT: Since the effect of thermal diffusion is used in engineering for the separation of gas mixtures, the diffusion and thermodiffusion mass transfers have already been investigated many times. In the present case these problems are studied in the light of the similarity of molecular processes. Two geometrically similar subsystems containing the same number of molecules with the same degrees of freedom are discussed. Subsequently, the generalized functions and examples for their application for the determination of the mass transfer coefficients are given. Table 1, moreover, contains the diffusion coefficients of vapors of various liquids in a temperature and concentration range not covered by the experiments, but calculated from the functions derived. Experiments with binary gas mixtures of Ar, Kr, Xe, and N_2 with H_2 as well as Kr and Xe showed that the sepa-

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Application of the Similarity Method in the Investigation of Mass Transfer Processes

S/076/60/034/04/33/042
B010/B009

ration of these mixtures by thermodiffusion may be described by equation (III) of a straight line (Table 2, data for the mixture $H_2 - D_2$). By means of an interpolation in the range of the given generalization further data concerning the thermodiffusion separation of binary gas mixtures may be obtained for temperatures and concentrations otherwise not covered. There are 6 figures, 2 tables, and 22 references, 7 of which are Soviet.

ASSOCIATION: Kazanskiy khimiko-tekhnologicheskiy institut im. S. M. Kirova (Kazan' Institute of Chemical Engineering imeni S. M. Kirov)

SUBMITTED: March 30, 1957 (initially) and December 4, 1958 (after revision)

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S/124/61/000/012/027/038
D237/D304

AUTHORS: Usmanov, A. G., and Berezhnoy, A. N.

TITLE: Investigating molecular and thermal diffusion by the similarity method

PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 12, 1961, 106, abstract 12B738 (V sb. Konvektisn. i luchistyy teploobmen. M., AN SSSR, 1960, 188-204)

TEXT: Starting from some not very clearly formulated assumptions concerning the character of the dependence of the coefficient of gaseous diffusion and thermodiffusive parameter for various gas mixtures on thermodynamic magnitudes, the authors suppose that a simple relation exists and is true for all gases. In particular, it is stated that these magnitudes depend only on two characteristic entropy values, appearing in the design of the experiment, from which the above coefficients

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are determined. The processing of the large amount of experimental data obtained apparently confirms the supposition of universality and simplicity of the above-mentioned relations. Graphs and tables are given, based on experimental data. The result obtained is useful insofar as it enables one to determine coefficients of diffusion and thermal diffusion parameters for the conditions outside the experimental ones. [Abstracter's note: Complete translation.]

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24896

S/076/63/037/001/017/029
B101/B186

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AUTHORS: Usmanov, A. G., Berezhnoy, A. N.

TITLE: An equation for calculating the diffusion coefficient of vapors

PERIODICAL: Zhurnal fizicheskoy khimii, v. 37, no. 1, 1963, 179 - 181

TEXT: An improved equation is given for the diffusion coefficient: $D = 1.012D_{\Delta S}\left[(S_1 - S)/R\right]^{0.141}$, where D and $D_{\Delta S}$ are the diffusion coefficients in the intervals of the change in entropy $S_1 - S$ and $\Delta S = S_1' - S_1$, respectively. S_1 is the entropy of the saturated vapor directly on the surface of the liquid and is calculated from $S_1 = S_v r_v + S_g r_g - R(r_v \ln r_v + r_g \ln r_g)$, where S_v and S_g are the molar entropies of the vapor and of the gas and r_v, r_g are the molar part of the vapor and of the gas on the surface of the liquid. S is the entropy at the end of the open tube within which diffusion occurs, equal to the entropy of the gas into which the vapor diffuses. The values of $D_{\Delta S}(cm^2/sec)$ for the diffusion of various organic

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An equation for calculating... S/076/63/037/001/017/029
B101/B186

vapors into air O_2, H_2, N_2, Ar + He, Ar, Ne, D_2, and CO_2 are tabulated. The mean deviation of the calculated values from those obtained by experiment is ±1.2% and the maximum error amounts to 4 - 5% for five points. The equation offers a means of calculating those values of D for $(S_1 - S)/R = 0.00 - 6.00$ entropy units that have hitherto not been determined experimentally. There are 1 figure and 1 table.

ASSOCIATION: Kazanskiy khimiko-tekhnologicheskiy institut im. S. M. Kirova (Kazan' Institute of Chemical Technology imeni S. M. Kirov)

SUBMITTED: May 27, 1961

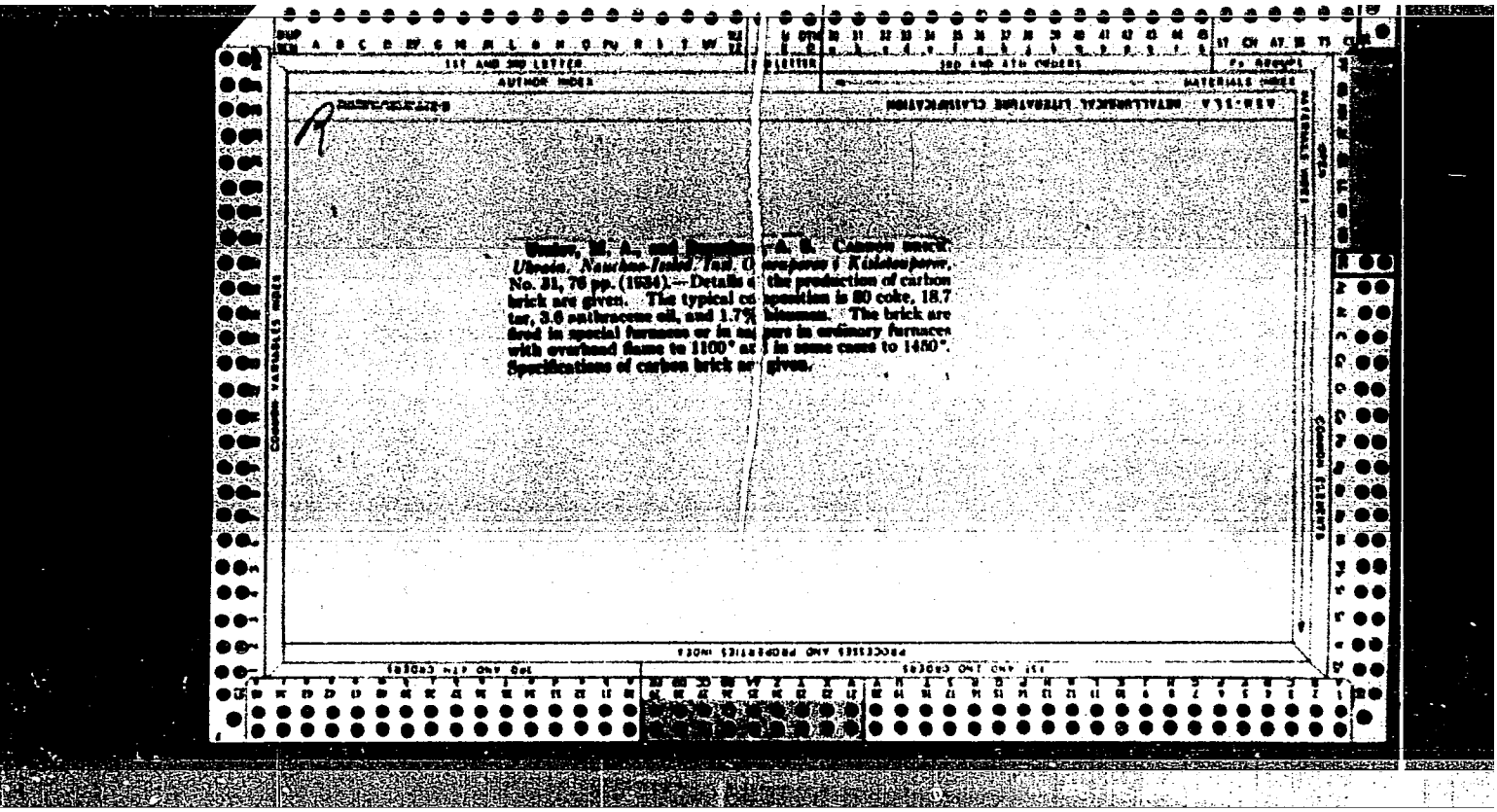
Card 2/2

USMANOV, A.G.; BEREZHNOY, A.N.

Characteristics of the thermodiffusional mass transfer calculated on the base of generalized relationships. Izv.vys.ucheb.zav.; khim. i khim.tekh. 8 no.2:218-223 '65.

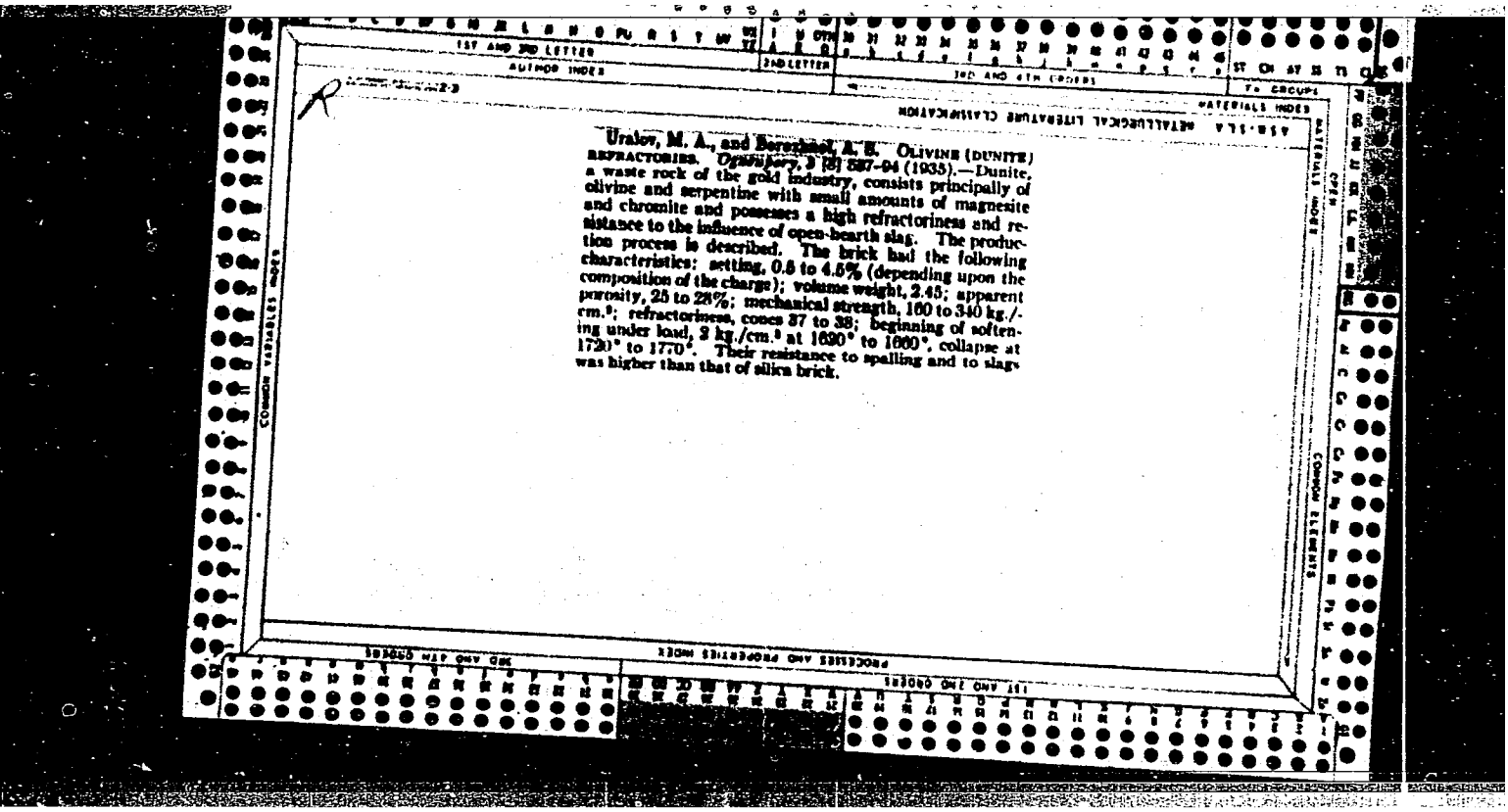
(MIRA 18:8)

1. Kazanskiy khimiko-tekhnologicheskiy institut imeni Kirova, kafedra teplotekhniki.

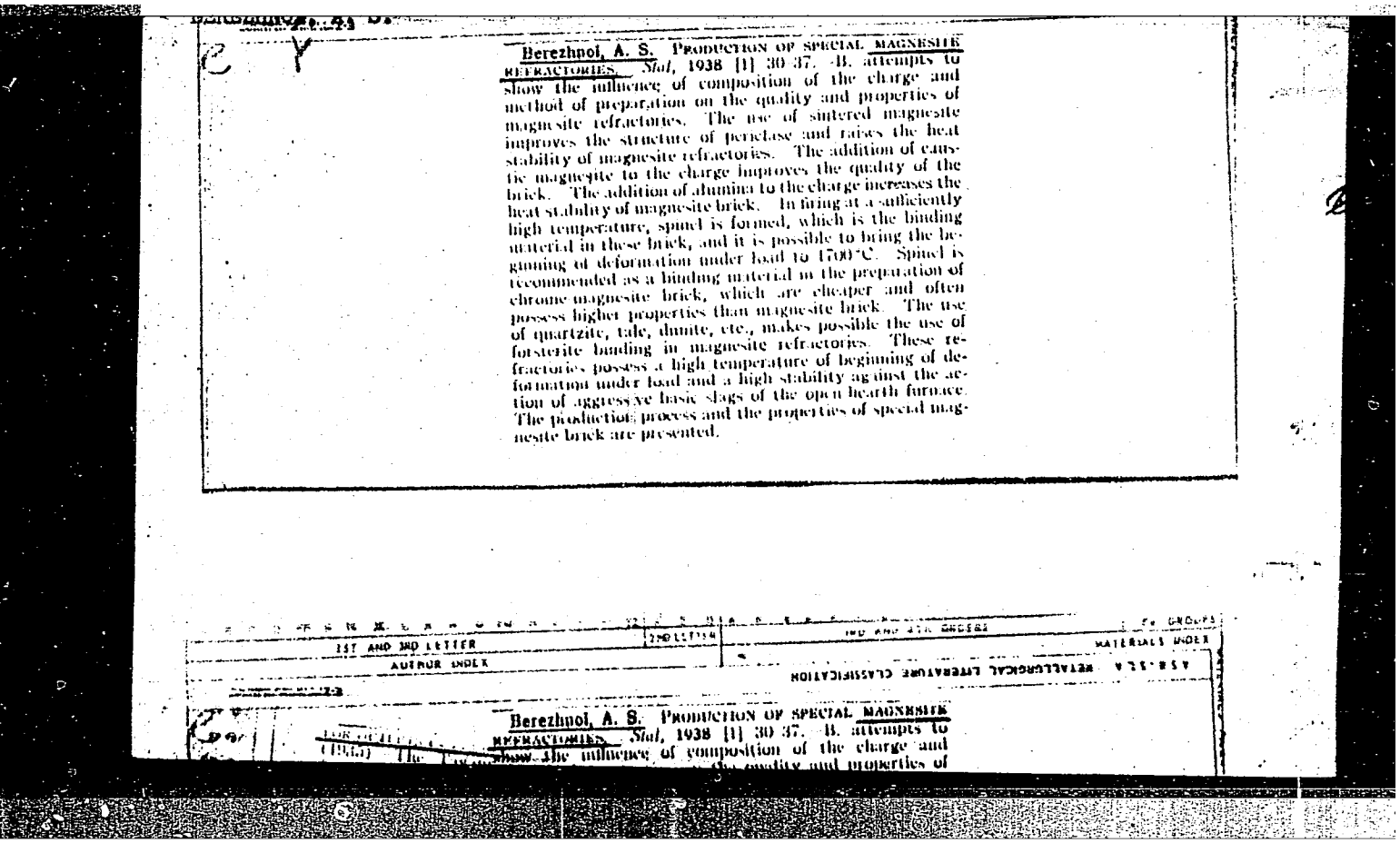


BEREZHNOI, A. S.

Frenkel, A. S., and Berezhnoi, A. S. PRODUCTION OF CHROMITE REFRACTORIES. Ogneupory, 3 (6) 449-55 (1935).--Mixtures of chromite with quartzite, clay from different deposits, alumina, soluble glass, soda, lime, magnesite, dolomite, magnesia and quartzite in the proportion of 2MgO: SiO_2, magnesia and alumina in the proportion of MgO:Al_2O_3, natural serpentine, and other materials were investigated as to their refractoriness. Chromite had the following chemical composition: SiO_2 3.40 Al_2O_3 14.75, Cr_2O_3 42.0, FeO 22.92, CaO 0.58, and MgO 14.63%. High-refractory mixtures with quartzite can be obtained with 0 to 15% and 87 to 100% chromite. With 0 to 44% alumina the refractoriness did not fall under cone 37. Soluble glass (20%) and soda lower it to cone 16. With up to 20% CaO, 15% MgO, and 20% dolemite it was over cone 37. With serpentine (over 24%) it falls to cone 18. If clay, kaolin, aluminum oxide and its salts, soluble glass, etc., are used, low-melting glasses and silicates are formed with the magnesia silicates present. A blinding mass of forsterite type was taken, amounting to 20% after firing. The mass had the following granulometric composition: 1 to 2 mm. 6%, 0.5 to 1 mm. 8%, 0.2 to 0.5 mm. 24%, and under 0.2 mm. 62% Samples were pressed at 300 kg./cm.^{2}, fired at 1650° for 6 to 6.3 hr., and cooled for 24 hr. The brick obtained was sintered; the mechanical strength was from 350 to 500 kg./cm.^{2}, water absorption 5.1 to 6.2%, apparent porosity 17.4 to 20.9%, volume porosity 17.4 to 20.9%, volume weight 3.2 to 3.4, specific weight 4.1 to 4.2, refractoriness above cone 39, beginning of deformation under load of 2 kg./cm.^{2} at 1570° to 1595° 2%, and collapse at 1620°.



