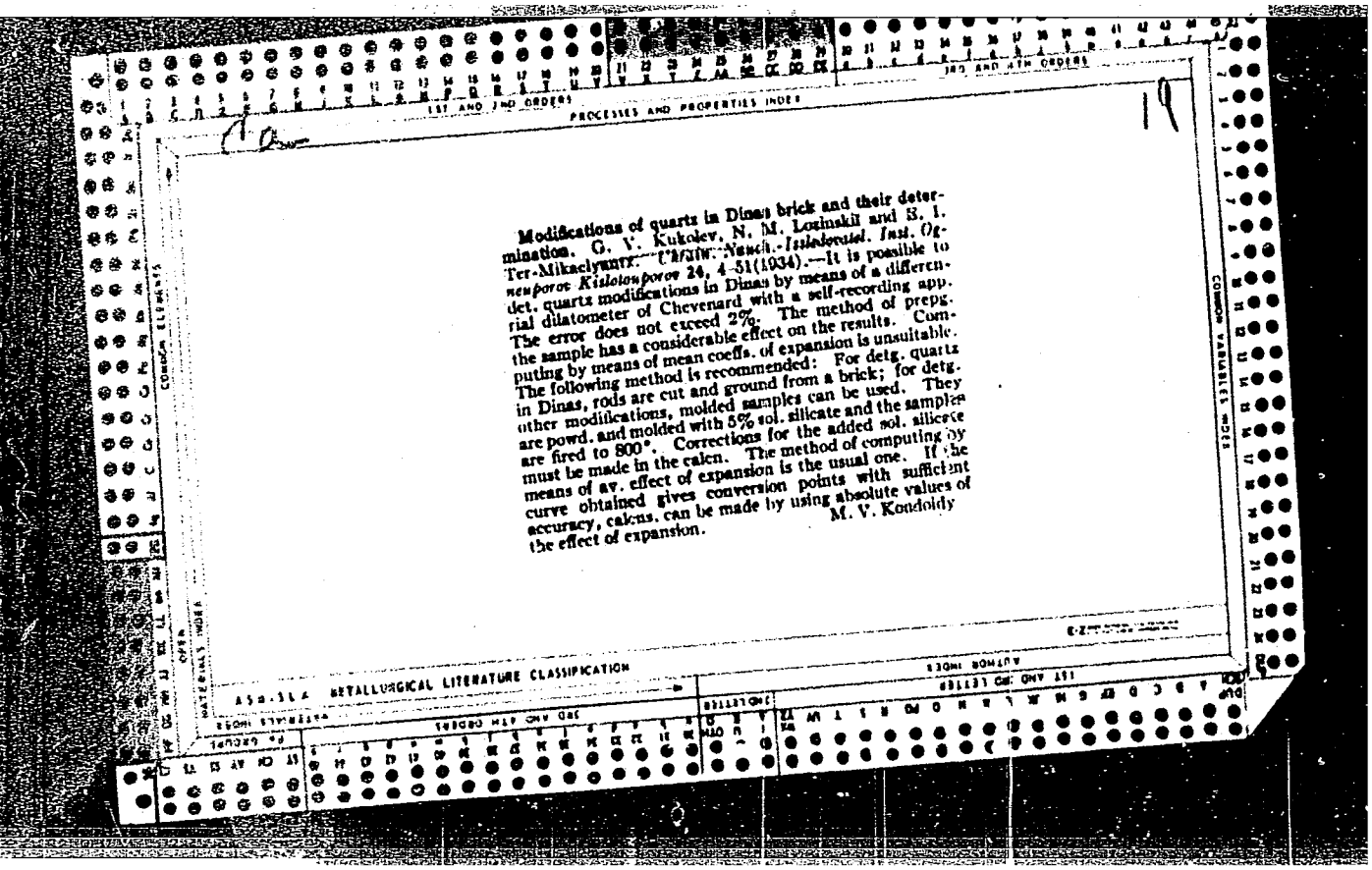


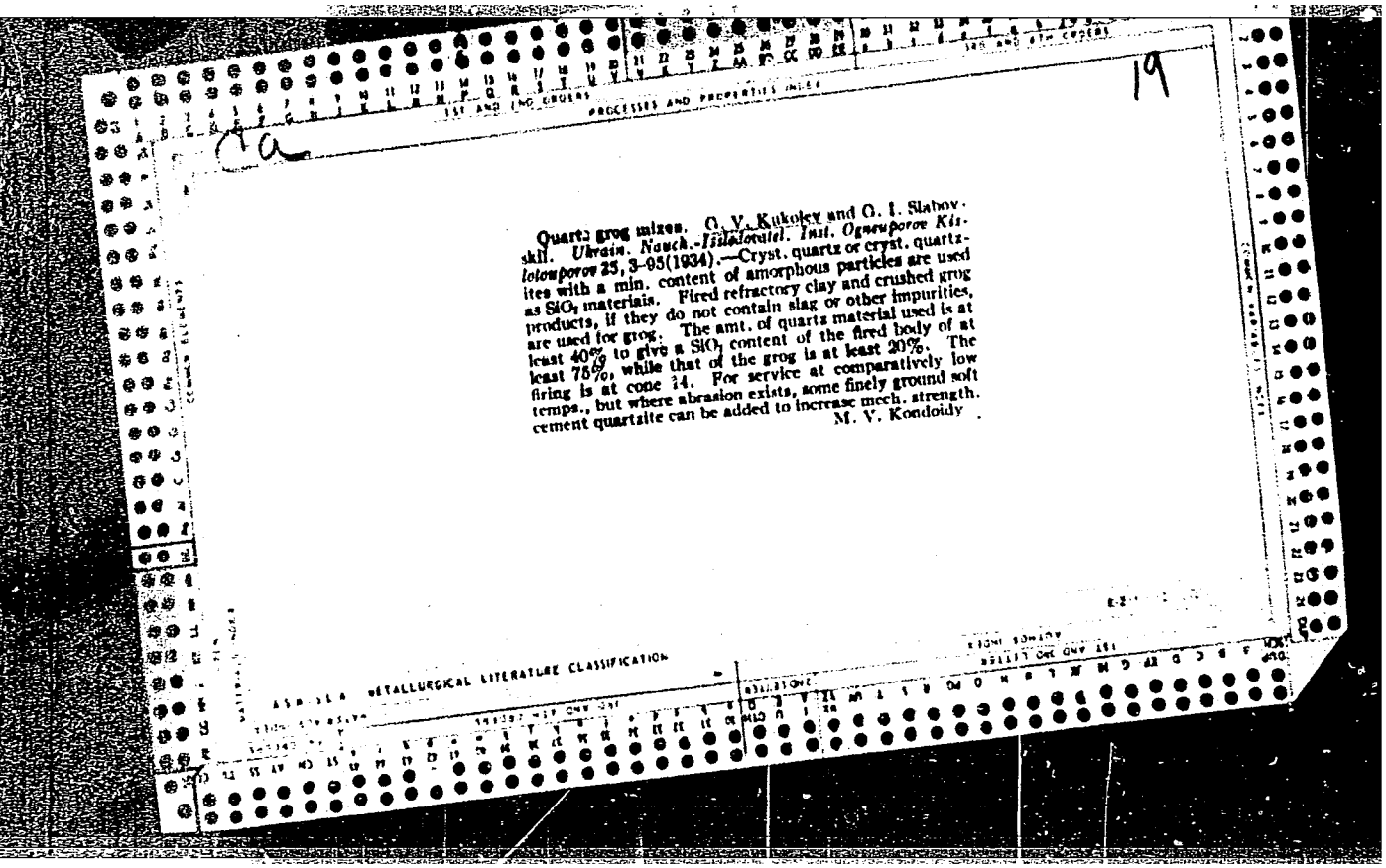
PROCESSES AND PROPERTIES INDEX

19

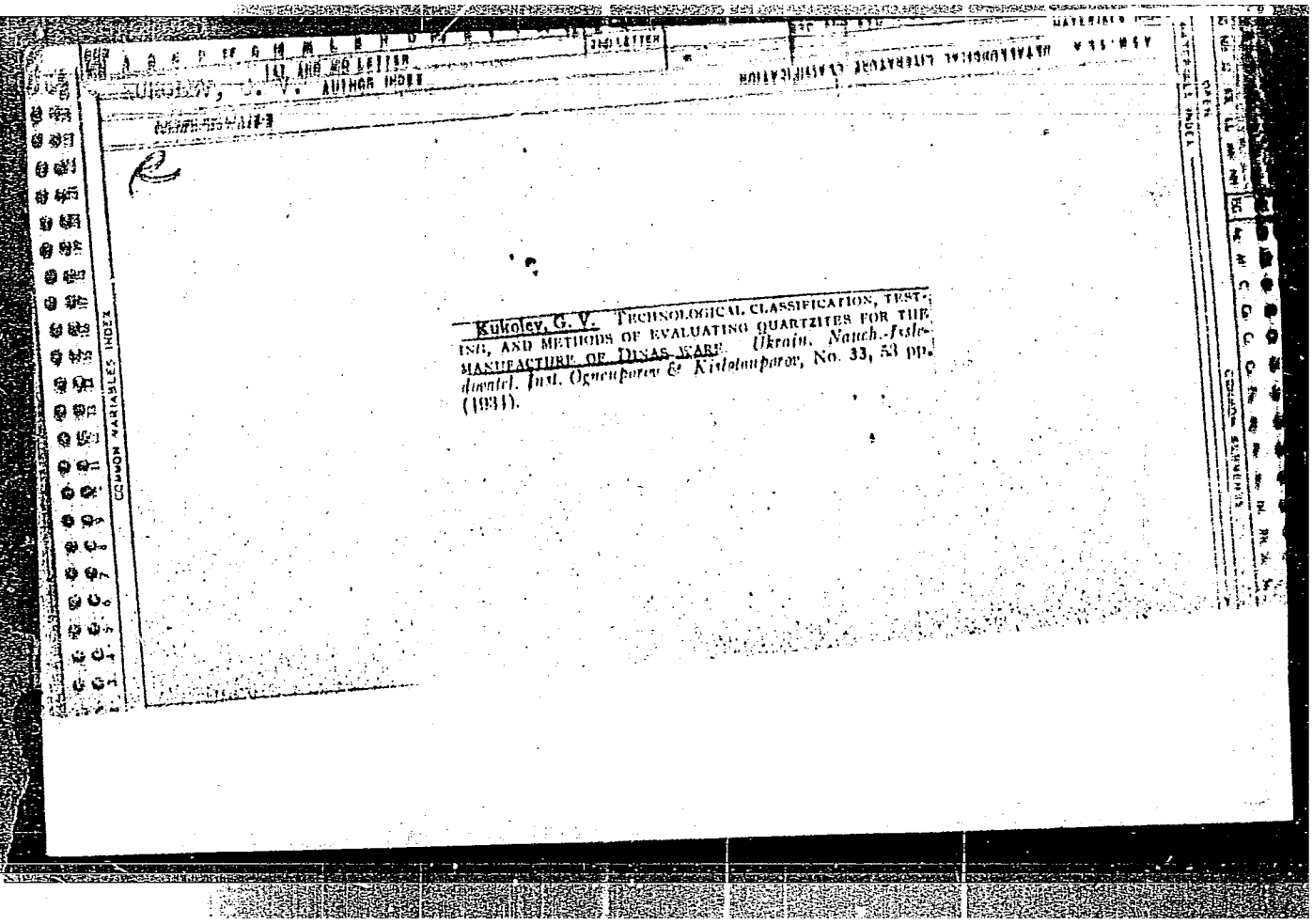
Modifications of quartz in Dinas brick and their determination. G. V. Kukolev, N. M. Loginskii and S. I. Ter-Mikaelyants. *Trudy Nauch. Issledovatel. Inst. Ogneuporov Kislotaporov* 24, 4–51(1934).—It is possible to det. quartz modifications in Dinas by means of a differential dilatometer of Chevenard with a self-recording app. The error does not exceed 2%. The method of prepg. the sample has a considerable effect on the results. Computing by means of mean coeffs. of expansion is unsuitable. The following method is recommended: For detg. quartz in Dinas, rods are cut and ground from a brick; for detg. other modifications, molded samples can be used. They are powd. and molded with 5% sol. silicate and the samples are fired to 800°. Corrections for the added sol. silicate must be made in the calcn. The method of computing by means of av. effect of expansion is the usual one. If the curve obtained gives conversion points with sufficient accuracy, calcns. can be made by using absolute values of the effect of expansion.

M. V. Kondoidy

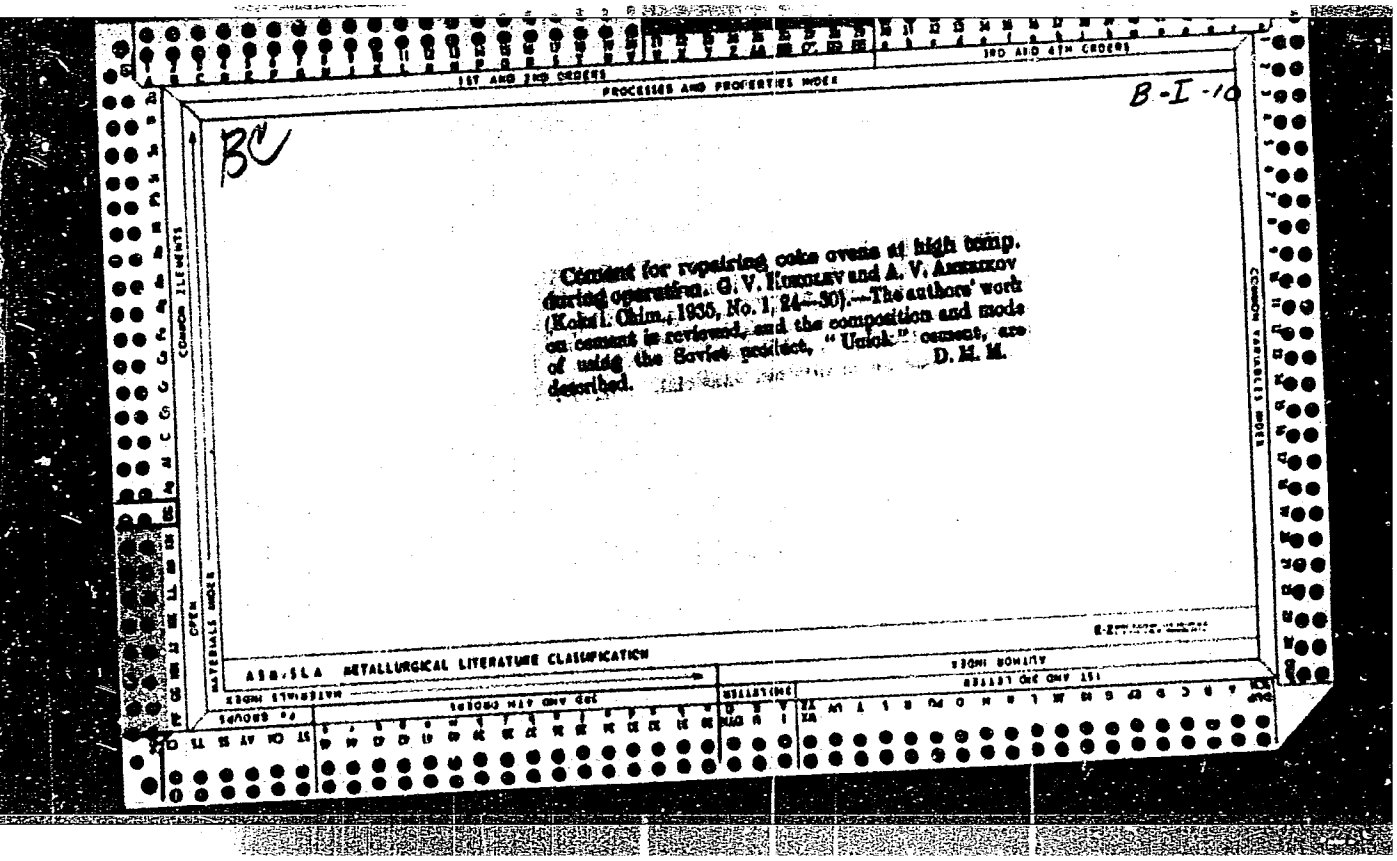
METALLURGICAL LITERATURE CLASSIFICATION

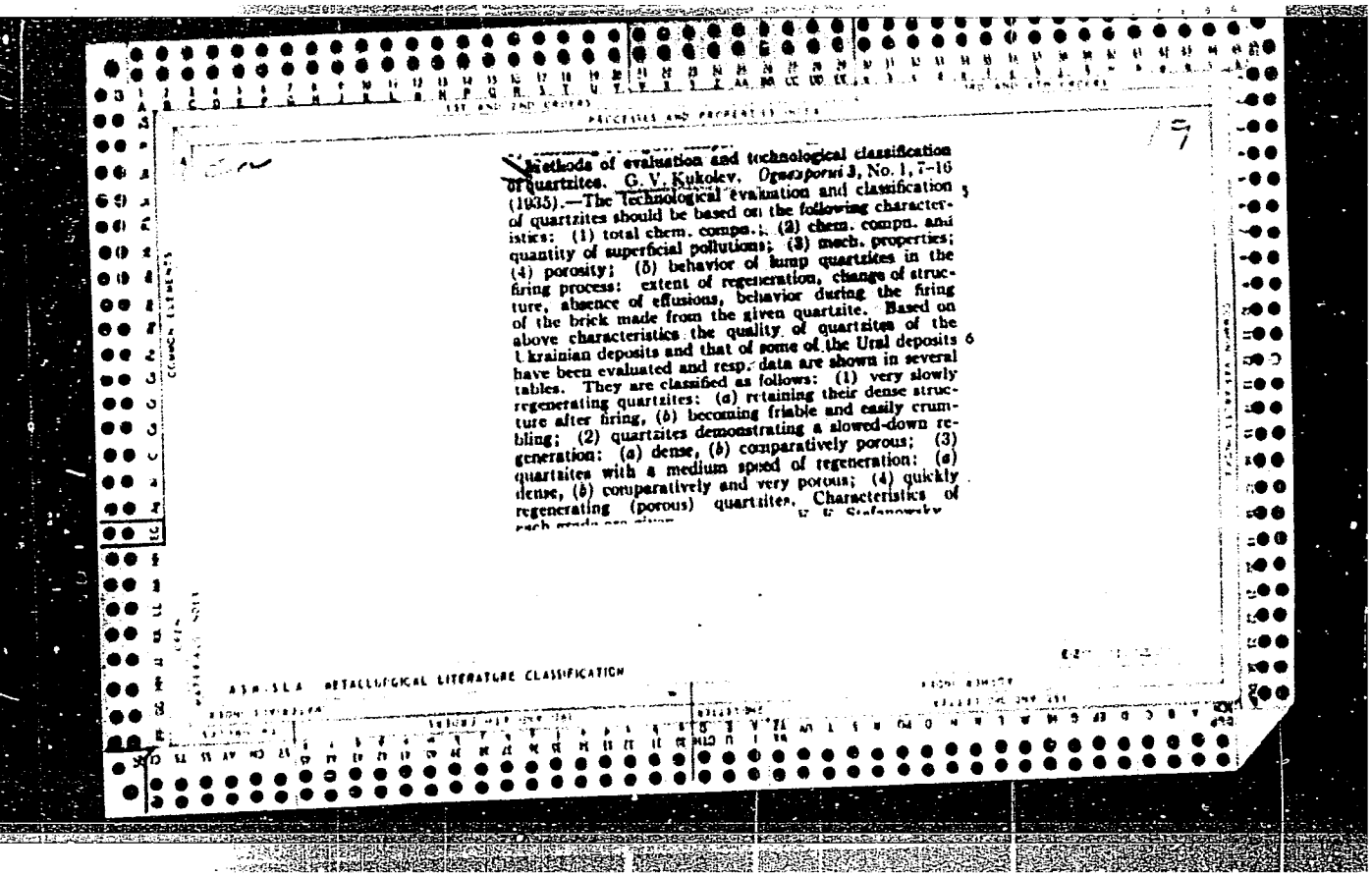


Quartz grog mixes. O. V. Kukolev and O. I. Slabov-skii. *Ukrain. Nauch.-Issledovatel. Inst. Ogneuporov Kislotenporov* 25, 3–05(1934).—Cryst. quartz or cryst. quartzites with a min. content of amorphous particles are used as SiO_2 materials. Fired refractory clay and crushed grog products, if they do not contain slag or other impurities, are used for grog. The amt. of quartz material used is at least 40% to give a SiO_2 content of the fired body of at least 75%, while that of the grog is at least 20%. The firing is at cone 14. For service at comparatively low temps., but where abrasion exists, some finely ground soft cement quartzite can be added to increase mech. strength.
M. V. Kondoidy