Uralov, M. A., and Berezhnoi, A. S. OLIVINE (DUNITE) REFRACTORIES. *Ogneupory*, 3 [8] 387-94 (1935).—Dunite, a waste rock of the gold industry, consists principally of olivine and serpentine with small amounts of magnesite and chromite and possesses a high refractoriness and resistance to the influence of open-hearth slag. The production process is described. The brick had the following characteristics: setting, 0.8 to 4.5% (depending upon the composition of the charge); volume weight, 2.45; apparent porosity, 25 to 28%; mechanical strength, 160 to 340 kg./cm.²; refractoriness, cones 37 to 38; beginning of softening under load, 2 kg./cm.² at 1690° to 1660°, collapse at 1720° to 1770°. Their resistance to spalling and to slags was higher than that of silica brick.



Berezhnoi, A. S. PRODUCTION OF SPECIAL MAGNESITE REFRACTORIES. *Stal*, 1938 [1] 30-37. -B. attempts to show the influence of composition of the charge and method of preparation on the quality and properties of magnesite refractories. The use of sintered magnesite improves the structure of periclase and raises the heat stability of magnesite refractories. The addition of caustic magnesite to the charge improves the quality of the brick. The addition of alumina to the charge increases the heat stability of magnesite brick. In firing at a sufficiently high temperature, spinel is formed, which is the binding material in these brick, and it is possible to bring the beginning of deformation under load to 1700°C. Spinel is recommended as a binding material in the preparation of chrome magnesite brick, which are cheaper and often possess higher properties than magnesite brick. The use of quartzite, talc, dunite, etc., makes possible the use of forsterite binding in magnesite refractories. These refractories possess a high temperature of beginning of deformation under load and a high stability against the action of aggressive basic slags of the open hearth furnace. The production process and the properties of special magnesite brick are presented.

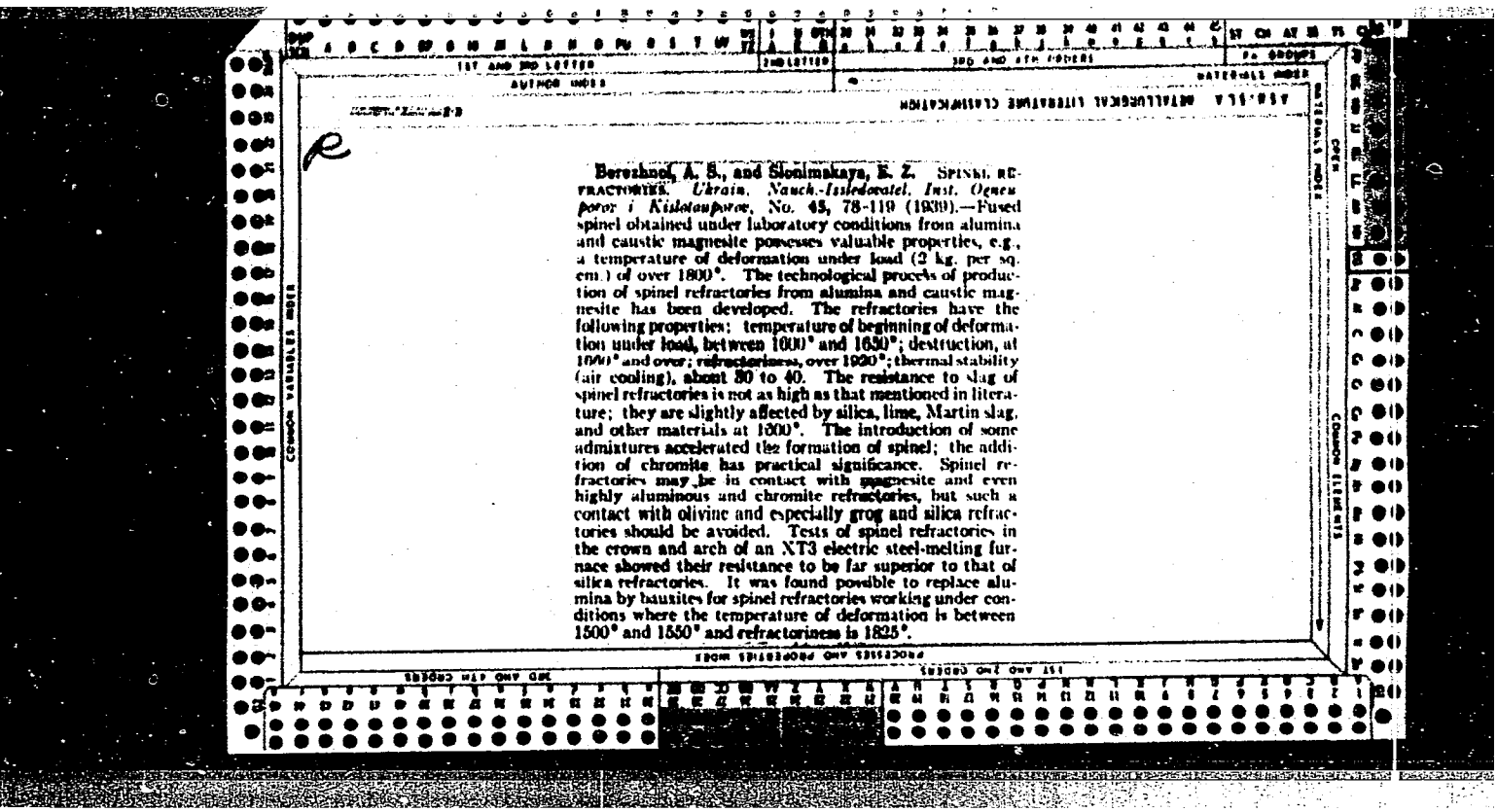
1ST AND 2ND LETTER AUTHOR INDEX

2ND LETTER

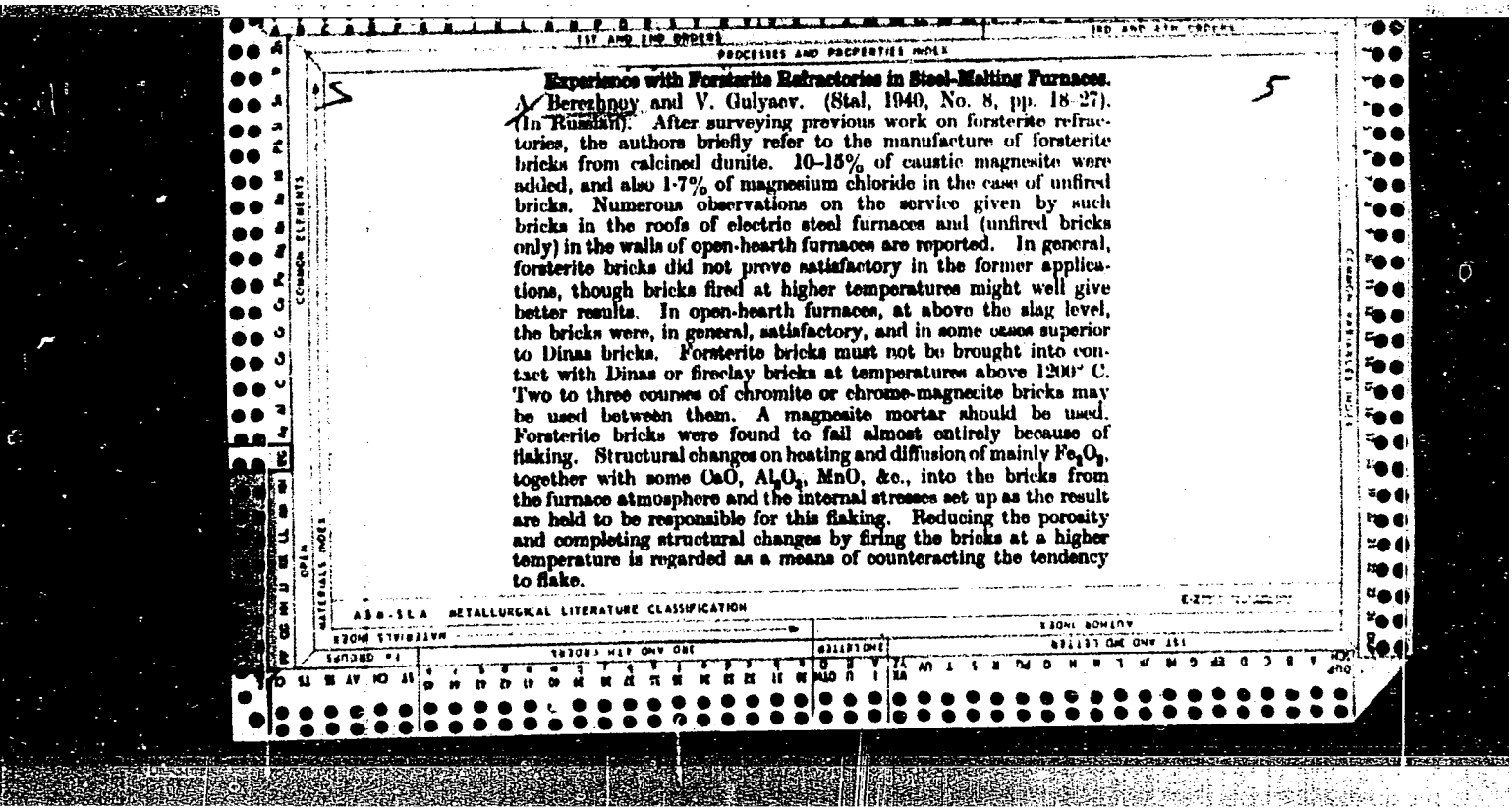
3RD AND 4TH ORDER

MATERIALS INDEX

REFRACTORIES. *Stal*, 1938 [1] 30-37. -B. attempts to show the influence of composition of the charge and

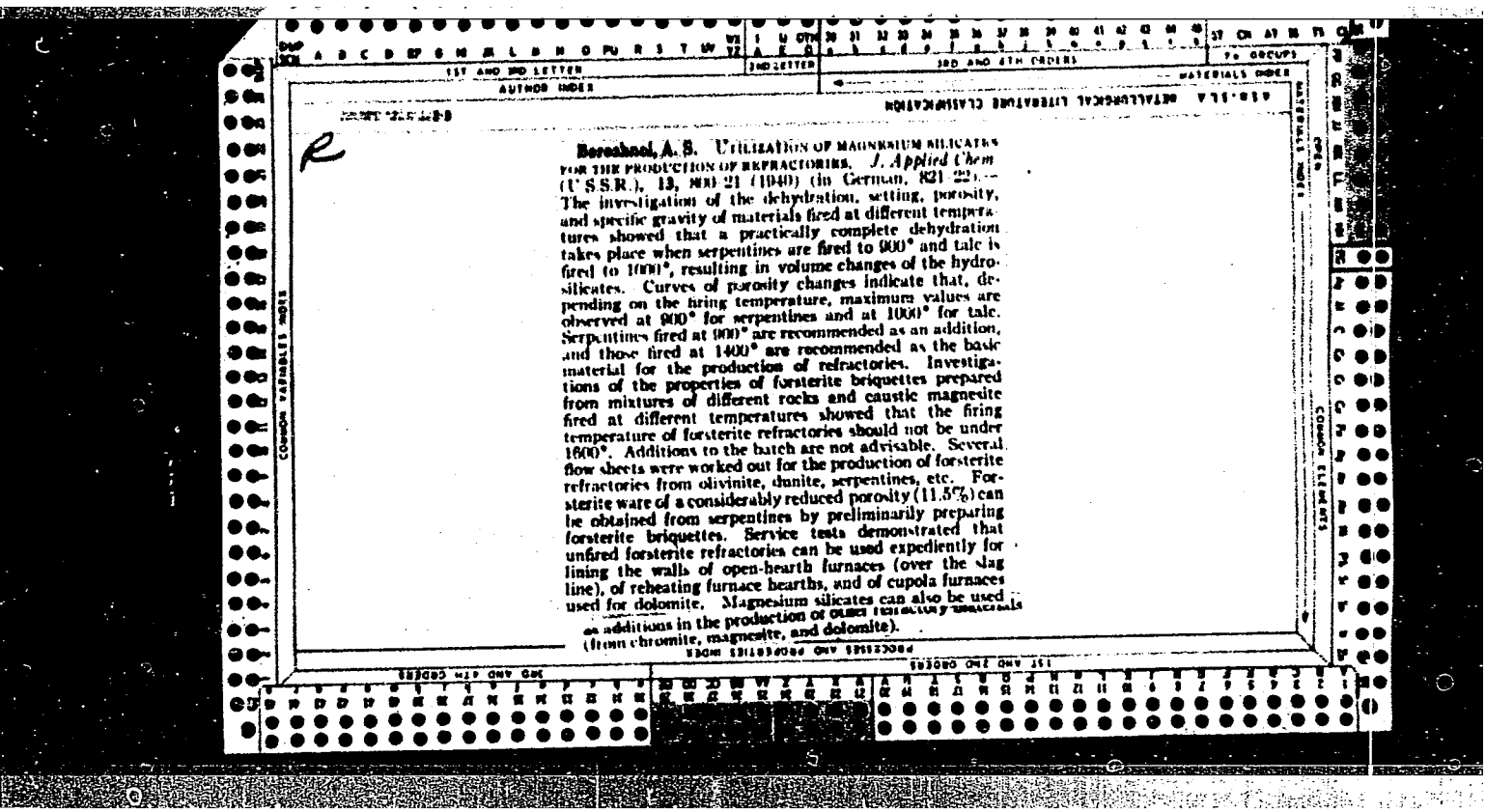


Berezhnoi, A. S., and Slonimskaya, E. Z. SPINEL REFRACTORIES. *Ukrain. Nauch.-Issledovatel. Inst. Ogneuporov i Kislotauporov*, No. 45, 78-119 (1939).—Fused spinel obtained under laboratory conditions from alumina and caustic magnesite possesses valuable properties, e.g., a temperature of deformation under load (2 kg. per sq. cm.) of over 1800°. The technological process of production of spinel refractories from alumina and caustic magnesite has been developed. The refractories have the following properties: temperature of beginning of deformation under load, between 1600° and 1650°; destruction, at 1600° and over; refractoriness, over 1920°; thermal stability (air cooling), about 30 to 40. The resistance to slag of spinel refractories is not as high as that mentioned in literature; they are slightly affected by silica, lime, Martin slag, and other materials at 1500°. The introduction of some admixtures accelerated the formation of spinel; the addition of chromite has practical significance. Spinel refractories may be in contact with magnesite and even highly aluminous and chromite refractories, but such a contact with olivine and especially grog and silica refractories should be avoided. Tests of spinel refractories in the crown and arch of an XT3 electric steel-melting furnace showed their resistance to be far superior to that of silica refractories. It was found possible to replace alumina by bauxites for spinel refractories working under conditions where the temperature of deformation is between 1500° and 1550° and refractoriness is 1825°.



Experience with Forsterite Refractories in Steel-Melting Furnaces.

A. Berezhnoy and V. Gulyaev. (Stal, 1940, No. 8, pp. 18–27). (In Russian). After surveying previous work on forsterite refractories, the authors briefly refer to the manufacture of forsterite bricks from calcined dunite. 10–15% of caustic magnesite were added, and also 1·7% of magnesium chloride in the case of unfired bricks. Numerous observations on the service given by such bricks in the roofs of electric steel furnaces and (unfired bricks only) in the walls of open-hearth furnaces are reported. In general, forsterite bricks did not prove satisfactory in the former applications, though bricks fired at higher temperatures might well give better results. In open-hearth furnaces, at above the slag level, the bricks were, in general, satisfactory, and in some cases superior to Dinas bricks. Forsterite bricks must not be brought into contact with Dinas or fireclay bricks at temperatures above 1200° C. Two to three courses of chromite or chrome-magnesite bricks may be used between them. A magnesite mortar should be used. Forsterite bricks were found to fail almost entirely because of flaking. Structural changes on heating and diffusion of mainly Fe_2O_3, together with some CaO, Al_2O_3, MnO, &c., into the bricks from the furnace atmosphere and the internal stresses set up as the result are held to be responsible for this flaking. Reducing the porosity and completing structural changes by firing the bricks at a higher temperature is regarded as a means of counteracting the tendency to flake.