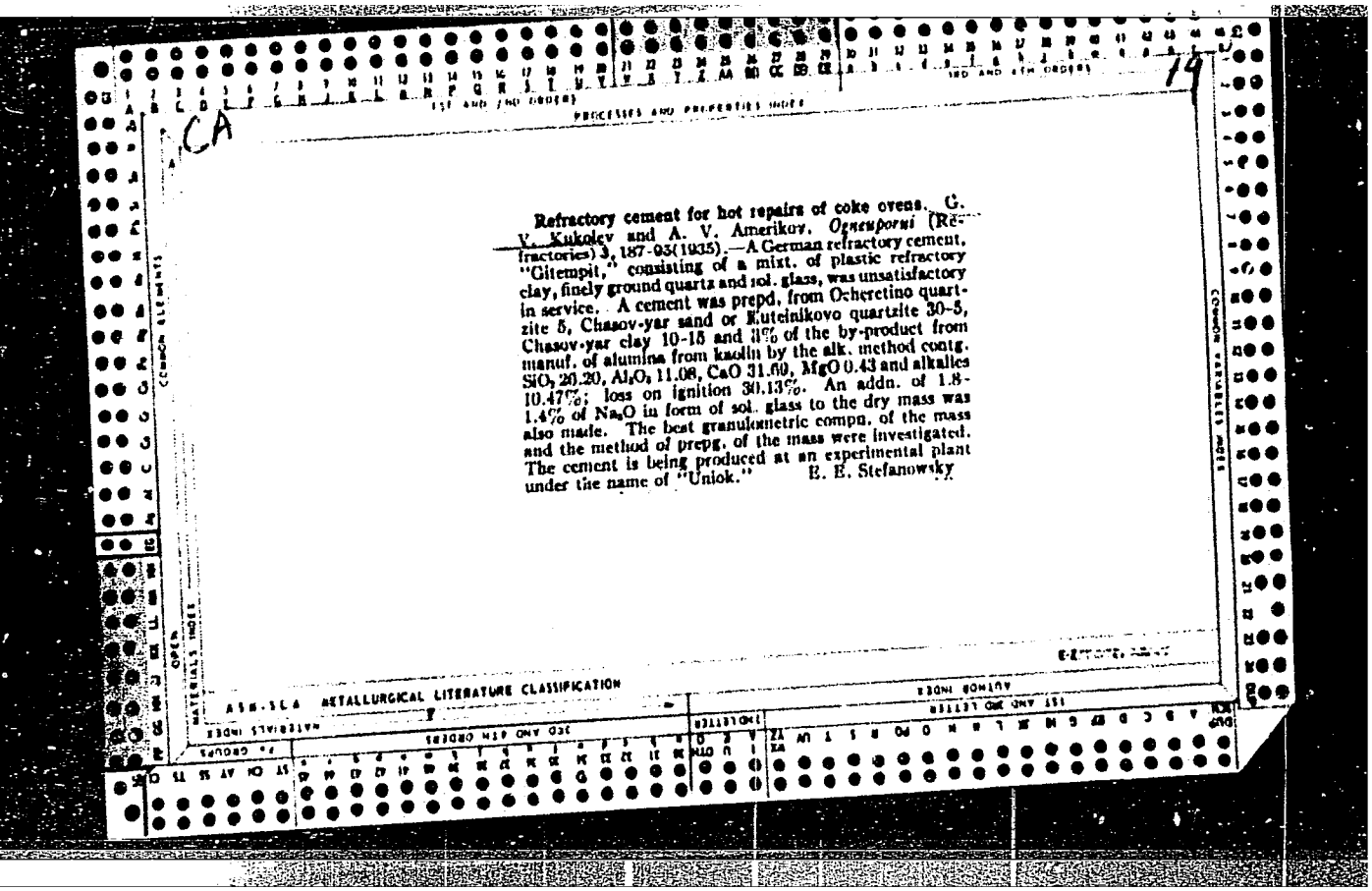
Kukolev, G. V. TECHNOLOGICAL CLASSIFICATION, TESTING, AND METHODS OF EVALUATING QUARTZITES FOR THE MANUFACTURE OF DINAS BRICK. *Ukrain. Nauch.-Issledovatel. Inst. Ogneuporov & Kislotaniparov*, No. 33, 53 pp. (1931).





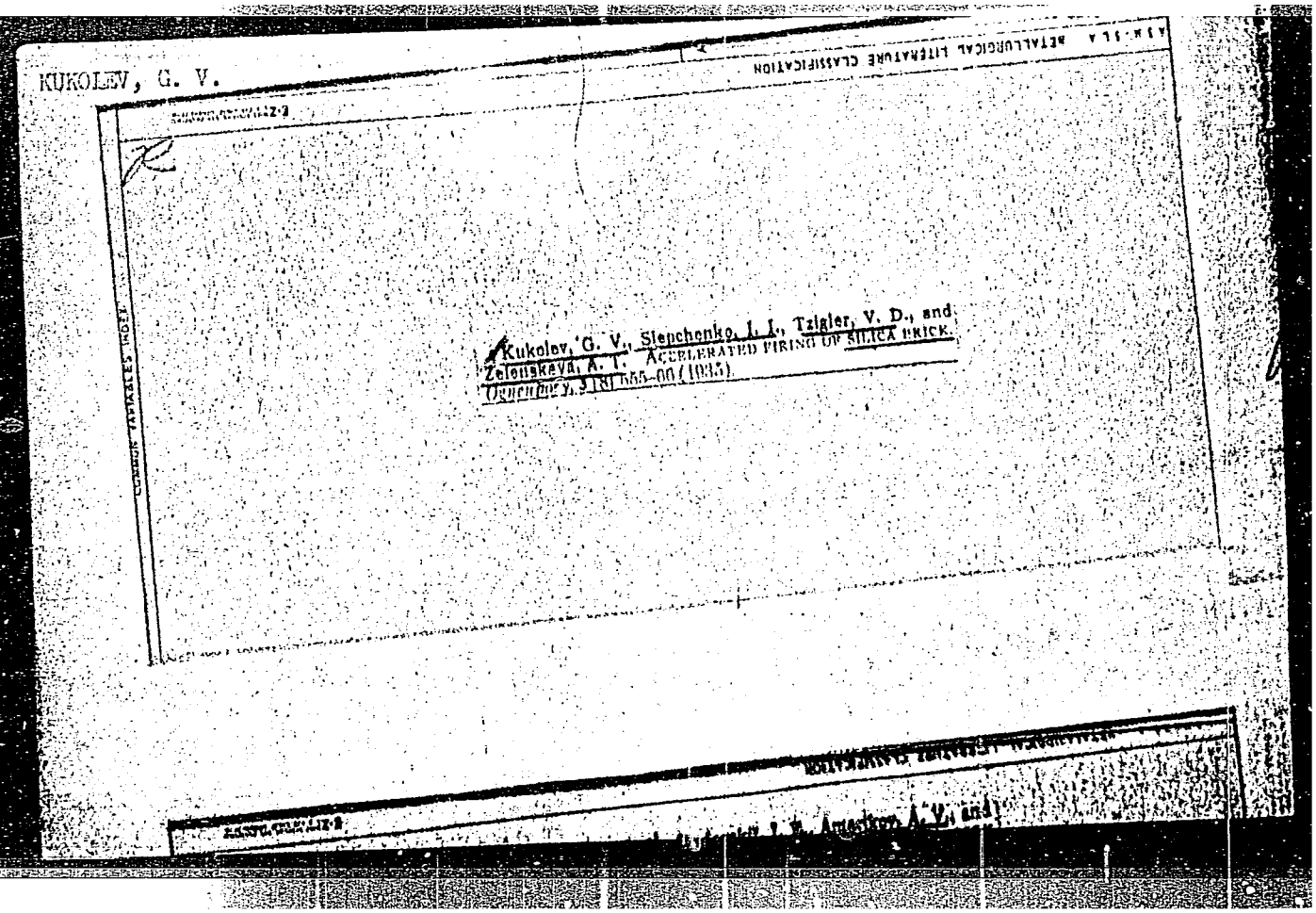
Methods of evaluation and technological classification of quartzites. G. V. Kukolev. *Ogneupory* 3, No. 1, 7–16 (1935).—The technological evaluation and classification of quartzites should be based on the following characteristics: (1) total chem. compn.; (2) chem. compn. and quantity of superficial pollutions; (3) mech. properties; (4) porosity; (5) behavior of lump quartzites in the firing process: extent of regeneration, change of structure, absence of effusions, behavior during the firing of the brick made from the given quartzite. Based on above characteristics the quality of quartzites of the Ukrainian deposits and that of some of the Ural deposits have been evaluated and resp. data are shown in several tables. They are classified as follows: (1) very slowly regenerating quartzites: (a) retaining their dense structure after firing, (b) becoming friable and easily crumbling; (2) quartzites demonstrating a slowed-down regeneration: (a) dense, (b) comparatively porous; (3) quartzites with a medium speed of regeneration: (a) dense, (b) comparatively and very porous; (4) quickly regenerating (porous) quartzites. Characteristics of

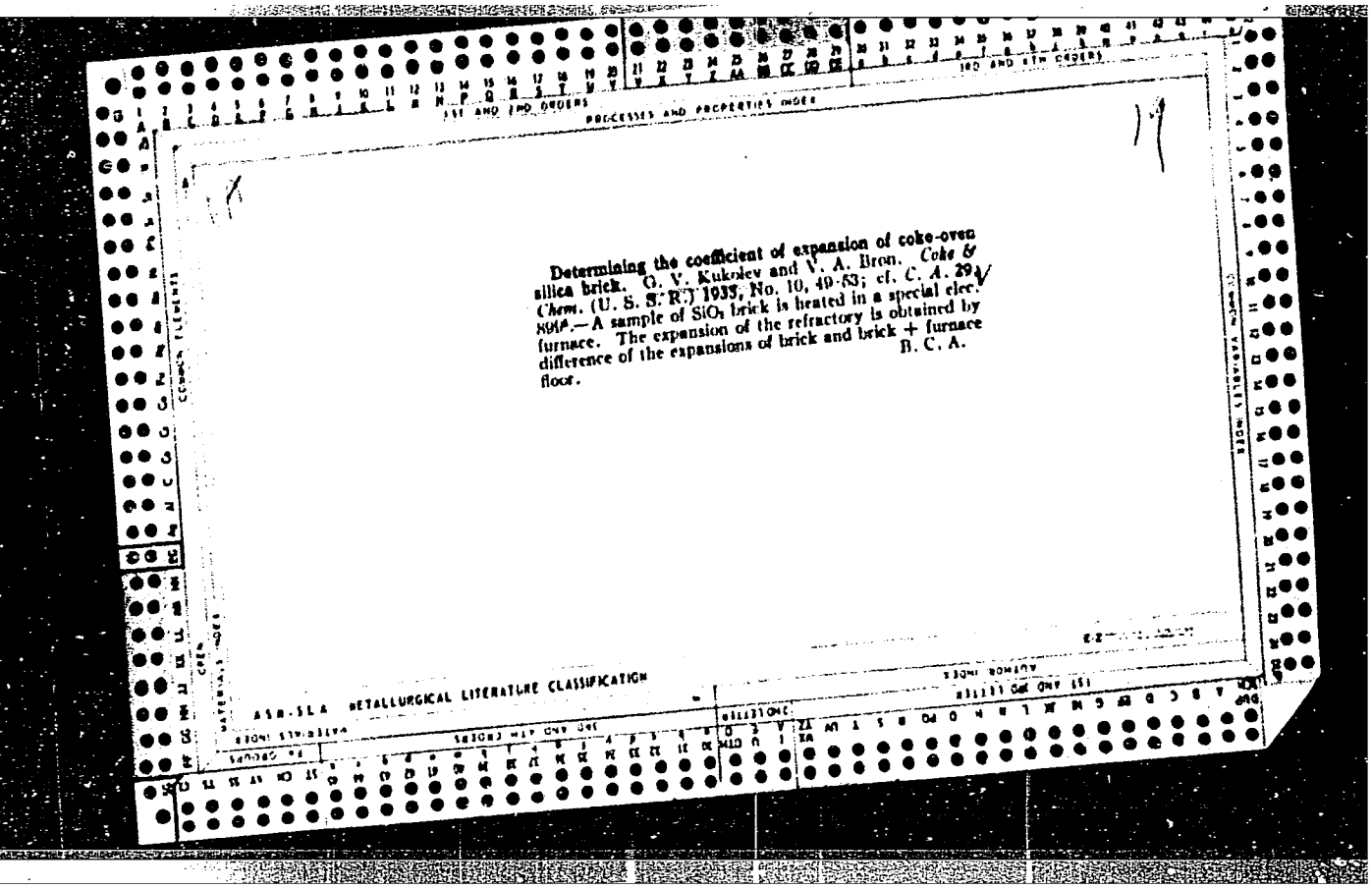
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



CA

Refractory cement for hot repairs of coke ovens. G. V. Kukolev and A. V. Amerikov. *Ogneupory* [Refractories] 3, 187-93(1935).—A German refractory cement, "Glitempit," consisting of a mixt. of plastic refractory clay, finely ground quartz and sol. glass, was unsatisfactory in service. A cement was prepd. from Ocheretino quartzite 5, Chasov-yar sand or Kuteinikovo quartzite 30-5, Chasov-yar clay 10-15 and 8% of the by-product from manuf. of alumina from kaolin by the alk. method contg. SiO_2 20.20, Al_2O_3 11.08, CaO 31.60, MgO 0.43 and alkalies 10.47%; loss on ignition 30.13%. An addn. of 1.8-1.4% of Na_2O in form of sol. glass to the dry mass was also made. The best granulometric compn. of the mass and the method of prepg. of the mass were investigated. The cement is being produced at an experimental plant under the name of "Uniok." B. E. Stefanowsky