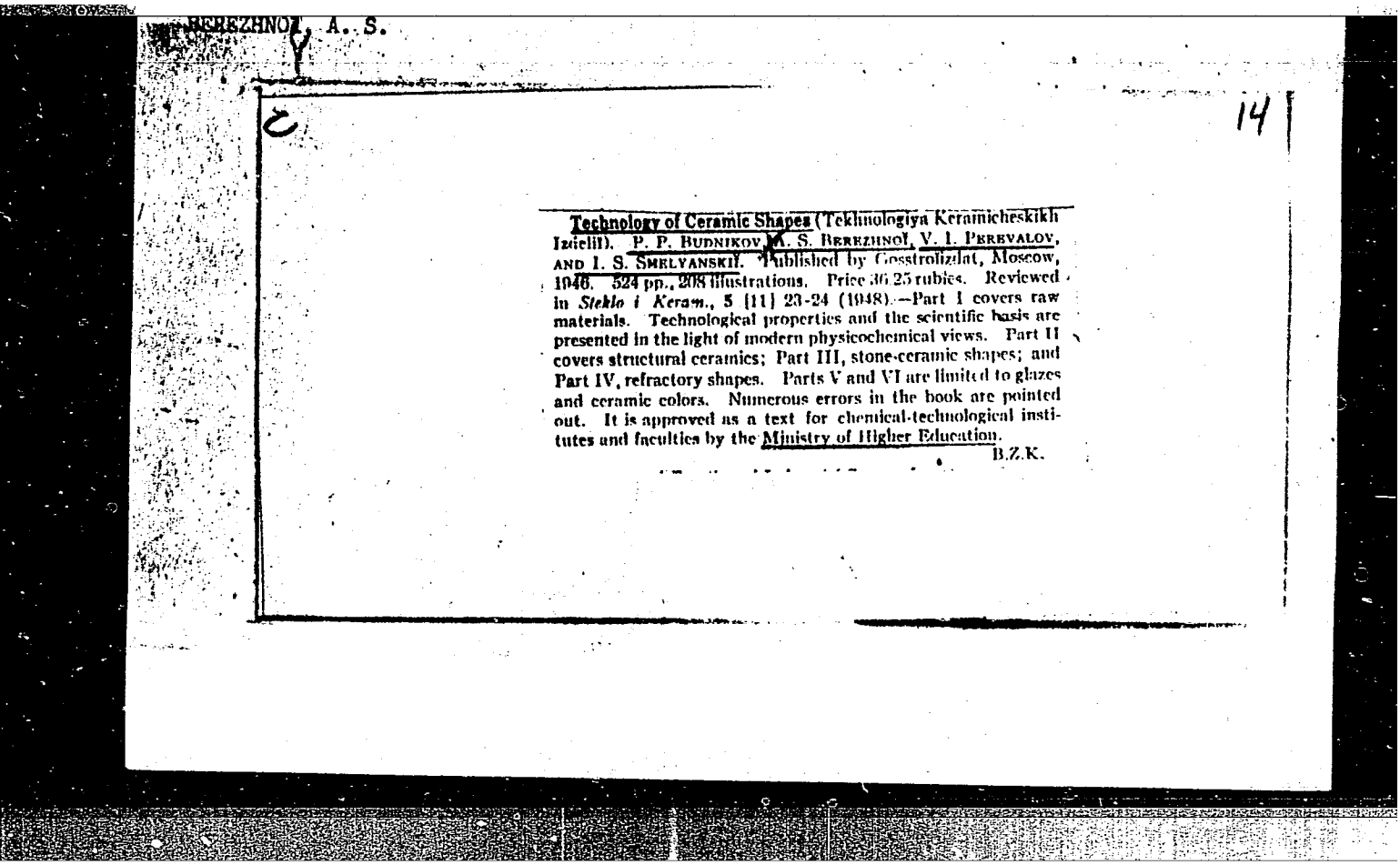
Boreshkol, A. S. UTILIZATION OF MAGNESIUM SILICATES FOR THE PRODUCTION OF REFRACTORIES. *J. Applied Chem* (U.S.S.R.), 13, 900 21 (1940) (in German, 821 22).—The investigation of the dehydration, setting, porosity, and specific gravity of materials fired at different temperatures showed that a practically complete dehydration takes place when serpentines are fired to 900° and talc is fired to 1000°, resulting in volume changes of the hydrosilicates. Curves of porosity changes indicate that, depending on the firing temperature, maximum values are observed at 900° for serpentines and at 1000° for talc. Serpentines fired at 900° are recommended as an addition, and those fired at 1400° are recommended as the basic material for the production of refractories. Investigations of the properties of forsterite briquettes prepared from mixtures of different rocks and caustic magnesite fired at different temperatures showed that the firing temperature of forsterite refractories should not be under 1600°. Additions to the batch are not advisable. Several flow sheets were worked out for the production of forsterite refractories from olivinite, dunite, serpentines, etc. Forsterite ware of a considerably reduced porosity (11.5%) can be obtained from serpentines by preliminarily preparing forsterite briquettes. Service tests demonstrated that unfired forsterite refractories can be used expediently for lining the walls of open-hearth furnaces (over the slag line), of reheating furnace hearths, and of cupola furnaces used for dolomite. Magnesium silicates can also be used as additions in the production of other refractory materials (from chromite, magnesite, and dolomite).

Forsterite refractories. A. S. Bakarzhiev. *Sbornik Robot Ukrain. Nauch.-Issledovatel. Inst. Ogneuporov & Kislotouporov*, 1940, No. 46, pp. 87–116; *Khim. Referat. Zhur.*, 4 [9] 110 (1941).—B. gives the results of his experiments on the production of fired and green forsterite refractories from dunite and olivinite. The dunite products were best when fired at 1670° to 1720° for 6 hr. The olivinite were fired at 1600°. Comparing the processes of their preparation and the properties of the products, B. prefers refractories made from olivinite. He also experimented with combined magnesite-forsterite refractories and found them preferable to forsterite refractories, as they fire better and have a higher thermal resistance. Unfired masses are suitable for the walls of open-hearth furnaces. See "Spinel. . .," *Ceram. Abs.*, 19 [3] 68 (1940); "Service. . .," *ibid.*, 20 [6] 147 (1941); "Substitute. . .," *ibid.*, 21 [11] 235 (1942). M.Ho.

A.C.S.

Refractories

Thermostable magnesite refractories with a spinel matrix. A. S. Berezhnoi and V. M. Tsvnkina. *Sbornik Materialov po Voprosu Ogneuporov Prom.*, 1940, No. 2, pp. 95-102; *Khim. Referat. Zhur.*, 4 [9] 110-11 (1941). —Results of experiments show the possibility of producing high-quality thermostable refractories from Satkin magnesite. A study of the formation of various spinels at high temperature, primarily through reactions in the solid phase, showed that alumina and chrome spinels are the most suitable. A technological procedure is recommended based on the study of the interdependence between the properties of fired magnesite and the methods of its production. A review of the literature and a description of technological works are included. See "Production. . .," *Ceram. Abs.*, 18 [9] 243 (1939); "Spinel. . .," *ibid.*, 19 [3] 68 (1940). M.Ho.



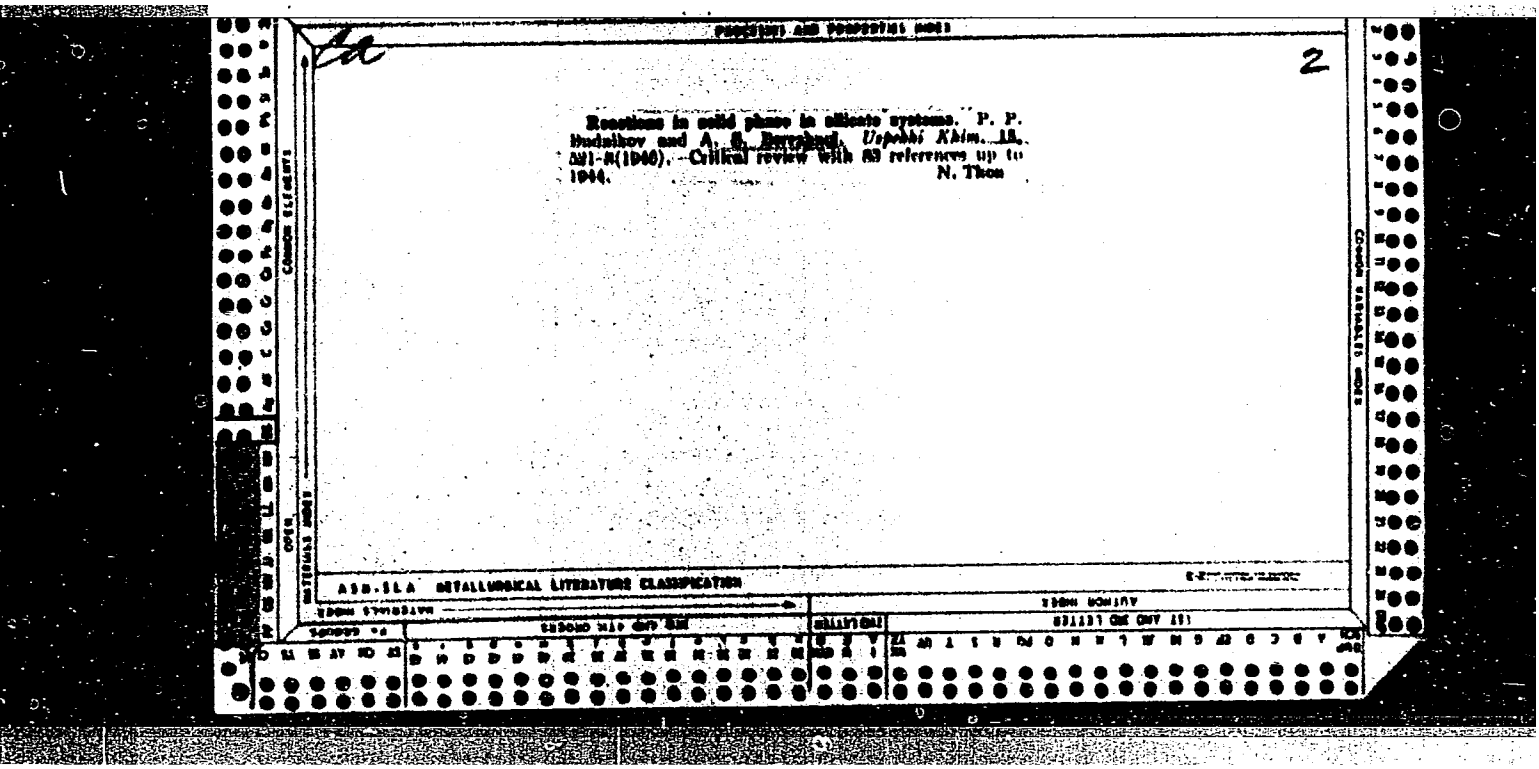
BEREZHNOI, A. S.

C

14

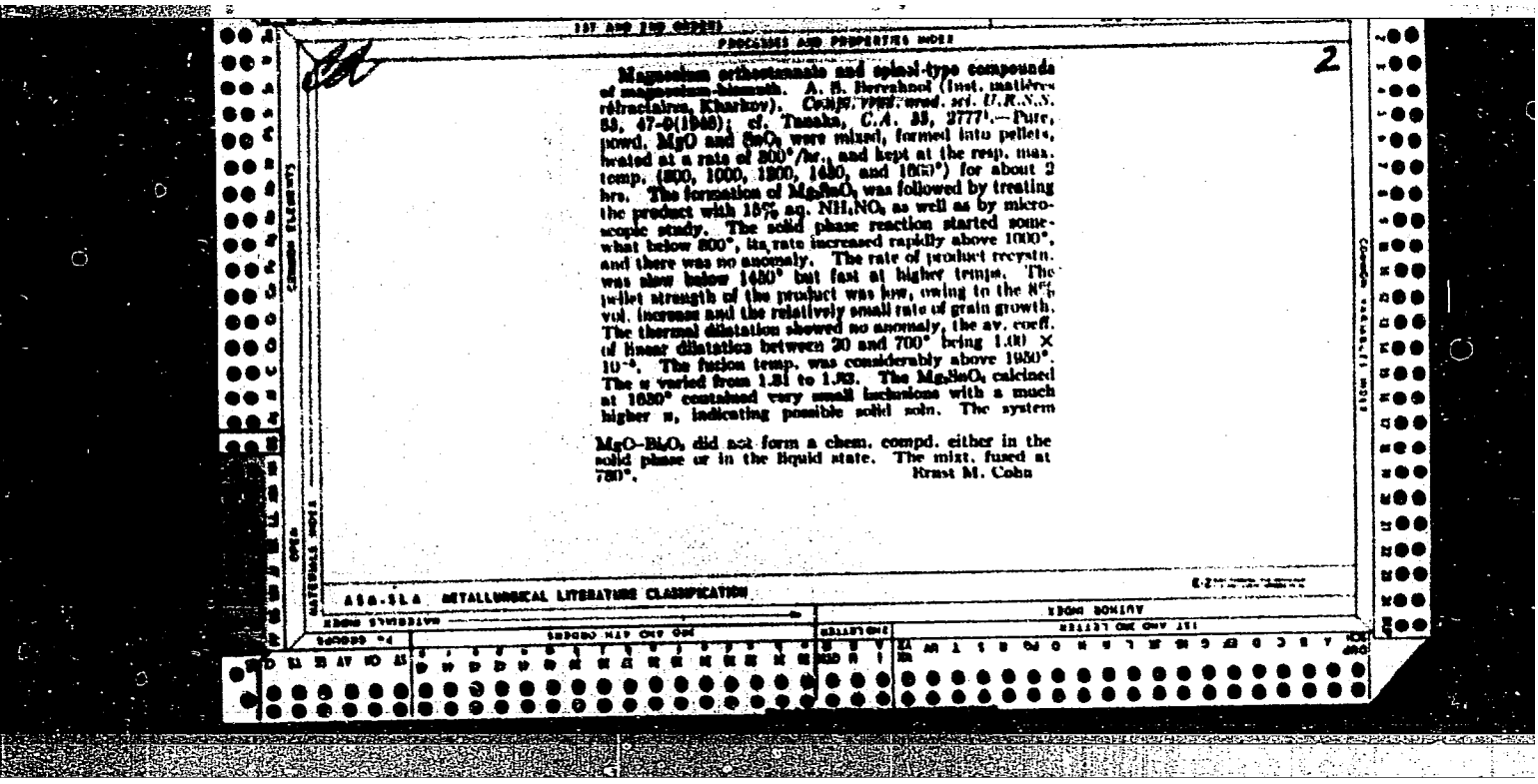
Technology of Ceramic Shapes (Tekhnologiya Keramicheskikh Izdelii). P. P. Budnikov, A. S. Berezhnoi, V. I. Perevalov, and I. S. Shelyanskii. Published by Gosstroiizdat, Moscow, 1946. 524 pp., 208 illustrations. Price 36.25 rubles. Reviewed in *Steklo i Keram.*, 5 [11] 23-24 (1948).—Part I covers raw materials. Technological properties and the scientific basis are presented in the light of modern physicochemical views. Part II covers structural ceramics; Part III, stone-ceramic shapes; and Part IV, refractory shapes. Parts V and VI are limited to glazes and ceramic colors. Numerous errors in the book are pointed out. It is approved as a text for chemical-technological institutes and faculties by the Ministry of Higher Education.

B.Z.K.



2

Reactions in solid phase in silicate systems. P. P. Budnikov and A. S. Berezhnoi. *Uspekhi Khim.* 13, No. 1-2(1944). Critical review with 83 references up to 1944. N. Thon



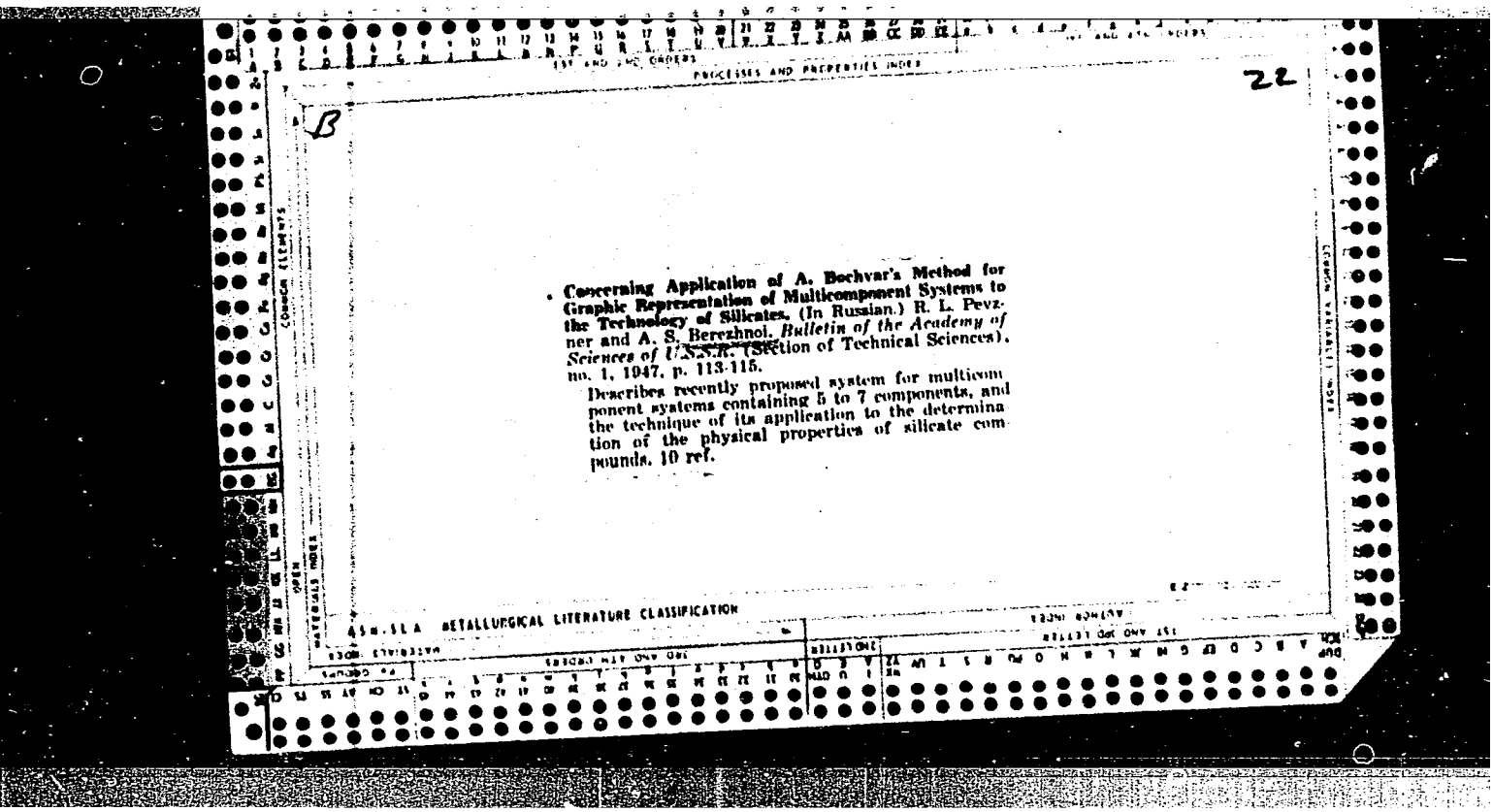
PROCESSES AND PROPERTIES INDEX

2

Magnesium orthostannate and spinel-type compounds of magnesium-bismuth. A. S. Berezhnoi (Inst. matières réfractaires, Kharkov). *Compt. rend. acad. sci. U.R.S.S.* 53, 47-9(1946); cf. Tanaka, *C.A.* 35, 2777¹.—Pure, powd. MgO and SnO_2 were mixed, formed into pellets, heated at a rate of 300°/hr., and kept at the resp. max. temp. (800, 1000, 1200, 1450, and 1650°) for about 2 hrs. The formation of Mg_2SnO_4 was followed by treating the product with 15% aq. NH_4NO_3 as well as by microscopic study. The solid phase reaction started somewhat below 800°, its rate increased rapidly above 1000°, and there was no anomaly. The rate of product recrystn. was slow below 1450° but fast at higher temps. The pellet strength of the product was low, owing to the 8% vol. increase and the relatively small rate of grain growth. The thermal dilatation showed no anomaly, the av. coeff. of linear dilatation between 20 and 700° being 1.40×10^{-6}. The fusion temp. was considerably above 1980°. The n varied from 1.81 to 1.93. The Mg_2SnO_4 calcined at 1650° contained very small inclusions with a much higher n, indicating possible solid soln. The system MgO–B_2O_3 did not form a chem. compd. either in the solid phase or in the liquid state. The mixt. fused at 780°.

Ernst M. Cohn

A56-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

22

B

• **Concerning Application of A. Bochvar's Method for Graphic Representation of Multicomponent Systems to the Technology of Silicates.** (In Russian.) R. L. Pevzner and A. S. Berezhnoi. *Bulletin of the Academy of Sciences of U.S.S.R.* (Section of Technical Sciences), no. 1, 1947. p. 113-115.

Describes recently proposed system for multicomponent systems containing 5 to 7 components, and the technique of its application to the determination of the physical properties of silicate compounds. 10 ref.

45M-51A METALLURGICAL LITERATURE CLASSIFICATION

BEREZHNOY, A. S.

PA 14T73

USSR/Fireproofing Jul 1947
Compression

"The Theory of Compressing Fire-- resisting Products Out of Nonplastic Matter," A. S. Berezhnoy, 4 pp

"Ogneupory" No 7

Discusses mathematical formulae to be used in the mechanical and hydraulic exertion of pressure on magnesium bricks. Table and graphs showing relationship of pressure applied to change in thickness of bricks.

14T73

PA 18T27

BEREZHNOY, A.S.

USSR/Metallurgy, Powder May 1947
Furnaces, Metallurgical

"Synthetic Metallurgical Powder for Martin Furnaces," A. S. Berezhnoy, V. I. Mitasov, I. G. Fadeyev, Factory imeni Serov and All-Union Institute of Refractory Materials, 2 pp

"Stal'" Vol VII, No 5

It is difficult to use magnesium metallurgical powder in Martin furnaces, even when it is combined with slag. Berezhnoy, at the Institute of Refractory Materials, has discovered a synthetic metallurgical powder (for example, Bazifrite, tomasite and some

USSR/Metallurgy, Powder (Contd) May 1947
Furnaces, Metallurgical

others). Its production is not being made public. However, does describe repair work done to furnaces.

18T27

BEREZHNOY A. S. PA 17T95

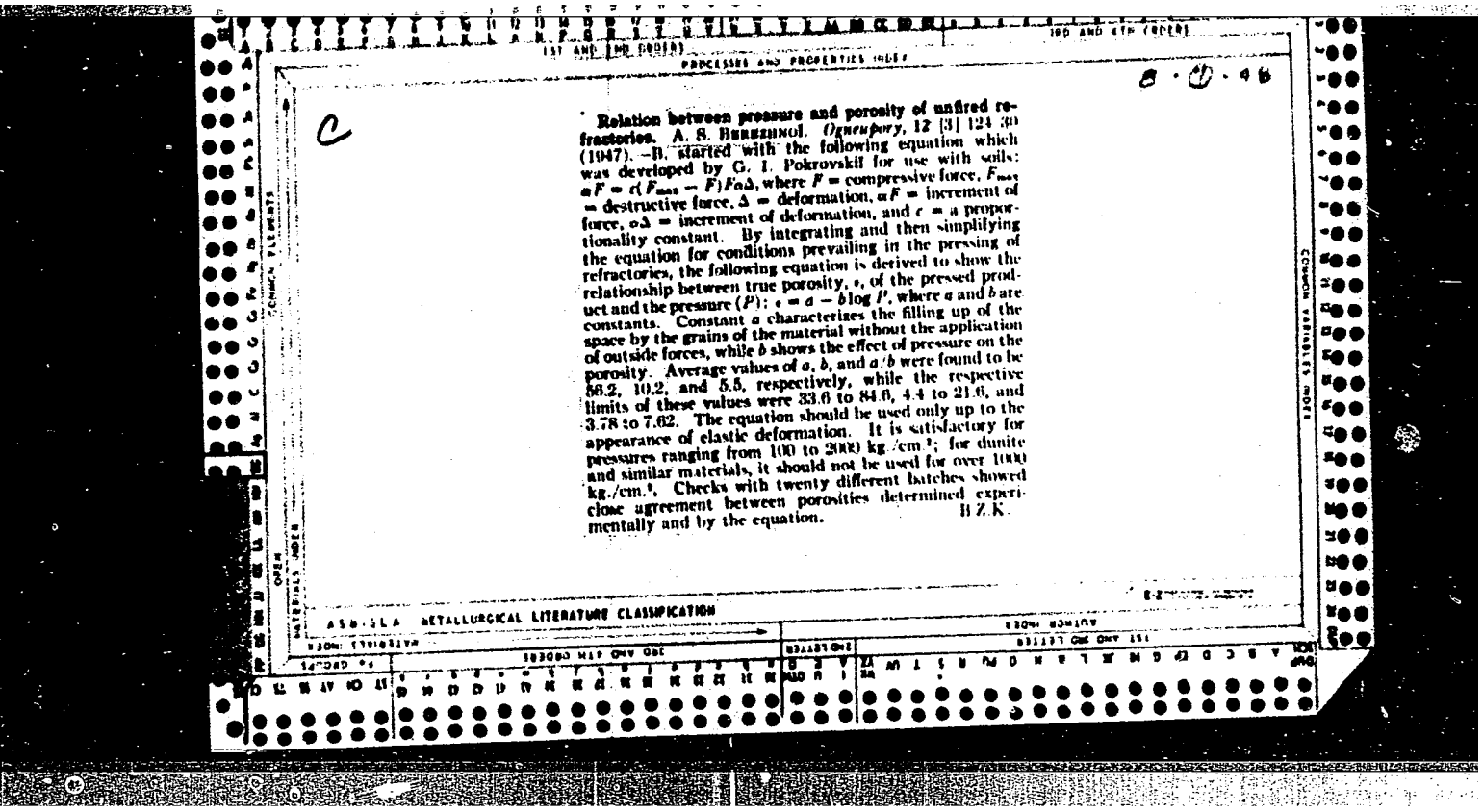
USSR/Refractory Materials Aug 1947
Magnesium Compounds

"Martinite, its Production and Characteristics," A. S. Berezhnoy

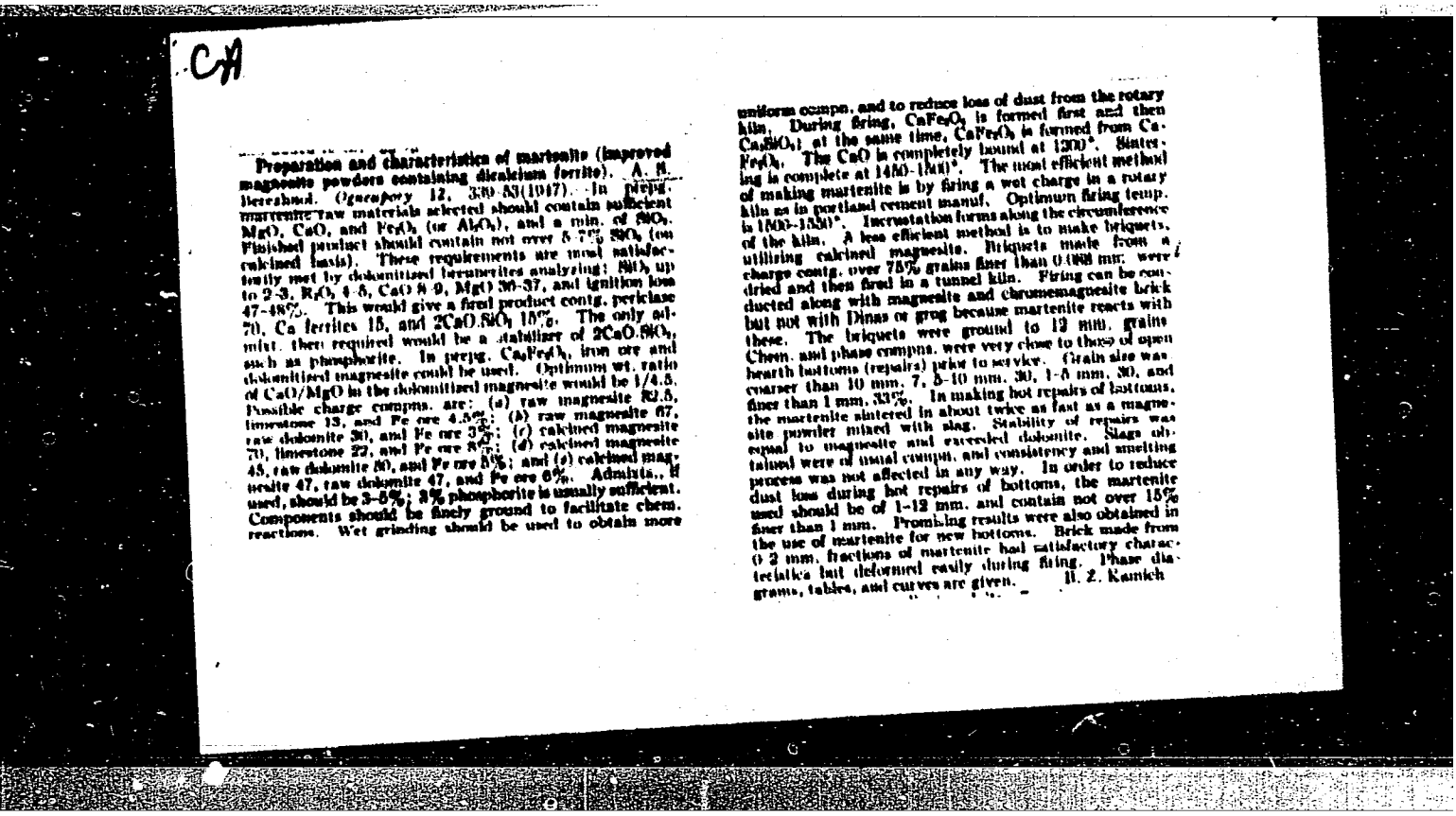
"Ogneupory" No 8

Describes methods of deriving martinite from such ores as Mg_2S,O_4, $MgAl_2O_4$, and others. Fire-resistance of martinite is higher than temperatures of 2000 degrees. Of all magnesium compounds, martinite appears to have the highest fire-resisting qualities. Tables and graphs show relative characteristics of martinite and other magnesium compounds.

17T95

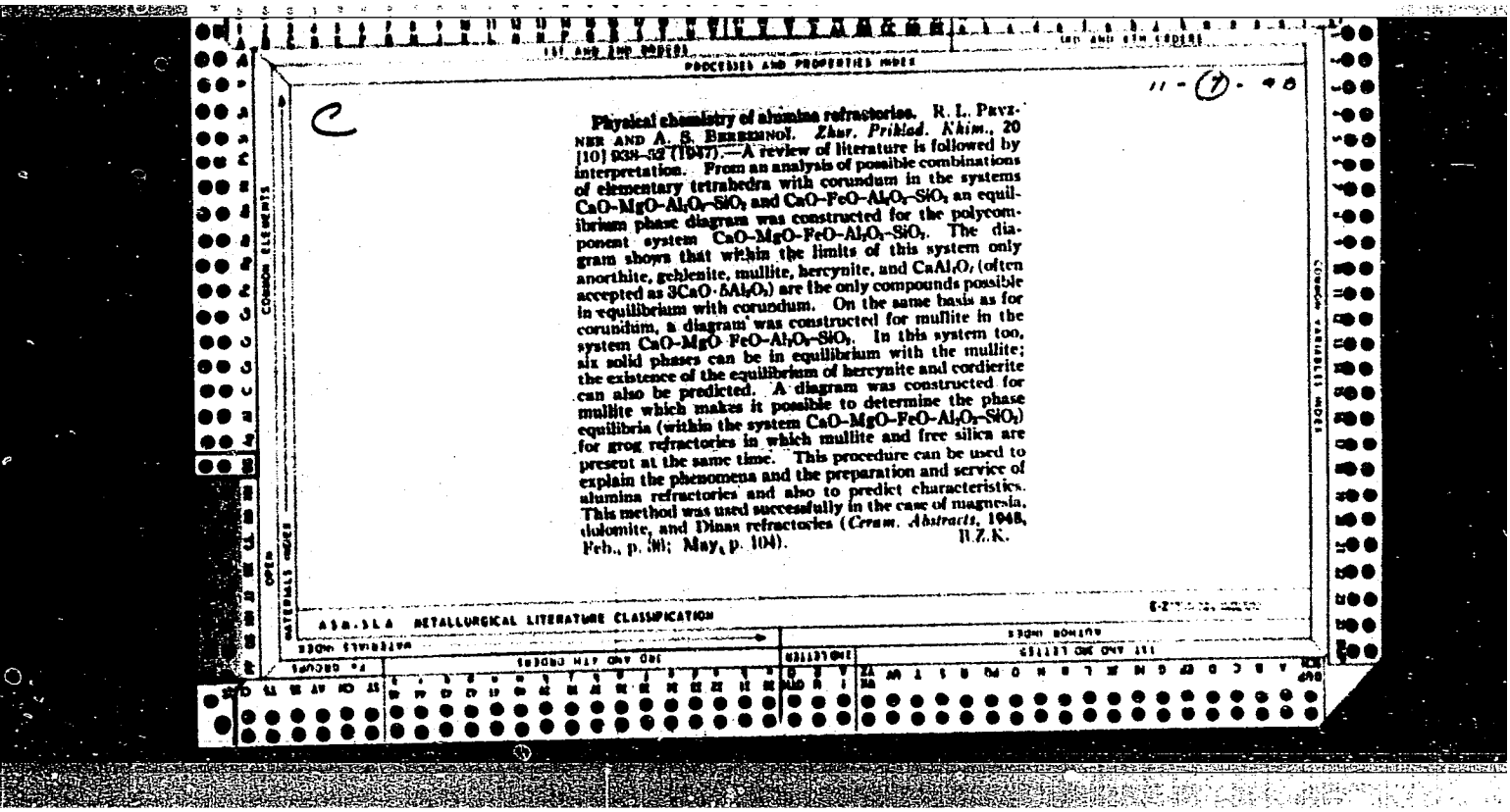


Relation between pressure and porosity of unfired refractories. A. S. Burzzhnoi. *Ogneupory*, 12 [3] 124-30 (1947). —B. started with the following equation which was developed by G. I. Pokrovskii for use with soils: $\alpha F = c(F_{max} - F)F\alpha\Delta$, where F = compressive force, F_{max} = destructive force, Δ = deformation, αF = increment of force, $\alpha\Delta$ = increment of deformation, and c = a proportionality constant. By integrating and then simplifying the equation for conditions prevailing in the pressing of refractories, the following equation is derived to show the relationship between true porosity, ϵ, of the pressed product and the pressure (P): $\epsilon = a - b \log P$, where a and b are constants. Constant a characterizes the filling up of the space by the grains of the material without the application of outside forces, while b shows the effect of pressure on the porosity. Average values of a, b, and a/b were found to be 56.2, 10.2, and 5.5, respectively, while the respective limits of these values were 33.6 to 84.6, 4.4 to 21.6, and 3.78 to 7.62. The equation should be used only up to the appearance of elastic deformation. It is satisfactory for pressures ranging from 100 to 2000 kg./cm.^{2}; for dunite and similar materials, it should not be used for over 1000 kg./cm.^{2}. Checks with twenty different batches showed close agreement between porosities determined experimentally and by the equation. H Z K