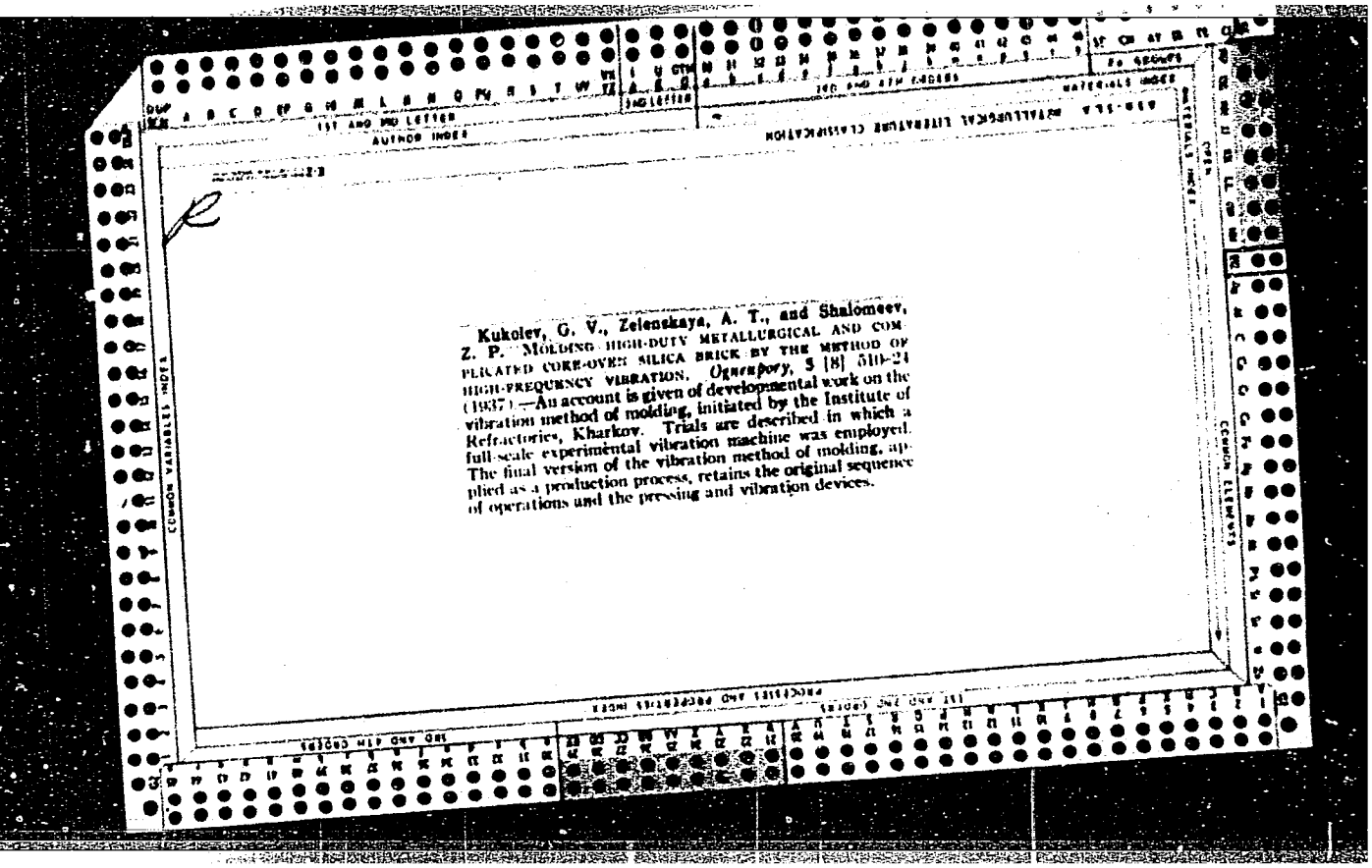




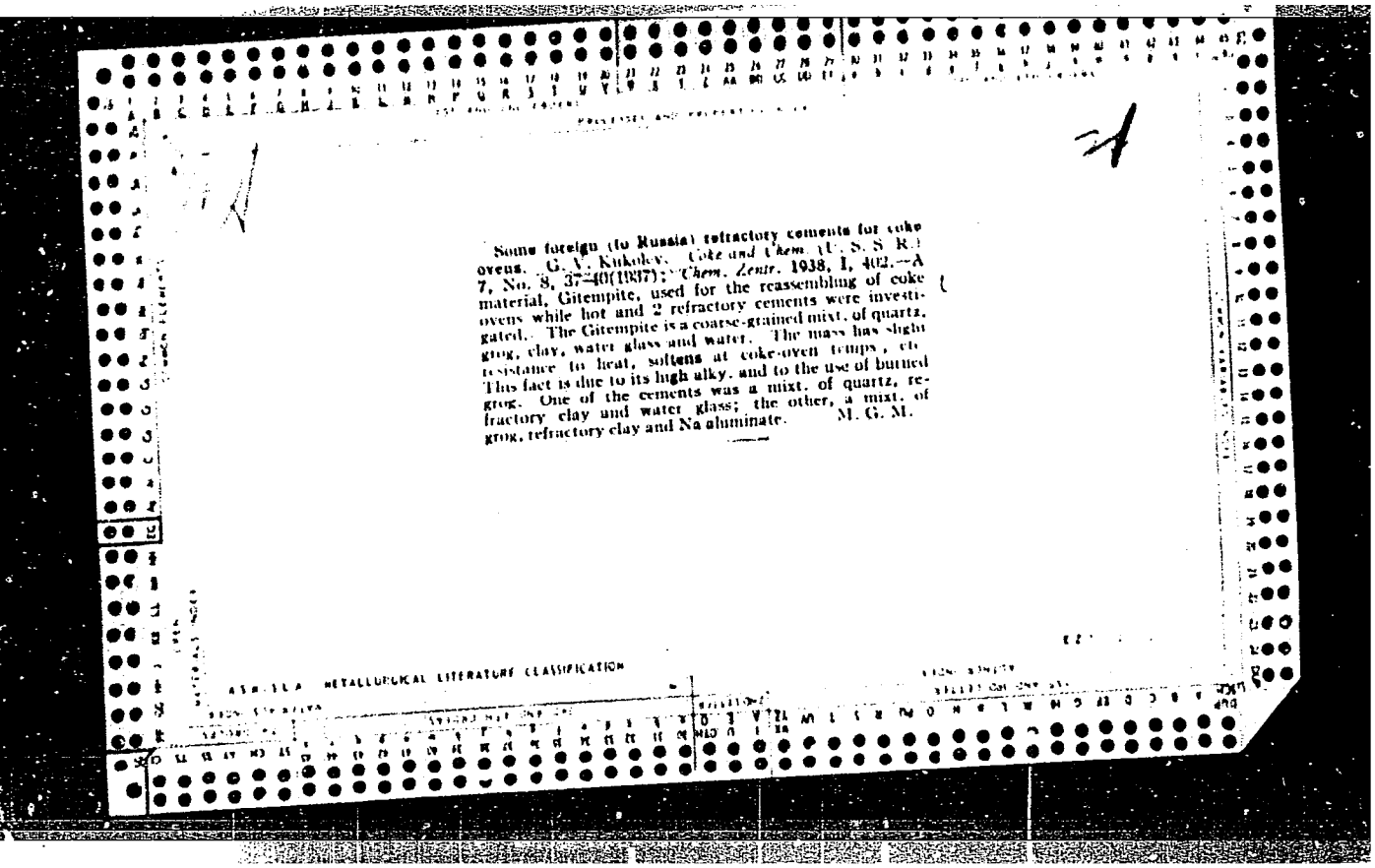
Determining the coefficient of expansion of coke-oven silica brick. O. V. Kukolev and V. A. Bron. *Coke & Chem.* (U. S. S. R.) 1935, No. 10, 49-53; cf. *C. A.* 29, 8084.—A sample of SiO_2 brick is heated in a special elec. furnace. The expansion of the refractory is obtained by difference of the expansions of brick and brick + furnace floor.

B. C. A.

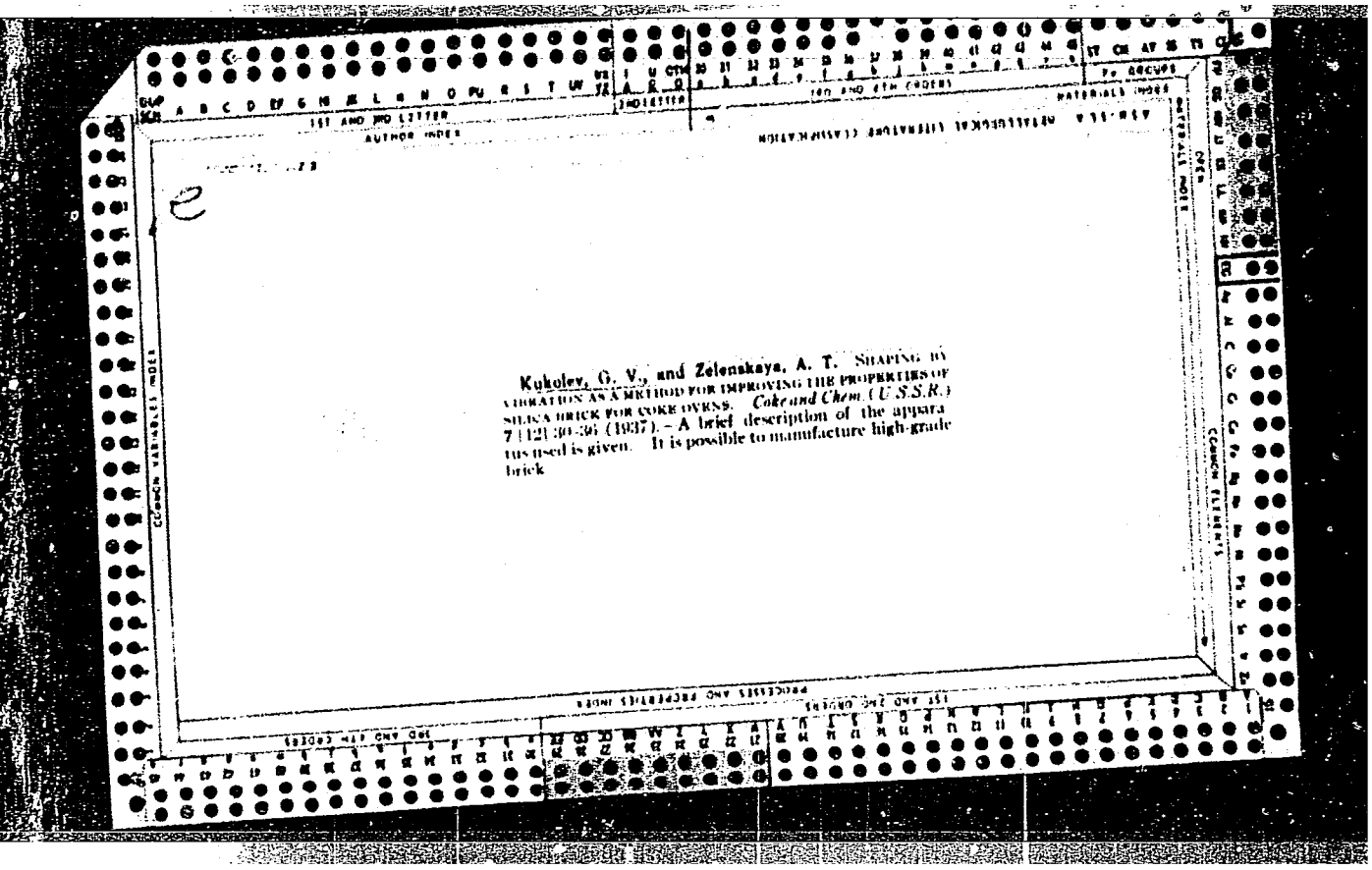
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