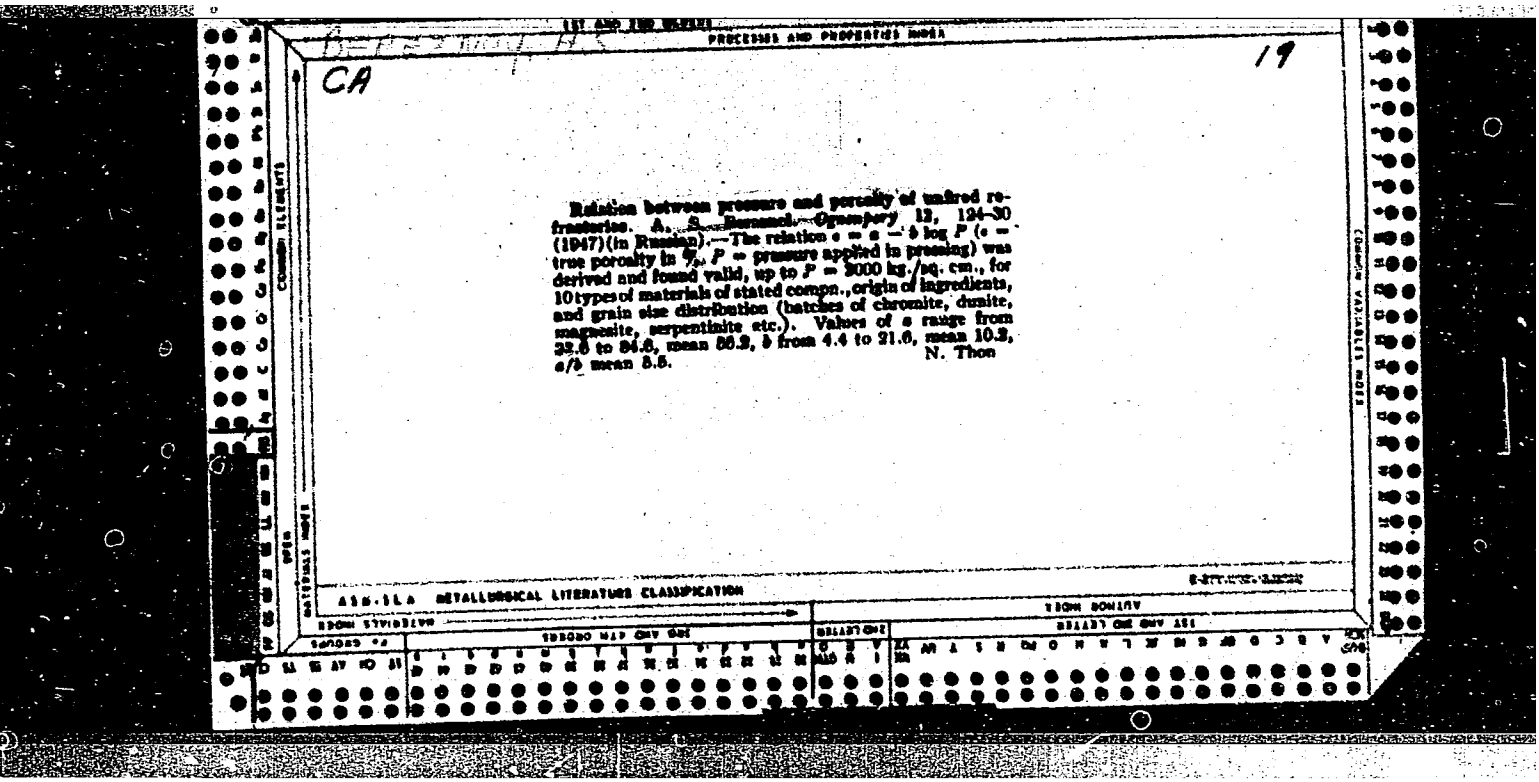


CA

Preparation and characterization of martenite (improved magnesite powders containing dicalcium ferrite). A. M. Berezhnoi. *Ogneupory* 12, 330-53(1947). In prepg. martenite raw materials selected should contain sufficient MgO, CaO, and Fe_2O_3 (or Al_2O_3), and a min. of SiO_2. Finished product should contain not over 5.7% SiO_2 (on calcined basis). These requirements are most satisfactorily met by dolomitized lavas analyzing: SiO_2 up to 2-3, R_2O_3 4-5, CaO 8-9, MgO 36-37, and ignition loss 47-48%. This would give a final product contg. periclase 70, Ca ferrites 15, and $2CaO.SiO_2$ 15%. The only admixt. then required would be a stabilizer of $2CaO.SiO_2$, such as phosphorite. In prepg. $Ca_2Fe_2O_5$, iron ore and dolomitized magnesite could be used. Optimum wt. ratio of CaO/MgO in the dolomitized magnesite would be 1/4.5. Possible charge compns. are: (a) raw magnesite 82.5, limestone 13, and Fe ore 4.5%; (b) raw magnesite 67, raw dolomite 30, and Fe ore 3%; (c) calcined magnesite 70, limestone 22, and Fe ore 8%; (d) calcined magnesite 45, raw dolomite 50, and Fe ore 5%; and (e) calcined magnesite 47, raw dolomite 47, and Fe ore 6%. Admixts., if used, should be 3-5%; 3% phosphorite is usually sufficient. Components should be finely ground to facilitate chem. reactions. Wet grinding should be used to obtain more uniform compn. and to reduce loss of dust from the rotary kiln. During firing, $CaFe_2O_5$ is formed first and then Ca_2SiO_4; at the same time, $CaFe_2O_5$ is formed from CaO and Fe_2O_3. The CaO is completely bound at 1200°. Sintering is complete at 1450-1500°. The most efficient method of making martenite is by firing a wet charge in a rotary kiln as in portland cement manuf. Optimum firing temp. is 1400-1550°. Incrustation forms along the circumference of the kiln. A less efficient method is to make briquets, utilizing calcined magnesite. Briquets made from a charge contg. over 75% grains finer than 0.088 mm. were dried and then fired in a tunnel kiln. Firing can be conducted along with magnesite and chromemagnesite brick but not with Dinas or grog because martenite reacts with these. The briquets were ground to 12 mm. grains. Chem. and phase compns. were very close to those of open hearth bottoms (repairs) prior to service. Grain size was coarser than 10 mm. 7, 5-10 mm. 30, 1-5 mm. 30, and finer than 1 mm. 33%. In making hot repairs of bottoms, the martenite sintered in about twice as fast as a magnesite powder mixed with slag. Stability of repairs was equal to magnesite and exceeded dolomite. Slags obtained were of usual compn. and consistency and smelting process was not affected in any way. In order to reduce dust loss during hot repairs of bottoms, the martenite used should be of 1-12 mm. and contain not over 15% finer than 1 mm. Promising results were also obtained in the use of martenite for new bottoms. Brick made from 0-3 mm. fractions of martenite had satisfactory characteristics but deformed easily during firing. Phase diagrams, tables, and curves are given. B. Z. Kamich



Physical chemistry of alumina refractories. R. L. Pryzner and A. S. Berezhnoi. *Zhur. Priklad. Khim.*, 20 [10] 938–52 (1947).—A review of literature is followed by interpretation. From an analysis of possible combinations of elementary tetrahedra with corundum in the systems $CaO–MgO–Al_2O_3–SiO_2$ and $CaO–FeO–Al_2O_3–SiO_2$ an equilibrium phase diagram was constructed for the polycomponent system $CaO–MgO–FeO–Al_2O_3–SiO_2$. The diagram shows that within the limits of this system only anorthite, gehlenite, mullite, hercynite, and $CaAl_2O_4$ (often accepted as $3CaO·5Al_2O_3$) are the only compounds possible in equilibrium with corundum. On the same basis as for corundum, a diagram was constructed for mullite in the system $CaO–MgO–FeO–Al_2O_3–SiO_2$. In this system too, six solid phases can be in equilibrium with the mullite; the existence of the equilibrium of hercynite and cordierite can also be predicted. A diagram was constructed for mullite which makes it possible to determine the phase equilibria (within the system $CaO–MgO–FeO–Al_2O_3–SiO_2$) for grog refractories in which mullite and free silica are present at the same time. This procedure can be used to explain the phenomena and the preparation and service of alumina refractories and also to predict characteristics. This method was used successfully in the case of magnesia, dolomite, and Dinas refractories (*Ceram. Abstracts*, 1948, Feb., p. 30; May, p. 104). B.Z.K.



CA

19

Relation between pressure and porosity of unfired refractories. A. S. Berman.—*Ogneupory* 12, 124–30 (1947)(in Russian).—The relation $\epsilon = a - b \log P$ (ϵ = true porosity in %, P = pressure applied in pressing) was derived and found valid, up to P = 3000 kg./sq. cm., for 10 types of materials of stated compn., origin of ingredients, and grain size distribution (batches of chromite, dunite, magnesite, serpentinite etc.). Values of a range from 32.6 to 94.8, mean 56.2, b from 4.4 to 21.6, mean 10.3, a/b mean 5.5.

N. Thon

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

BEREZHNOY, A. S.

PA 41T23

USSR/Engineering Jan 1948
Metallurgy
Furnaces, Metallurgical

"Characteristics of Basic Fettling in Martin Furnaces," A. S. Berezhnoy, Dr Tech Sci, All-Union Inst of Fire Resistant Materials, 9 pp

"Stal'" No 1

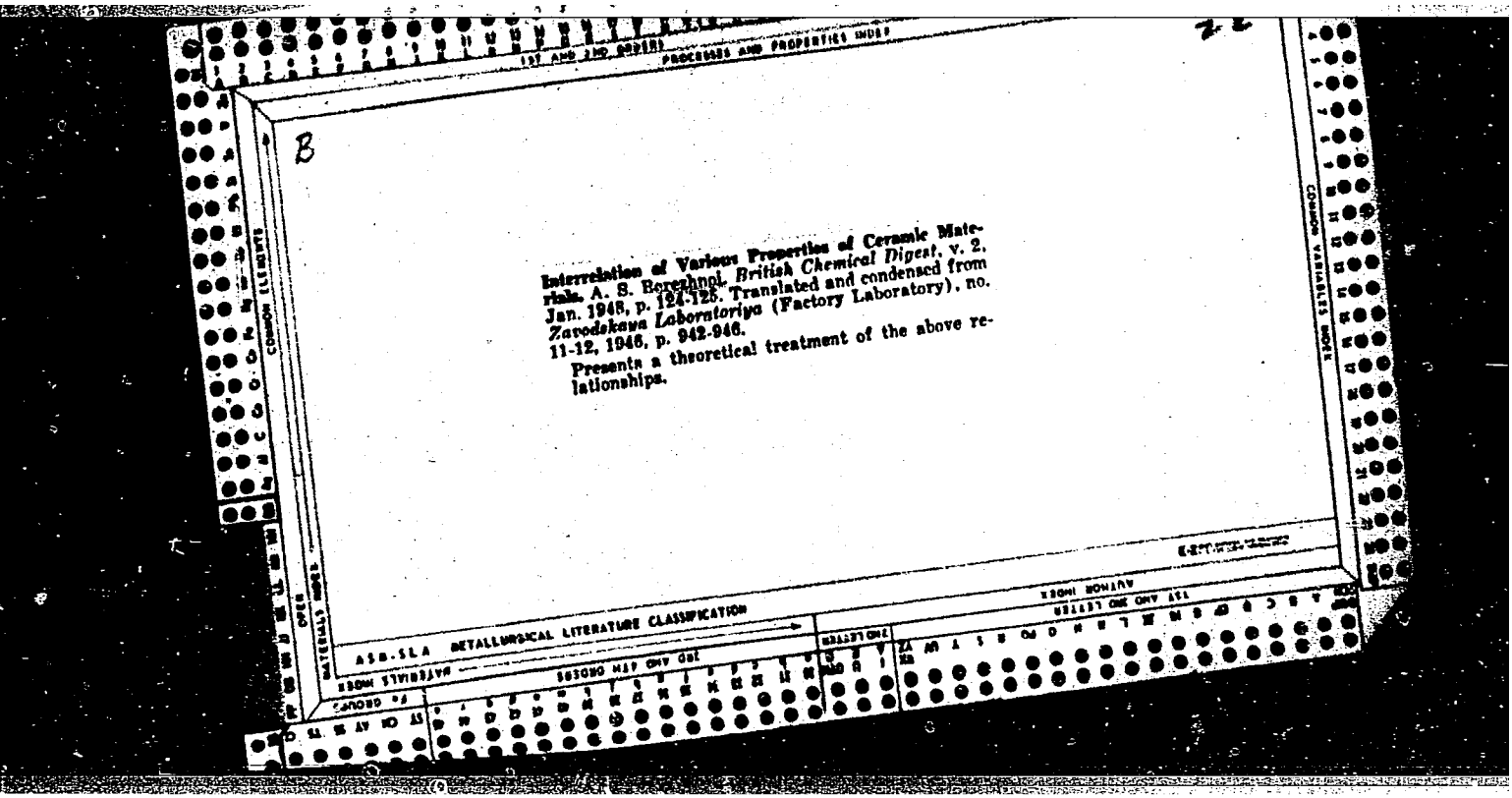
Characteristics of basic fettling of Martin furnaces vary widely because of variations in the composition of the mixtures, and conditions under which fettling takes place. Where there is a high magnesium oxide content, magnesium welds have high degree of stability in comparison with magnesium-dolomites, but have a

41T23

USSR/Engineering (Contd) Jan 1948

slightly lower clinkering factor. During operation of the furnaces, it must be noted that it is possible to oxidize the basic fettling.

41T23



B

Interrelation of Various Properties of Ceramic Materials. A. S. Bereshnoi. *British Chemical Digest*, v. 2, Jan. 1948, p. 124-125. Translated and condensed from *Zavodskaya Laboratoriya* (Factory Laboratory), no. 11-12, 1946, p. 942-946.

Presents a theoretical treatment of the above relationships.

PA 32/49T37

BEREZHNOY, A. S. PROF.

Aug 48

USSR/Engineering
Sintering
Mathematics - Applied

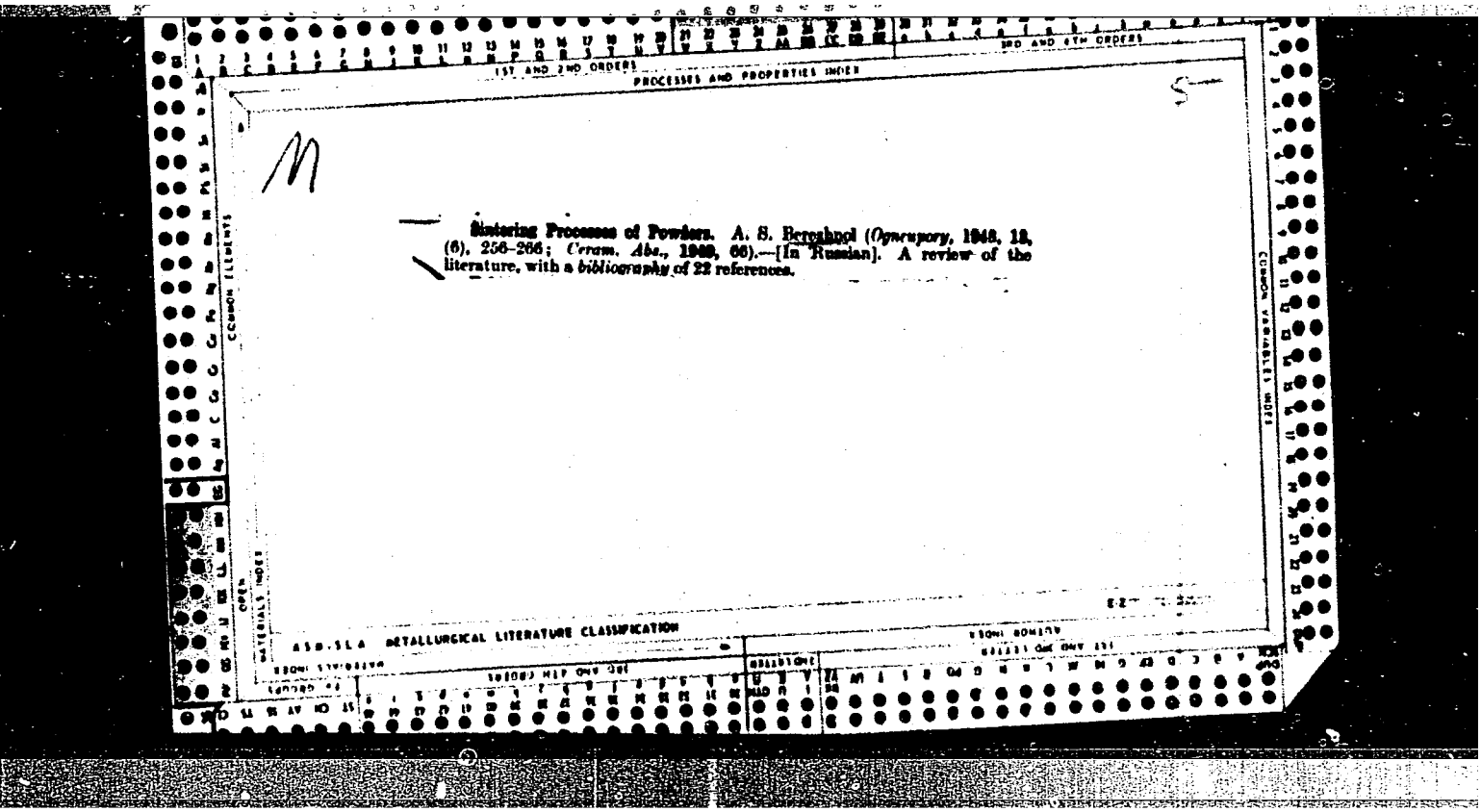
"The Theory of Liquid Sintering and the Effect of Compression Stress on Sintering," Prof A. S. Berezhnoy, Dr Mech Sci, 10½ pp

"Ogneupory" No 8

Liquid sintering ("gluing") is of great practical importance. Analyzes processes involved from mathematical standpoint.

32/49T37

[redacted]



Sintering Processes of Powders. A. S. Berezhnoi (*Ogneupory*, 1948, 13, (6), 256–266; *Ceram. Abs.*, 1949, 66).—[In Russian]. A review of the literature, with a *bibliography* of 22 references.

BEREZHNOY, A. S. PROF

USSR/Engineering Jun 48
Refractories
Agglutination

"Agglutination of Powders and Associated Processes," Prof A. S. Berezhnoy, Dr Tech Sci, 11 pp

Ogneupory" Vol XIII, No 6

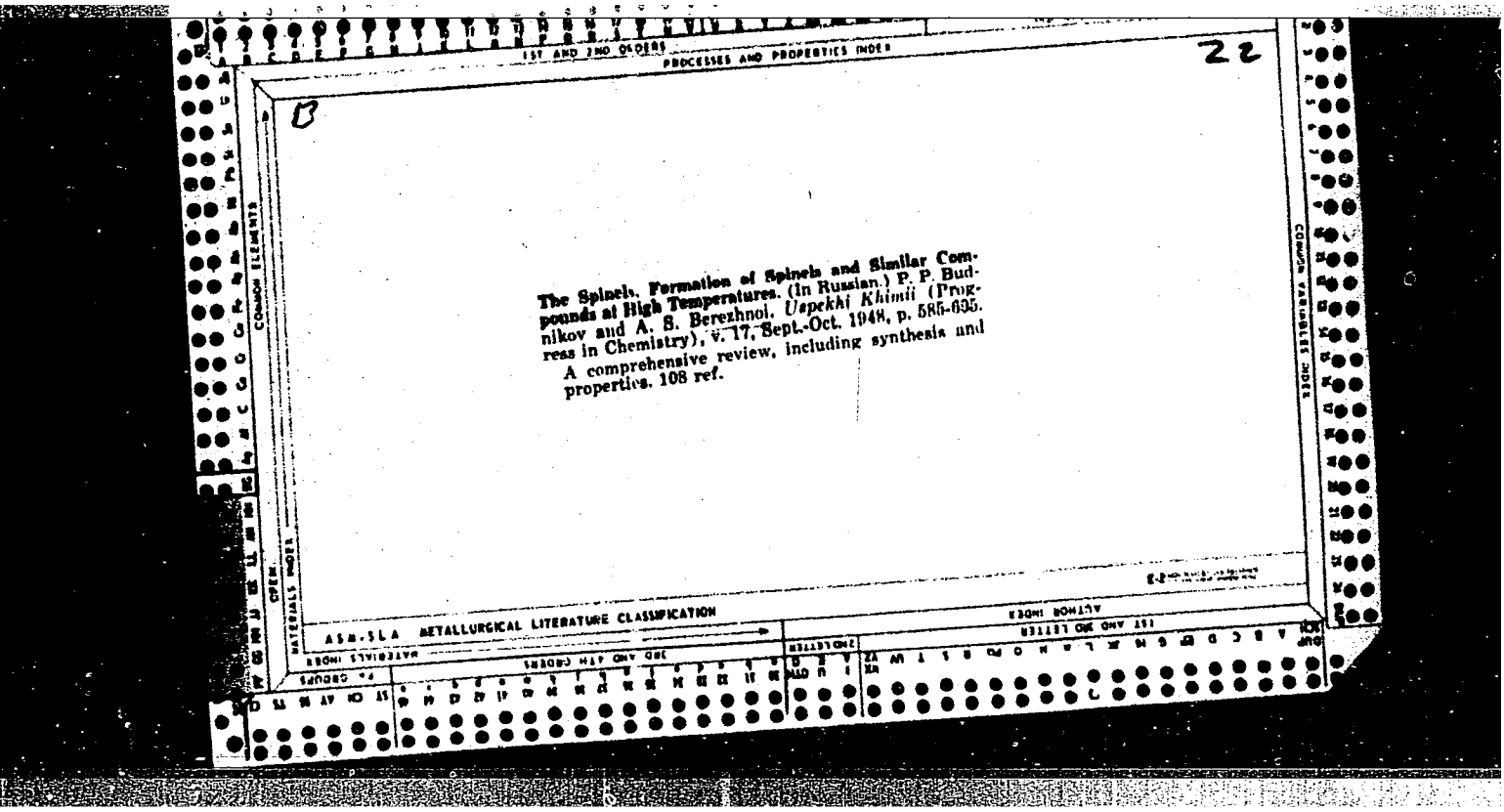
Discusses agglutination (1) in the absence of a liquid phase, (2) with liquid phase, (3) complex processes. Treatment is mainly mathematical but article is illustrated with graphs based on experimental data.