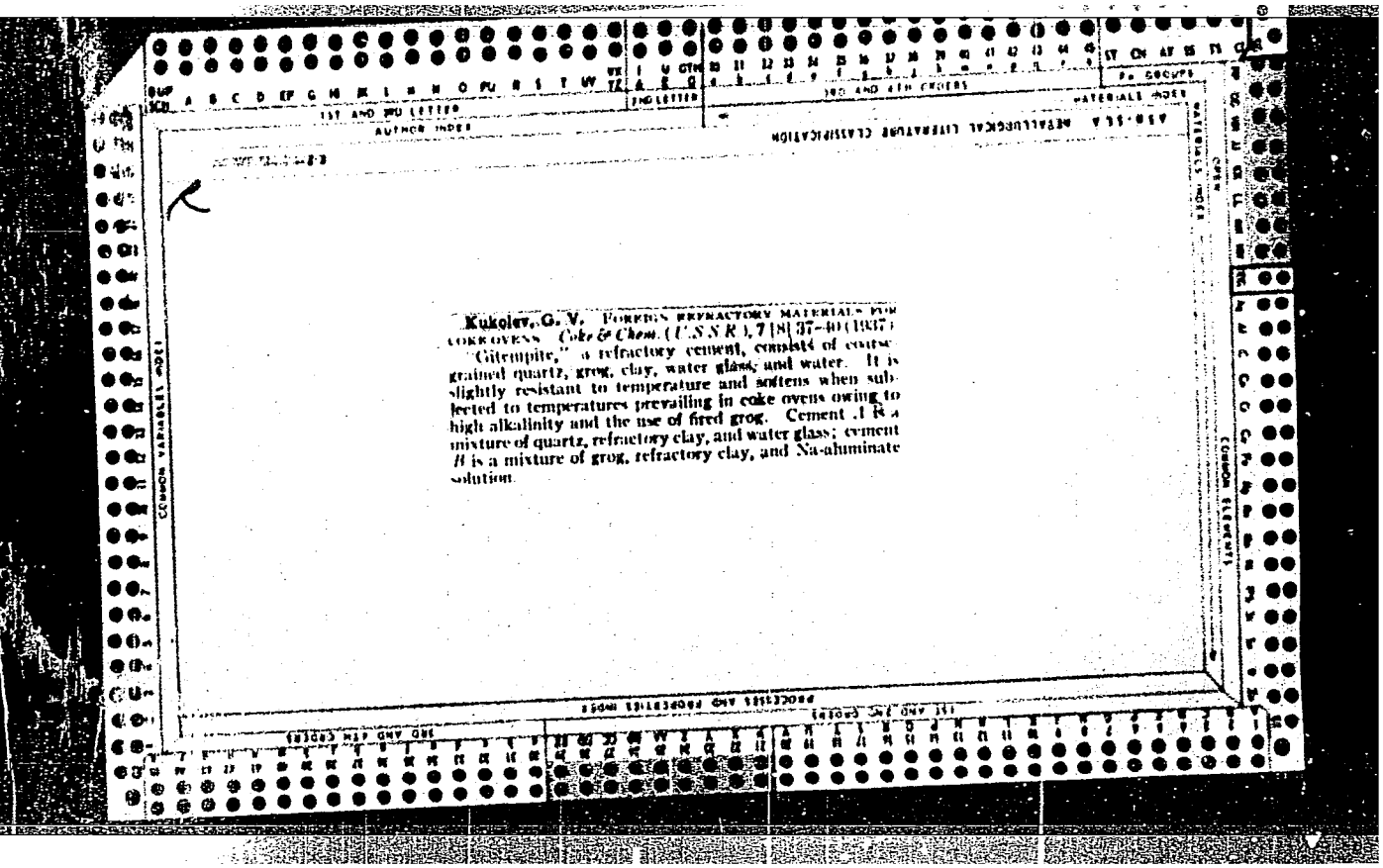
Kukolev, G. V., Zelenskaya, A. T., and Shalomeev, Z. P. MOLDING HIGH-DUTY METALLURGICAL AND COMPLICATED COKE-OVEN SILICA BRICK BY THE METHOD OF HIGH-FREQUENCY VIBRATION. *Ogneupory*, 5 [8] 510-24 (1937).—An account is given of developmental work on the vibration method of molding, initiated by the Institute of Refractories, Kharkov. Trials are described in which a full-scale experimental vibration machine was employed. The final version of the vibration method of molding, applied as a production process, retains the original sequence of operations and the pressing and vibration devices.



Some foreign (to Russia) refractory cements for coke ovens. G. V. Kukolev. *Coke and Chem.* (U. S. S. R.) 7, No. 8, 37–40(1937); *Chem. Zentr.* 1938, I, 402.—A material, Gitempite, used for the reassembling of coke ovens while hot and 2 refractory cements were investigated. The Gitempite is a coarse-grained mixt. of quartz, grog, clay, water glass and water. The mass has slight resistance to heat, softens at coke-oven temps., etc. This fact is due to its high alky. and to the use of burned grog. One of the cements was a mixt. of quartz, refractory clay and water glass; the other, a mixt. of grog, refractory clay and Na aluminate. M. G. M.