6/49738

Bil. ab.

Theory of [illegible] and influence of pressure on sintering [of magnesite]. [illegible] (*Ogneupory*, 1948, 13, 351; *Brit. ceram. Abstr.*, 1948, 346).—Results of sintering experiments with magnesite of uniform grain size are given. The average distance between centres of grains is always > their diameter; the porosity of the system is ~40%, which corresponds to cubic packing. When magnesite particles are moistened with water the total vol. increases with water additions up to ~3%; with further additions the porosity is reduced considerably. The effect of pressure on the degree of sintering of magnesite powder (0—0·2 mm.) was studied. After firing at 1540° the degree of sintering increases regularly with the pressure up to ~ 21,000 lb. per sq. in. At still higher pressures the degree of sintering falls off slightly.

INST. CERAM. RES. ASS. (C/).



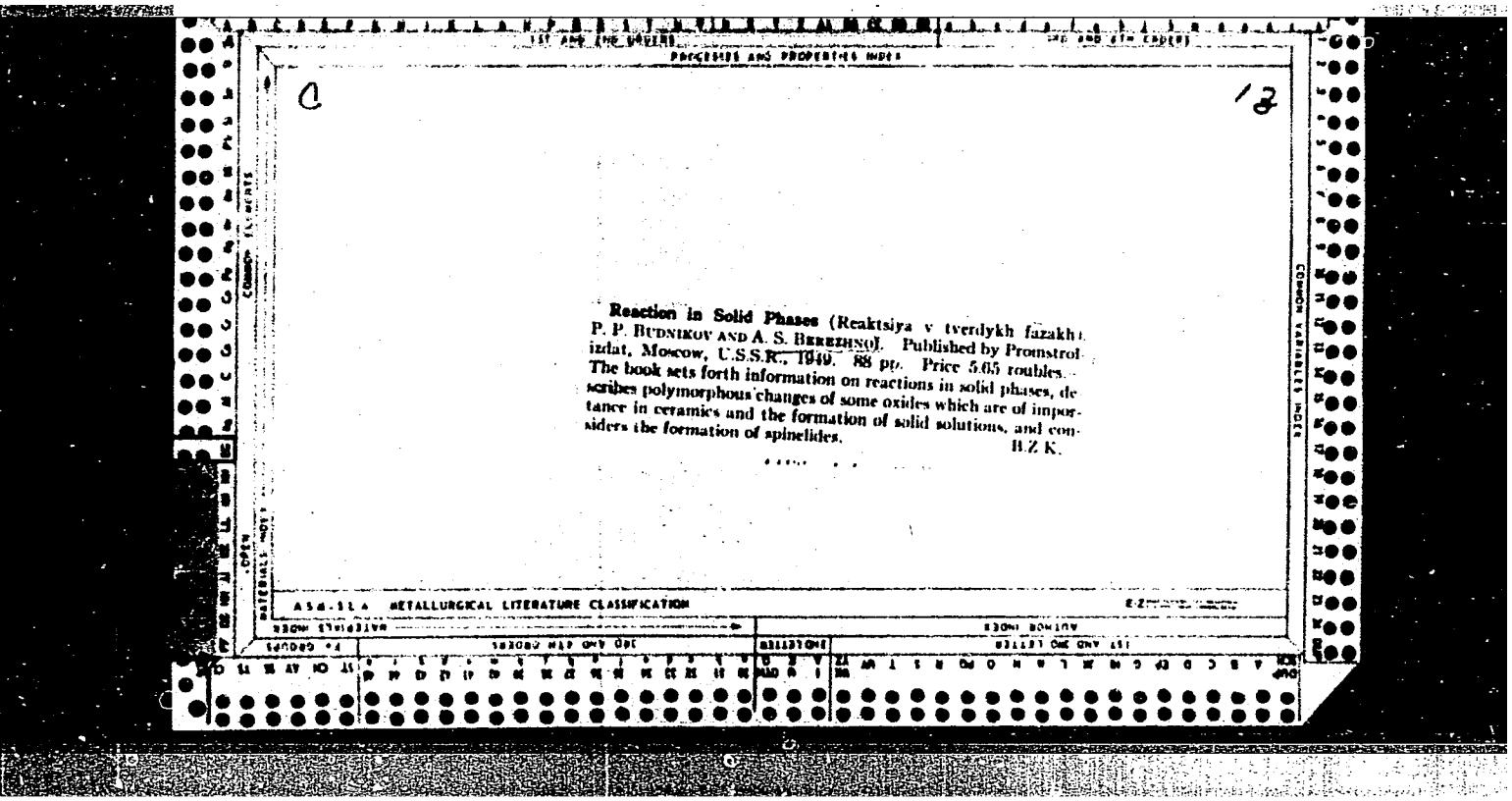
BEREZHNOI, A. S.

Berezhnoi, A. S., "The physico-chemistry of magnesium oxide in the system $CaO-MgO-Al_2O_3-F_2O_3-SiO_2$." p. 717

For clearing up that part of the system $CaO-MgO-Al_3O_2-FeO_2-SiO_2$ which is of interest here, first it was necessary to establish which phases are in equilibrium with magnesium oxide and at the same time with each other. The value of the coefficient of thermal expansion of almost all substances in equilibrium with magnesium oxide are very close to the value of the expansion coefficient of magnesium oxide.

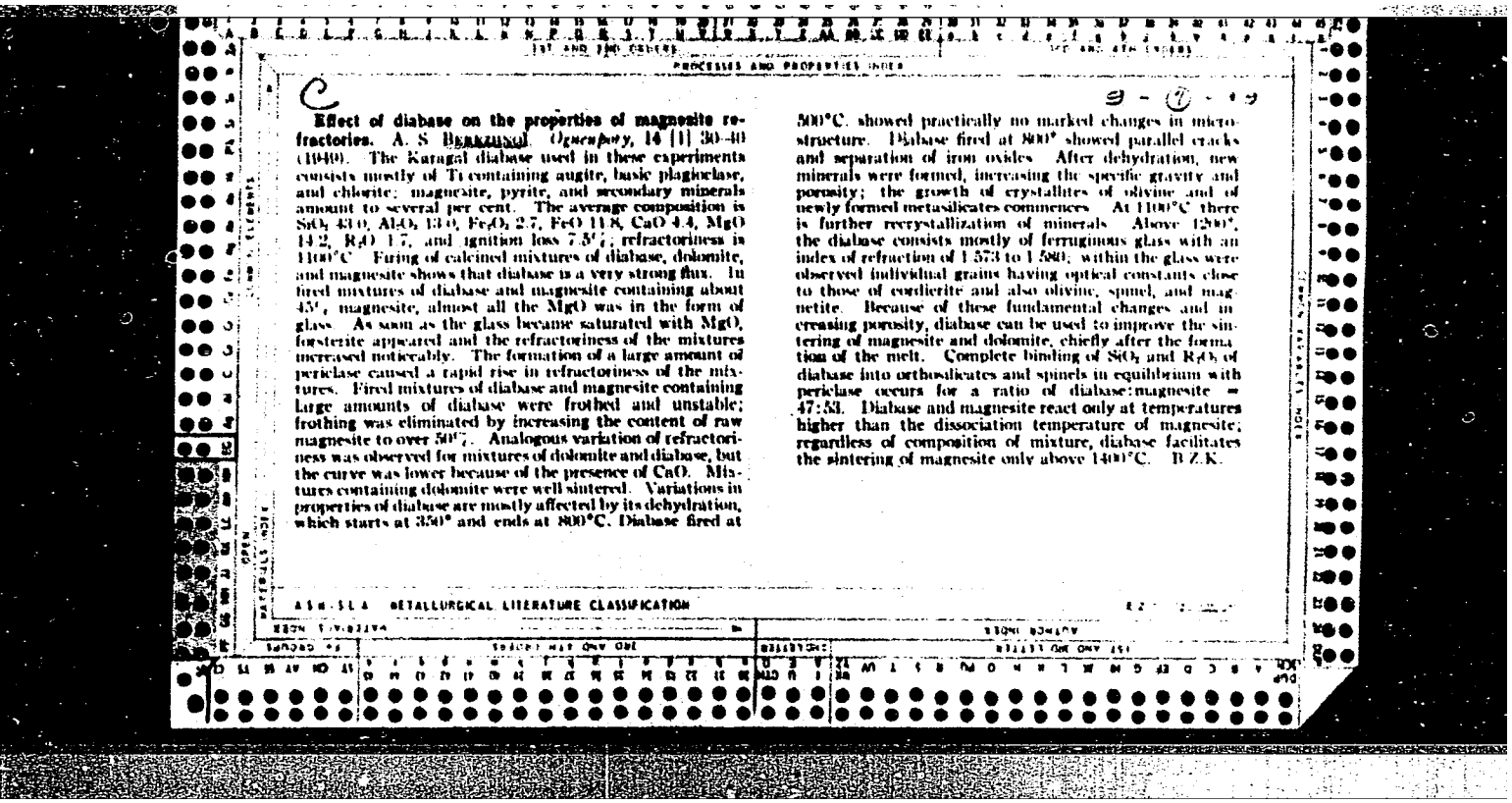
All Union Institute of Fireproofs. July 30, 1947

SO: Journal of Applied Chemistry (USSR) 21, No. 7 (1948)



Reaction in Solid Phases (Reaktsiya v tverdykh fazakh) P. P. BUDNIKOV AND A. S. BEREZHNOI. Published by Promstroizdat, Moscow, U.S.S.R., 1949. 88 pp. Price 5.65 roubles. The book sets forth information on reactions in solid phases, describes polymorphous changes of some oxides which are of importance in ceramics and the formation of solid solutions, and considers the formation of spinelides.

B.Z.K.



C

Effect of diabase on the properties of magnesite refractories. A. S. Berezinol. *Ogneupory*, 14 [1] 30-40 (1949). The Karagal diabase used in these experiments consists mostly of Ti-containing augite, basic plagioclase, and chlorite; magnesite, pyrite, and secondary minerals amount to several per cent. The average composition is SiO_2 43.0, Al_2O_3 13.0, Fe_2O_3 2.7, FeO 11.8, CaO 4.4, MgO 14.2, R_2O 1.7, and ignition loss 7.5%; refractoriness is 1100°C. Firing of calcined mixtures of diabase, dolomite, and magnesite shows that diabase is a very strong flux. In fired mixtures of diabase and magnesite containing about 45% magnesite, almost all the MgO was in the form of glass. As soon as the glass became saturated with MgO, forsterite appeared and the refractoriness of the mixtures increased noticeably. The formation of a large amount of periclase caused a rapid rise in refractoriness of the mixtures. Fired mixtures of diabase and magnesite containing large amounts of diabase were frothed and unstable; frothing was eliminated by increasing the content of raw magnesite to over 50%. Analogous variation of refractoriness was observed for mixtures of dolomite and diabase, but the curve was lower because of the presence of CaO. Mixtures containing dolomite were well sintered. Variations in properties of diabase are mostly affected by its dehydration, which starts at 350° and ends at 800°C. Diabase fired at 500°C. showed practically no marked changes in microstructure. Diabase fired at 800° showed parallel cracks and separation of iron oxides. After dehydration, new minerals were formed, increasing the specific gravity and porosity; the growth of crystallites of olivine and of newly formed metasilicates commences. At 1100°C there is further recrystallization of minerals. Above 1200°, the diabase consists mostly of ferruginous glass with an index of refraction of 1.573 to 1.580; within the glass were observed individual grains having optical constants close to those of cordierite and also olivine, spinel, and magnetite. Because of these fundamental changes and increasing porosity, diabase can be used to improve the sintering of magnesite and dolomite, chiefly after the formation of the melt. Complete binding of SiO_2 and R_2O_3 of diabase into orthosilicates and spinels in equilibrium with periclase occurs for a ratio of diabase:magnesite = 47:53. Diabase and magnesite react only at temperatures higher than the dissociation temperature of magnesite; regardless of composition of mixture, diabase facilitates the sintering of magnesite only above 1400°C. B.Z.K.

BEREZHNOY, A. S.

PHASE X TREASURE ISLAND BIBLIOGRAPHICAL REPORT AID 707 - X

BOOK

Call No.: TP807.B9

Authors: BUDNIKOV, P. P.; BEREZHNOY, A. S.; BULAVIN, I. A.; GRISSIK, B. M.; KUKOLEV, G. V.; POLUBOYARINOV, D. N.

Full Title: MANUFACTURE OF CERAMICS AND REFRACTORY MATERIALS

Transliterated Title: Tekhnologiya keramiki i ogneuporov

PUBLISHING DATA

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Date: 1950 No. pp.: 575 No. of copies: 4,000

Editorial Staff

Editor: P. P. Budnikov, Member of the Academy of Sciences, Ukrainian SSR

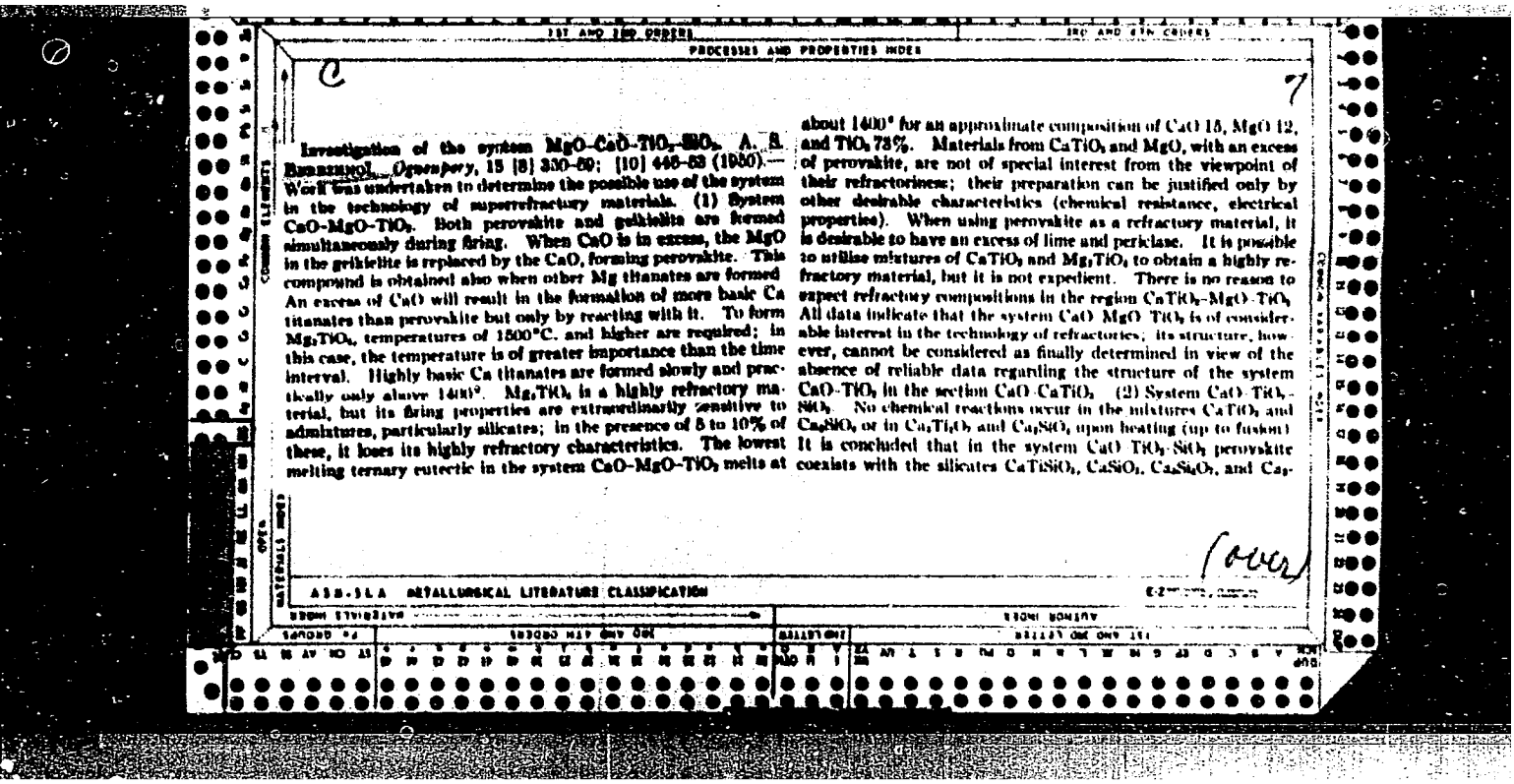
PURPOSE AND EVALUATION: This manual is approved as a textbook for institutes of chemical technology and of construction materials and for students specializing in the technology of silicates. The book compares favorably with its American counterparts, e. g., volume III of Ceramics by Ed. P. McNamara (State College, Pa., 1939) and Factory Design and Equipment and Manufacture of Clay Wares by T. W. Garve (N.Y., 1929). All phases of manufacturing are extensively covered and the book can be used as a reference book.

CATALYSTS 2

(3) Chem

Reaction of chromium oxide with forsterite in the solid phase. P. P. Budnikov (D. I. Mendeleev Inst. Chem. Technol., Moscow) and A. S. Berezhnoi. *Doporidi Akad. Nauk Ukr. R.S.R.* 1950, No. 5, 345–8(Russian summary, 348–9).—Mixts. of Cr_2O_3 and Mg_2SiO_4 were pressed at 500 kg./sq. cm. and the specimens kept 0.5–7.0 hrs. at 1200°, as well as in the range 1000–1600° with temp. rise over 2 hrs. After cooling in air, the extent of conversion to $MgSiO_3$ and $MgCr_2O_4$ was detd. by soln. in 15% HCl at 80° for 20 min., under which conditions only forsterite is attacked; both photographic and x-ray methods were used. At 1200° the reaction is intensive for 2 hrs., then almost stops, owing to coating effects with reduced diffusion. At higher temp. the reaction is more rapid; at 1300° partial vitrification occurs. The reaction runs to completion at 1850–1900° with 2.6% vol. increase. The resulting mixt. of 66% $MgCr_2O_4$ and 34% $MgSiO_3$ is refractory above 1900°. G. M. K.

9-2-54 gfp



PROCESSES AND PROPERTIES INDEX

C

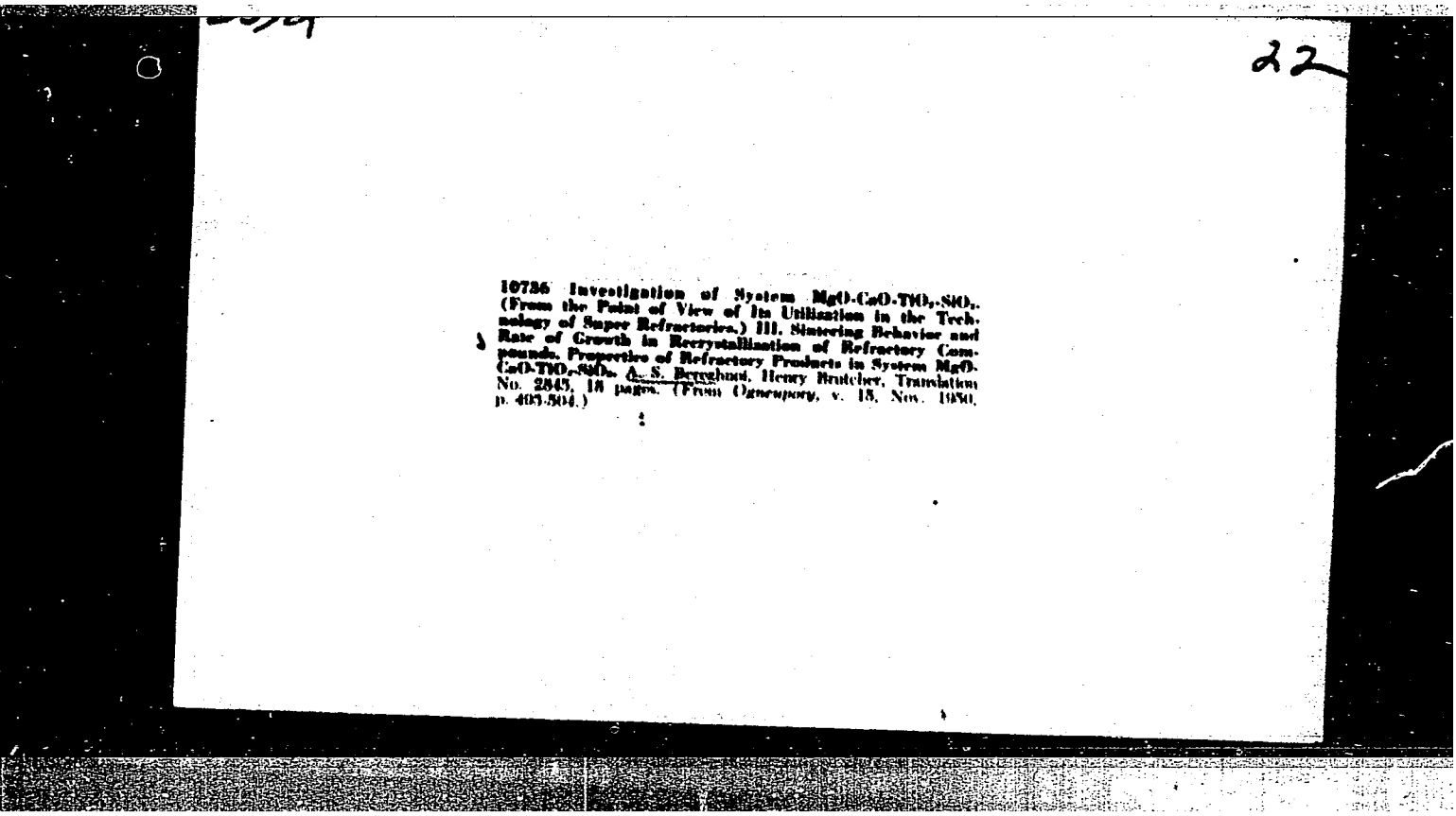
7

Investigation of the system MgO–CaO–TiO_2–SiO_2. A. S. Bannazzol. *Ogneupory*, 15 [8] 350–59; [10] 448–53 (1950).—Work was undertaken to determine the possible use of the system in the technology of superrefractory materials. (1) System CaO–MgO–TiO_2. Both perovskite and gehlenite are formed simultaneously during firing. When CaO is in excess, the MgO in the gehlenite is replaced by the CaO, forming perovskite. This compound is obtained also when other Mg titanates are formed. An excess of CaO will result in the formation of more basic Ca titanates than perovskite but only by reacting with it. To form Mg_2TiO_4, temperatures of 1500°C. and higher are required; in this case, the temperature is of greater importance than the time interval. Highly basic Ca titanates are formed slowly and practically only above 1400°. Mg_2TiO_4 is a highly refractory material, but its firing properties are extraordinarily sensitive to admixtures, particularly silicates; in the presence of 5 to 10% of these, it loses its highly refractory characteristics. The lowest melting ternary eutectic in the system CaO–MgO–TiO_2 melts at about 1400° for an approximate composition of CaO 15, MgO 12, and TiO_2 73%. Materials from $CaTiO_3$ and MgO, with an excess of perovskite, are not of special interest from the viewpoint of their refractoriness; their preparation can be justified only by other desirable characteristics (chemical resistance, electrical properties). When using perovskite as a refractory material, it is desirable to have an excess of lime and periclase. It is possible to utilize mixtures of $CaTiO_3$ and Mg_2TiO_4 to obtain a highly refractory material, but it is not expedient. There is no reason to expect refractory compositions in the region $CaTiO_3$–MgO–TiO_2. All data indicate that the system CaO–MgO–TiO_2 is of considerable interest in the technology of refractories; its structure, however, cannot be considered as finally determined in view of the absence of reliable data regarding the structure of the system CaO–TiO_2 in the section CaO–$CaTiO_3$. (2) System CaO–TiO_2–SiO_2. No chemical reactions occur in the mixtures $CaTiO_3$ and Ca_2SiO_4 or in $Ca_4Ti_3O_{10}$ and Ca_2SiO_4 upon heating (up to fusion). It is concluded that in the system CaO–TiO_2–SiO_2 perovskite coexists with the silicates $CaTiSiO_5$, $CaSiO_3$, $Ca_3Si_2O_7$, and Ca_3-

(over)

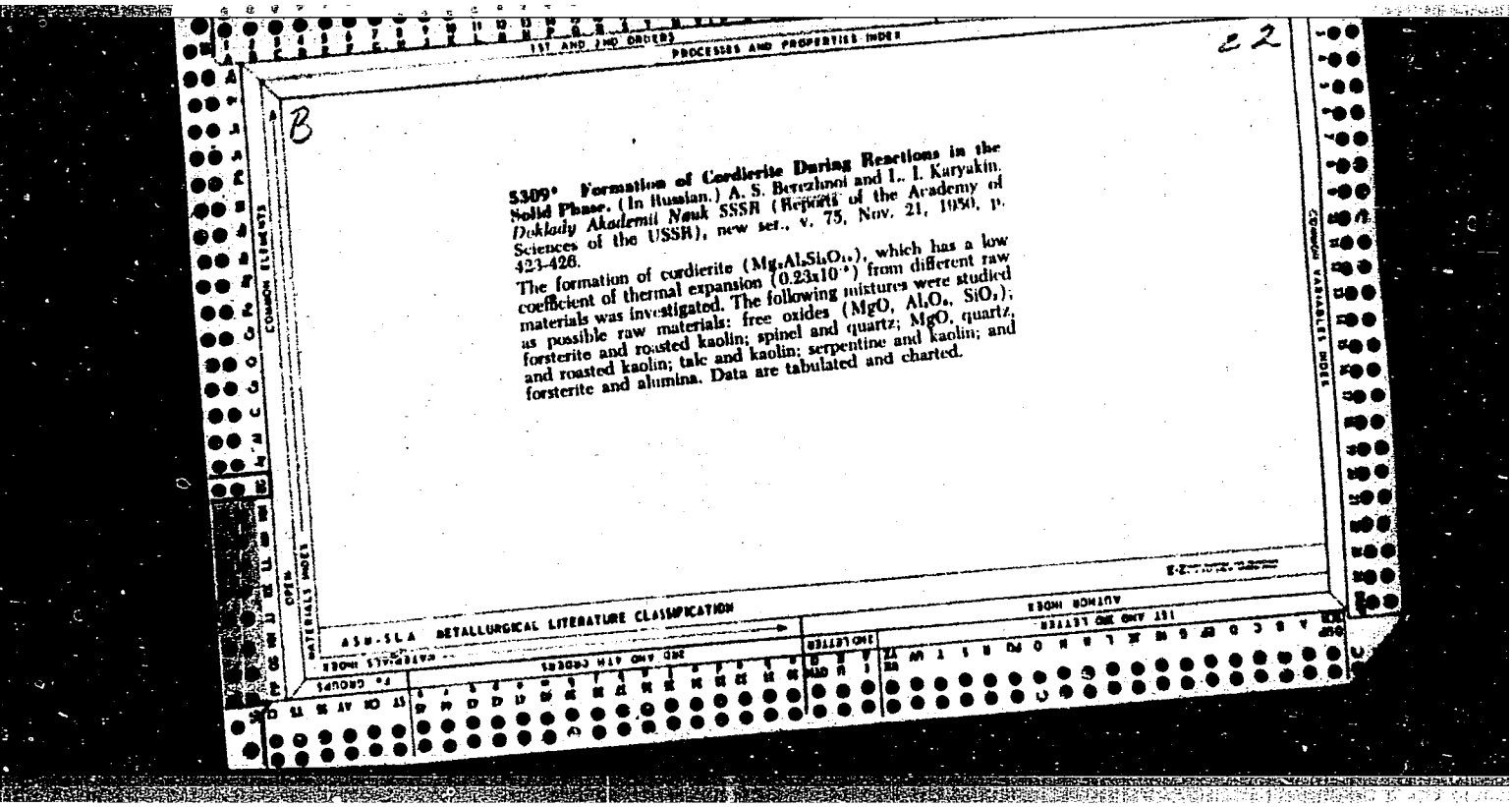
A58-51A METALLURGICAL LITERATURE CLASSIFICATION

SiO_4. In this system, unlike in CaO-MgO-TiO_2, there is a large region of nonrefractory compositions. In the technology of refractories, strictly speaking, only the region of compositions $CaTiO_3$-Ca_3SiO_5-CaO can be utilized. In the individual system $CaTiO_3$-Ca_3SiO_5 the eutectic mixture (about 31% Ca_2SiO_4) melts at 1600°C. (3) System MgO-TiO_2-SiO_2. The formation of Mg titanosilicates was not detected. The rate of formation of forsterite in the solid phase was less than of geikielite. The primary product in the solid phase is $MgTiO_3$; then forsterite appears followed by Mg orthotitanate. The area of compositions within the limits of Mg_2SiO_4-Mg_2TiO_4-MgO can be utilized in the technology of refractories. This region has a comparatively simple structure; all its compositions are refractory. The eutectic melts at about 1600°. Minimum refractoriness of mixtures in the system is 1415°. (4) System CaO-MgO-SiO_2. The region of compositions suitable for refractories is small. Monticellite has an especially unfavorable effect upon periclase and forsterite refractories. 13 figures, 2 photomicrographs, 12 references. B.Z.K.



22

10786 Investigation of System MgO-CaO-TiO$_2$-SiO$_2$. (From the Point of View of Its Utilization in the Technology of Super Refractories.) III. Sintering Behavior and Rate of Growth in Recrystallization of Refractory Compounds. Properties of Refractory Products in System MgO-CaO-TiO$_2$-SiO$_2$. A. S. Berezhnoi, Henry Brutcher, Translation No. 2845, 18 pages. (From *Ogneupory*, v. 18, Nov. 1950, p. 493-504.)



5309* **Formation of Cordierite During Reactions in the Solid Phase.** (In Russian.) A. S. Berezhnoi and L. I. Kuryukin. *Doklady Akademii Nauk* SSSR (Reports of the Academy of Sciences of the USSR), new ser., v. 75, Nov. 21, 1950, p. 423-426.

The formation of cordierite ($Mg_2Al_4Si_5O_{18}$), which has a low coefficient of thermal expansion (0.23×10^{-6}) from different raw materials was investigated. The following mixtures were studied as possible raw materials: free oxides (MgO, Al_2O_3, SiO_2); forsterite and roasted kaolin; spinel and quartz; MgO, quartz, and roasted kaolin; talc and kaolin; serpentine and kaolin; and forsterite and alumina. Data are tabulated and charted.

USSR

Some data on the system MgO-CaF_2-SiO_2 and their significance in the technology of refractory materials. A. S. Berezhnoi. *Doposvid: Akad. Nauk Ukr. R.S.R.* 1951, 248-52(Russian summary). – The following are, resp., m.ps. and percentages of MgO in MgO-CaF_2 mixts.: 2800°, 100; 1900°, 80; 1530°, 60; 1430°, 50; 1345°, 40; 1350°, 30; 1350°, 20; 1350°, 10; and 1370°, 0. The eutectic is estd. at 75% CaF_2 and 1340°. For Mg_2SiO_4 and CaF_2 the data are (percentages of Mg_2SiO_4): 1890°, 100; 1720°, 95; 1680°, 90; 1310°, 80; 1280°, 70; 1150°, 60; 1140°, 50; 1150°, 40; 1150°, 30; 1220°, 20; 1320°, 10; and 1370°, 0. The eutectic is estd. at 60% CaF_2 and 1140°. Microscopic examns. of mixts. MgO-CaF_2 and Mg_2SiO_4-CaF_2 did not show any chem. interaction. For SiO_2 and CaF_2 the data are (percentages of SiO_2): 1770°, 100; 1750°, 95; 1700°, 90; 1630°, 80; 1540°, 60; 1470°, 40; 1450°, 30; 1420°, 20; 1410°, 10; 1380°, 5; and 1370°, 0. No eutectic mixt. was observed for SiO_2-CaF_2. A briquet contg. 40% CaF_2-60% SiO_2 showed interaction after 2 hrs. at 1350°. In a three-component system a eutectic was observed, m. 1120-1130°, contg. SiO_2 17, CaF_2 58, and MgO 25%. Volatile products were formed, presumably from the reaction of CaF_2 with one of the components. CaF_2 holds promise in the formulation of refractories from MgO and $MgSiO_3$.

Murray Senkus

BCS

refractories

952. The influence of the phase composition on the properties of magnesite refractories.—A. B. Banashkevich (*Ogneupory*, 16, 364, 1951). The properties of magnesite refractories are determined by the structure and properties of the system CaO–MgO–Fe_2O_3–SiO_2. For magnesite products corresponding to MgO–$MgFe_2O_4$–Mg_2SiO_4–Ca_2SiO_4 the governing factor is the CaO:SiO_2 ratio and, as a secondary factor, the amount of silicates and magnesioferrite (4.3–5%). Monticellite is the constituent chiefly responsible for lowering the refractoriness and Ca_3SiO_5, if not stabilized, may cause magnesite bricks to disintegrate. Therefore both these silicates are highly undesirable in magnesite refractories. If the molecular ratio of CaO:$SiO_2 \approx 2$, a stabilizer, e.g. borates or phosphates, is added; alternatively, the SiO_2 content can be increased (e.g. by adding finely-ground quartz or clay). In general, silicates of any comp. before melting retard the sintering of periclase. This is not true of forsterite during its formation in the solid state; later, forsterite also retards the sintering of products. The best sintering of periclase is produced by ferrites, especially by $Ca_2Fe_2O_5$. The presence of silicates is stated to reduce the influence of ferrites in magnesite products. The ferric content should be limited if the lining material is meant for use under conditions with a frequent variation of Fe valency. The presence of free CaO in magnesite refractories is undesirable. (16 figs., 2 tables.)

BEREZHNOY, A. S.

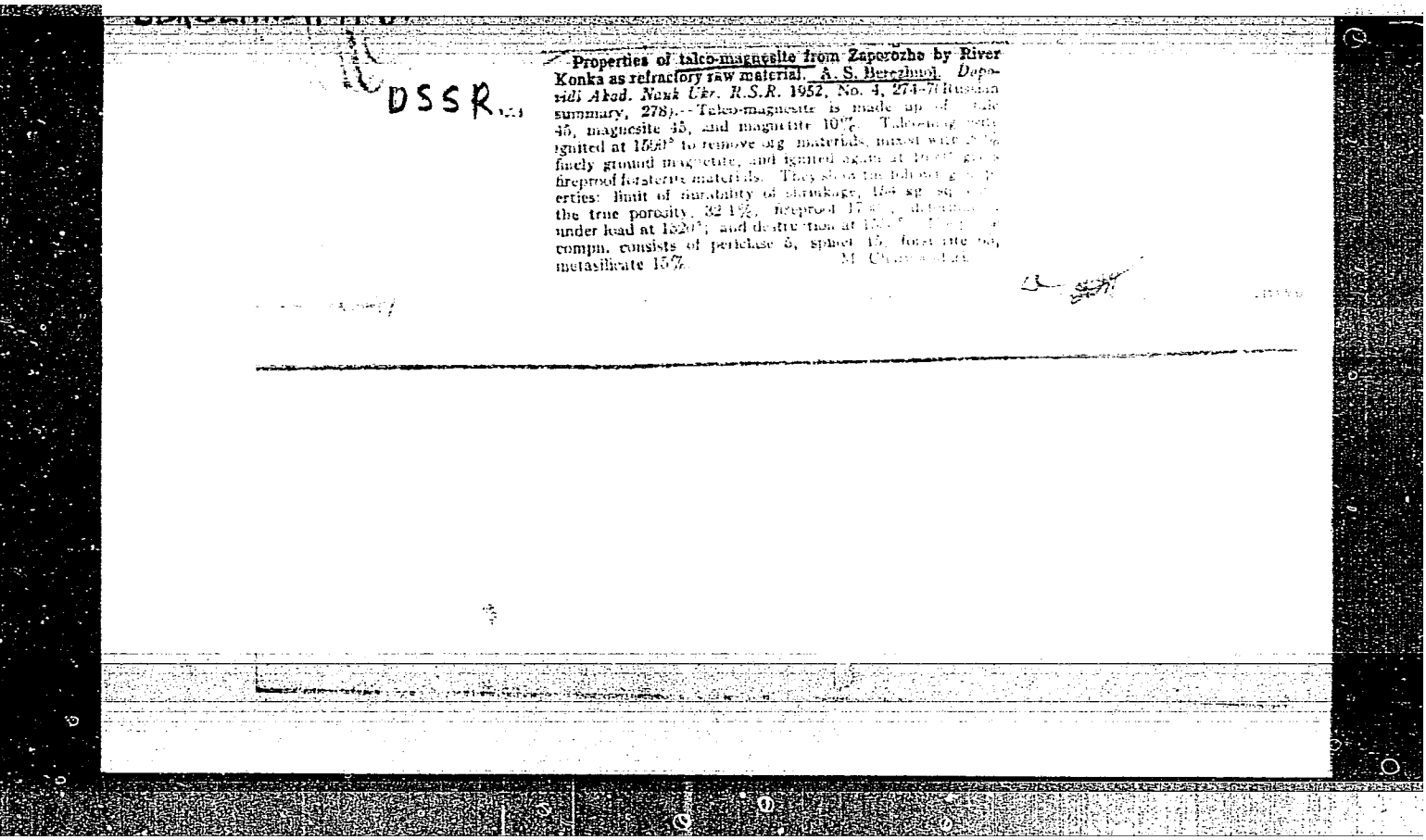
USSR/Engineering - Refractories, Structure — Mar 52

"On the Structure and Properties of the $MgO-ZrO_2-SiO_2$ System," A. S. Berezhnoy, L. I. Karyakin, Professors, Khar'kov Inst of Refractories.

"Ogneupory" No 3, pp 111-124

Clarifies physicochem and some tech features of $MgO-ZrO_2-SiO_2$ system with purpose of finding expedient ways for its practical use. Defines phases of system in equil, constructs diagram of fusibility and outlines possible phase diagram.

204T24



DSSR

Properties of talco-magnesite from Zaporozhe by River Konka as refractory raw material. A. S. Berezhnoi. *Dopovidi Akad. Nauk Ukr. R.S.R.* 1952, No. 4, 274-7 (Russian summary, 278).--Talco-magnesite is made up of talc 45, magnesite 45, and magnetite 10%. Talc is ignited at 1550° to remove org. materials, mixed with finely ground magnesite, and ignited again at fireproof refractory materials. They show the following properties: limit of durability of shrinkage, 1% sp. gr. the true porosity, 32.1%, fireproof 17 under load at 1520°; and destruction at comprn. consists of periclase 8, spinel 15, forsterite 50, metasilicate 15%. M. Hoscheit

BEREZHNOY, A. S., Prof

USSR/Engineering - Refractories, Structure — May 52

"On Structure and Properties of $MgO-ZrO_2-SiO_2$ System," Prof A. S. Berezhnoy, Prof L.I. Karyakin, Khar'kov Inst of Refractories

"Ogneupory" No 5, pp 211-221

Presents systematic investigation of solid phase reactions in $MgO-ZrO_2-SiO_2$ system and sintering capacity of materials within this system. Discusses tabulated results in detail.

220T39

BEREZHNOY, A. S.

Nov 52

USSR/Engineering - Refractories, Magnesite Technology

"On Rational Production Methods for Magnesite Refractories out of Satka Raw Materials," A. S. Berezhnoy, Corr Mem Acad Sci Ukr SSR, All-Union Inst of Refractories

Ogneupory, No 11, pp 494-506

Reviews entire discussion on technology of magnesite refractories started by A. P. Penarin's article in "Ogneupory" No 1, 1952, giving some additional information of his own and dividing whole subject into two major problems: measures necessary and possible under existing conditions at Soviet plants; the purpose of further improvements in production technology in case of radical changes in process.

266T35

BEREZHNOI, A.S.

Symposium on utilization of Satkinsk magnesite. Ogneupory 17, 494-506 '52. (CA 47 no.20:10819 '53) (MLRA 5:12)

BEREZHNOY, A. S.

USSR/Chemistry - Silicon Compounds, Refractories 21 Mar 52

"The System Cu_2O - SiO_2 and the Existence of Anhydrous Copper Silicates," A. S. Berezhnoy, L. I. Karyakin, I. Ye. Dudavskiy, All-Union Sci Res Inst of Refractories.

"Dok Ak Nauk SSSR" Vol 83, No 3, pp 399 - 401

The system Cu_2O - SiO_2 was studied. The prepns were subjected to microscopic, X-ray and chem exams. It was found that the mix forms 2 types of glass: one contg about 5% Cu_2O and the other 60-65% Cu_2O. A mp curve and a phase diagram were constructed. The mp of the mix (which does not form a solid soln) remains below that of SiO_2. No anhydrons chem compds are formed in the systems CnO-SiO_2 or Cn_2O-SiO_2. The results agree with those obtained in the operation of Cn smelters and in connection with the use of dinas. Presented by Acad D. S. Belyankin 22 Jan 1952.

22T73

BEREZHNOY, A.S.

Some data on the structure and properties of the $CaO--MgO--Fe_2O_3--SiO_2$ system. (In: Akademiia nauk SSSR. Voprosy petrografii i mineralogii. Moskva, 1953. Vol. 2, p.281-306) (MLRA 7:4)

1. Chlen-korrespondent Akademii nauk Ukrainskoy SSR. (Systems (Chemistry))

BEREZHNOY, A.S., prof.

Processes in the manufacture of chrome-magnesite refractories and improvement of their quality. Ogneupory 18 no.1:7-13 '53. (MIRA 11:10)

1.Khar'kovskiy institut ogneuporov.
(Refractory materials)

BEREZHNOY, A.S.

Physical processes occurring upon pressing of the magnesite paste. Ogneupory 18 no.10:452-466 '53. (MIRA 11:10)

1. Vsesoyuznyy institut ogneuporov, Khar'kov.
(Magnesite) (Power presses)

BEREZHNOY, A.S.

Effect of pressure on the properties of magnesite refractories.
Ogneupory 19 no.4:213-222 '54. (MIRA 11:9)

1. Vsesoyuznyy institut ogneuporov, g.Khar'kov.
(Magnesite) (Power presses)

BUDNIKOV, P.P.; BEREZHNOY, A.S.; BOTVINKIN, O.K.; DAVYDOV, S.S.; GEVORKYAN, KH.O.; GORYAYNOV, K.E.; KUPRIANOV, V.P.; KITAYGORODSKIY, I.I.; KYKOLEV, V.G.; LAPIN, V.V.; LITVAKOVSKIY, A.A.; MOSKVIN, V.M.; MIRONOV, S.A.; MCHEDLOV-PETROSYAN, O.P.; PEVZNER, R.L.; SKROMTAYEV, B.G.; YUNG, V.N.; YUSHKEVICH, M.O.

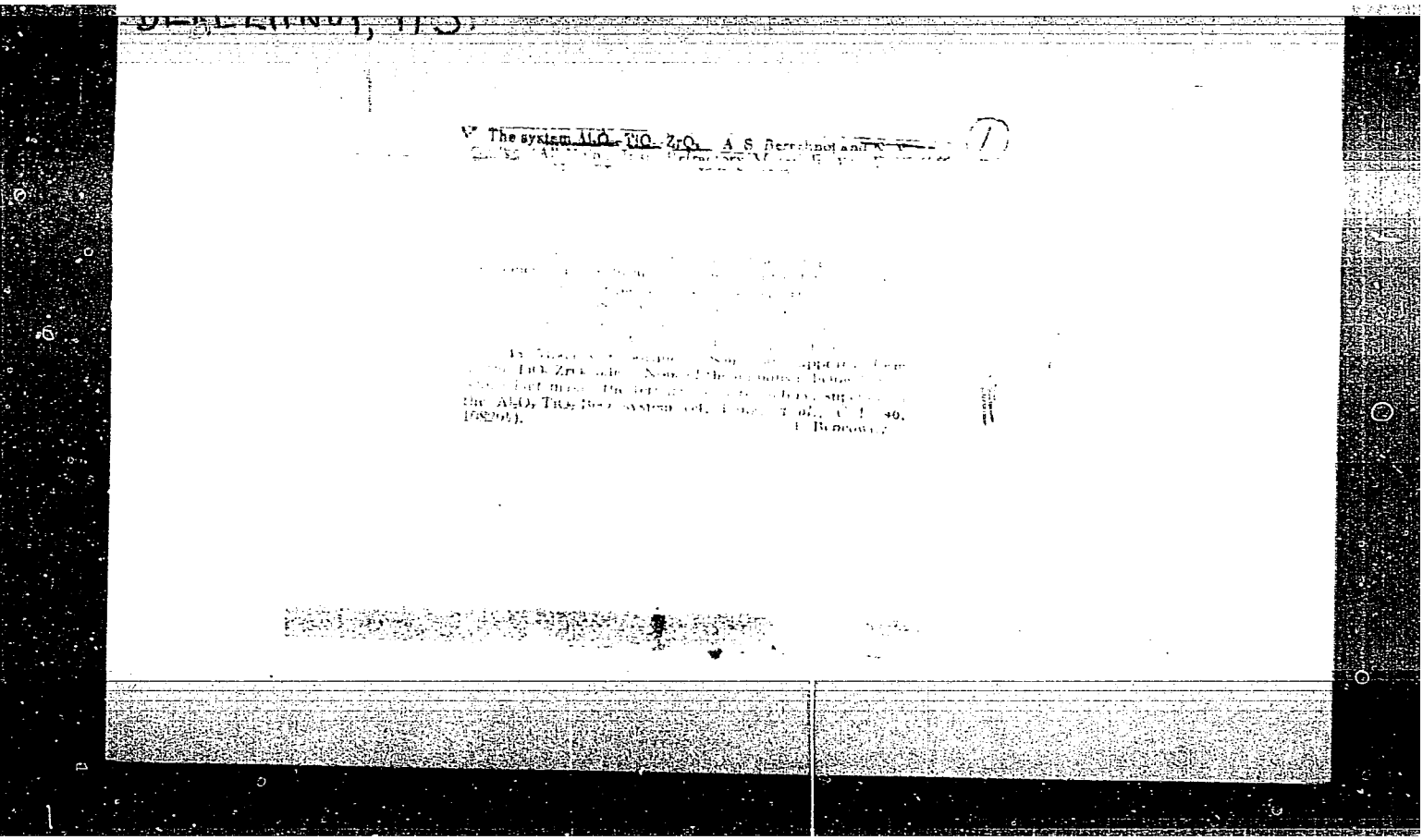
Academician D.S.Beliankin; obituary. Zhur.prikl.khim. 27 no.1: 3-4 Ja '54. (MLRA 7:3)
(Beliankin, Dmitrii Stepanovich, 1876-1953)

BEREZHNOY, A.S.

BUDNIKOV, Petr Petrovich; redaktor; BEREZHNOY, Anatoliy Semenovich; BULAVIN, Ivan Anisimovich; GRISSIK, Boris Mikhaylovich; KUKOLEV, Grigoriy Vladimirovich; POLYBOYARINOV, Dmitriy Nikolayevich; AVGUSTINIK, A.I., doktor tekhnicheskikh nauk, professor, retsenzent; GLEZAROVA, I.L., redaktor; PANOVA, L.Ya., tekhnicheskiy redaktor.

[Technology of ceramics and refractory materials] Tekhnologiia keramiki i ogneuporov. Pod obshchei red. P.P. Budnikova. Izd. 2-e, perer. Moskva, Gos.izd-vo lit-ry po stroit. materialam, 1955. 698 p. (MLRA 8:12)

1. Deystvitel'nyy chlen AN USSR. 2. Chlen korrespondent AN SSSR. (Ceramic industries) (Refractory materials)



USSR/ Chemistry - Refractories

Card 1/1 Pub. 116 - 4/24

Authors : Berezhnoy, A. S., and Gul'ko, N. V.

Title : Investigation of the $MgO-Al_2O_3-TiO_2$ system

Periodical : Ukr. khim. zhur. 21/2, 158-166, 1955

Abstract : Data are presented regarding the crystal form, structure, melting point and anisotropy of $MgO-Al_2O_3-TiO_2$ systems which are considered highly important for the technology of refractories and electro-ceramics. The solid solutions which form in this ternary system are described. Eleven references: 7 USA, 1 German and 3 USSR (1916-1953). Graphs; drawings.

Institution : All Union Inst. of Refractories, Kharkov

Submitted : July 18, 1954

BEREZHNOY, A.S.

BEREZHNOY, A.S.; KARYAKIN, L.I.

System: Cu_2O - SiO_2 and CuO_2. TSvet.met. 28 no.2:26-33 Mr-Ap '55.
(Copper oxides) (Silicon oxides)

BEREZHNOY, A.S.

AUTHOR: Berezhnoy, A.S.

TITLE: The Development of Scientific Research Work in the Industry of Refractories in the USSR (Razvitiye nauchno-issledovatel'skikh rabot v ogneupornoy promyshlennosti SSSR)

131-10-3/6

PERIODICAL: Ogneupory, 1957, Nr 10, pp. 447-456 (USSR)

ABSTRACT: In the twenties' the development of the industry of refractories began, in which connection it was necessary to guarantee the demands made by the metallurgical industry to be satisfied by means of raw material produced in the country. (Dinas productions for the lining of the arched roofs of industrial furnaces). At that time the chair for the technology of refractories was established at the Khar'kov Technological Institute, which exists still today. At the end of 1927 the Institute for Silicates was founded at Khar'kov, which was later transformed into a scientific research institute for refractories. Nearly at the same time departments for refractories were established at the institutes for building material in Moscow, Leningrad, and later also at Sverdlovsk, by which some work in this field was carried out and introduced in practice. (Production of blast furnace fireclay bricks by a half-dry method, etc.). It was at that time that also the periodicals "Ukrainskiye silikaty" and "Stroitel'nyye materialy" were founded. The creation of a large and well-equipped

Card 1/2

The Development of Scientific Research Work in the Industry of Refractories in the USSR

scientific center for ceramics at Leningrad rendered a thorough research of raw material produced in the country possible. The success achieved in this field made it possible, from 1934 onwards, to interrupt imports of refractories from other countries. At that time the following work was developed: 1) Investigation of the chemical and mineralogical composition as well as of the technological properties of the sillimanite series; bauxite; corundum; magnesite; chromite; magnesia silicate; zirconium; clays and kaolins. 2) The development of the production technology of refractories made from fireclay bricks, dinas, magnesite, and chromium-magnesite. 3) The development of the production of new kinds of refractories. 4) The study of refractories while in operation. 5) The development of theoretical research by the utilization of the latest achievements of modern physics: oscillation processes, radioactive isotopes, electron microscopy, vacuum technology, spectrography, etc.

ASSOCIATION: Khar'kov Institute for Refractories (Khar'kovskiy institut ogneuporov)

AVAILABLE: Library of Congress

Card 2/2

APPROVED FOR RELEASE: 06/08/2000 CIA-RDP86-00513R000204820002-3"

SOV/81-59-5-16172

Translation from: Referativnyy zhurnal, Khimiya, 1959, Nr 5, p 352 (USSR)

AUTHOR: Berezhnoy, A.S.

TITLE: The Principal Trends in Improving the Production Technology of Magnesite and Forsterite Refractories

PERIODICAL: Tr. Nauchno-tekh. o-va chernoy metallurgii. M-vo chernoy metallurgii USSR, 1957, Nr 12, pp 38 - 45. Discussion, pp 153-169

ABSTRACT: An analysis is made of the effect of various technological factors on achieving for magnesia refractories (MR) a maximum constancy of the volume of their operation zones, sufficient hardness (also at high temperatures) and a high heat resistance. For further improving of the technology it is necessary: to use raw material as pure and concentrated as possible; to burn the loose raw material, containing a considerable amount of volatile components, in rotary furnaces (preferrably by the wet method); to use part of the material with a rational granular composition of the mass; to apply

Card 1/2

The Principal Trends in Improving the Production Technology of Magnesite and Forsterite Refractories

high (up to 1,500 - 2,000 kg/cm^2) pressures in the pressing process; to burn magnesite at high temperatures (up to 1,750 - 1,800°C) and forsterite (up to 1,700°C).

V. Zlochevskiy

PHASE I BOOK EXPLOITATION SOV/2014

5(2); 5(4)

Berezhnoy, Anatoliy Semenovich

Kremniy i yego binarnyye sistemy (Silicon and Its Binary Systems) Kiyev, Izd-vo AN Ukr SSR, 1958. 249 p. Errata slip inserted. 3,000 copies printed.

Resp. Ed.: P.P. Budnikov, Academician, Ukrainian SSR Academy of Sciences; Ed. of Publishing House: Z.S. Pokrovskaya; Tech. Ed.: N.P. Rakhlina.

PURPOSE: The book is intended for chemists, silicate technologists, metallurgists, geochemists, petrographers, and mineralogists.

COVERAGE: The book gives a survey of the physical chemistry of silicon and its binary systems. The crystalline structures of silicon and of all known silicon binary compounds, their properties, and uses are described in detail. Special consideration is given to the silicon oxygen system (silica), silicon carbide (carborundum), and to silicides of transition metals. The author claims that this is the first survey on binary silicon compounds in over forty years. There are 716 references: 158 are Soviet, 252 English, 229 German, 62 French, 5 Czech, 1 Polish, 4 Italian, and 5 Japanese.

BEREZHNOY, Anatoliy Semenovich

Silicon and its Binary Systems. New York, Consultants Bureau, 1960. VIII, 275 p. illus., diagrs., graphs, tables
Translated from the original Russian: Kremniy i Yego Binarnyye Sistemy, Kiev, Izd-vo Akademii Nauk Ukrainskoy SSR, 1958.