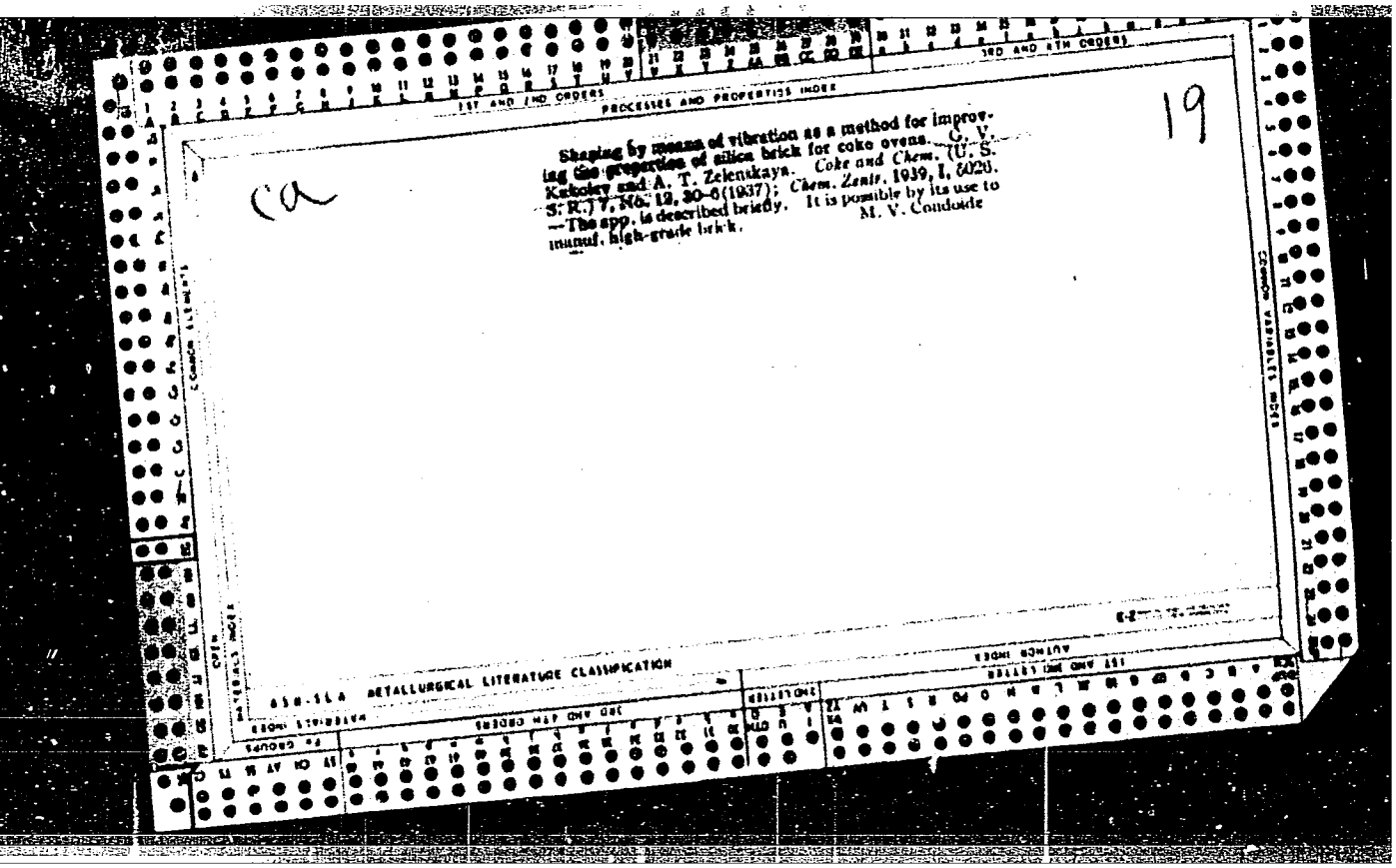


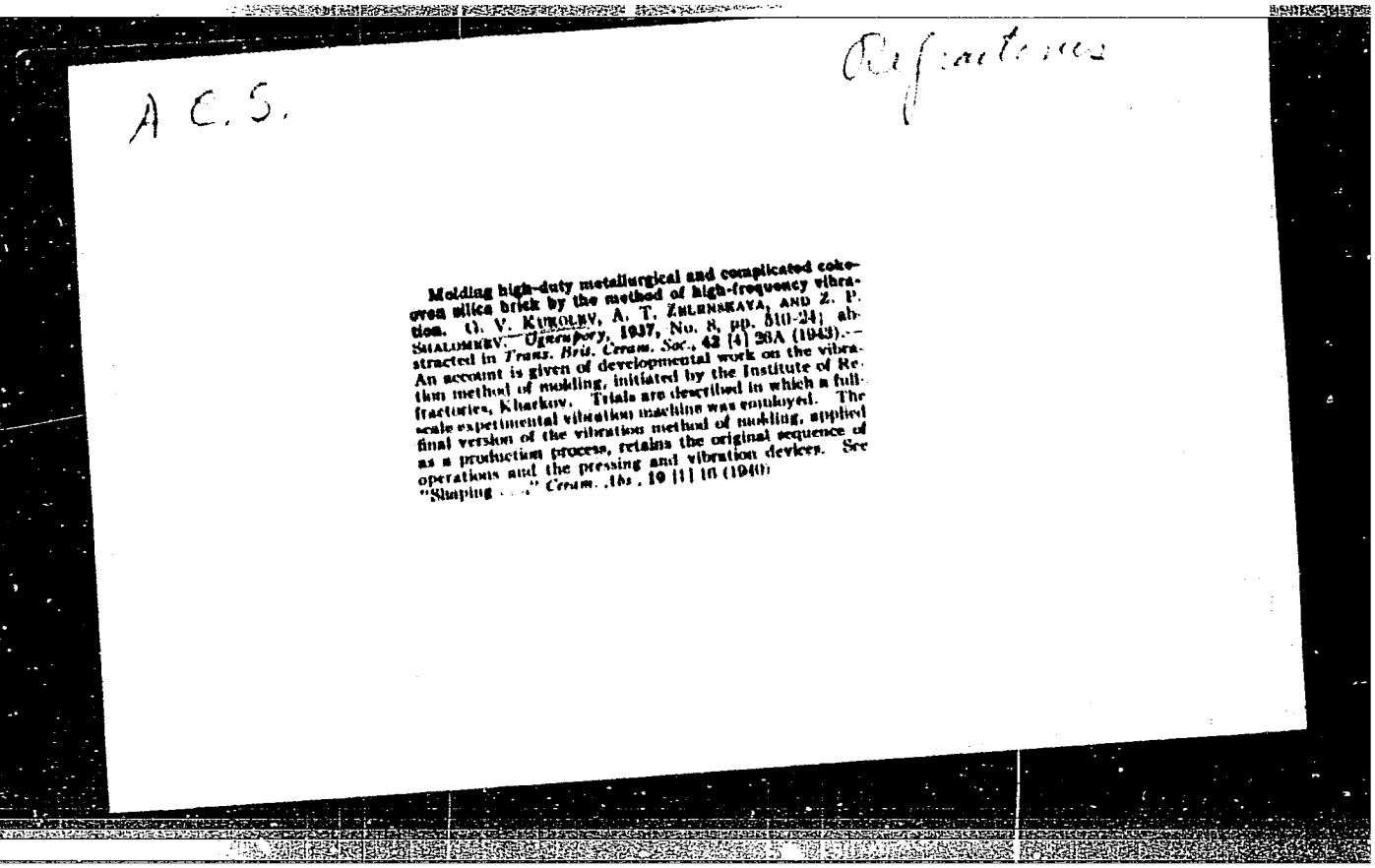
Kukolev, G. V., and Zelenskaya, A. T. SHAPING BY VIBRATION AS A METHOD FOR IMPROVING THE PROPERTIES OF SILICA BRICK FOR COKE OVENS. *Koks and Chem. (U.S.S.R.)* 7 [12] 30-36 (1937). – A brief description of the apparatus used is given. It is possible to manufacture high-grade brick



Kukolev, G. V. FOREIGN REFRACTORY MATERIALS FOR COKE OVENS. *Coke & Chem.* (*U.S.S.R.*), 7 [8] 37–40 (1937)

"Citrupite," a refractory cement, consists of coarse-grained quartz, grog, clay, water glass, and water. It is slightly resistant to temperature and softens when subjected to temperatures prevailing in coke ovens owing to high alkalinity and the use of fired grog. Cement *A* is a mixture of quartz, refractory clay, and water glass; cement *B* is a mixture of grog, refractory clay, and Na-aluminate solution.

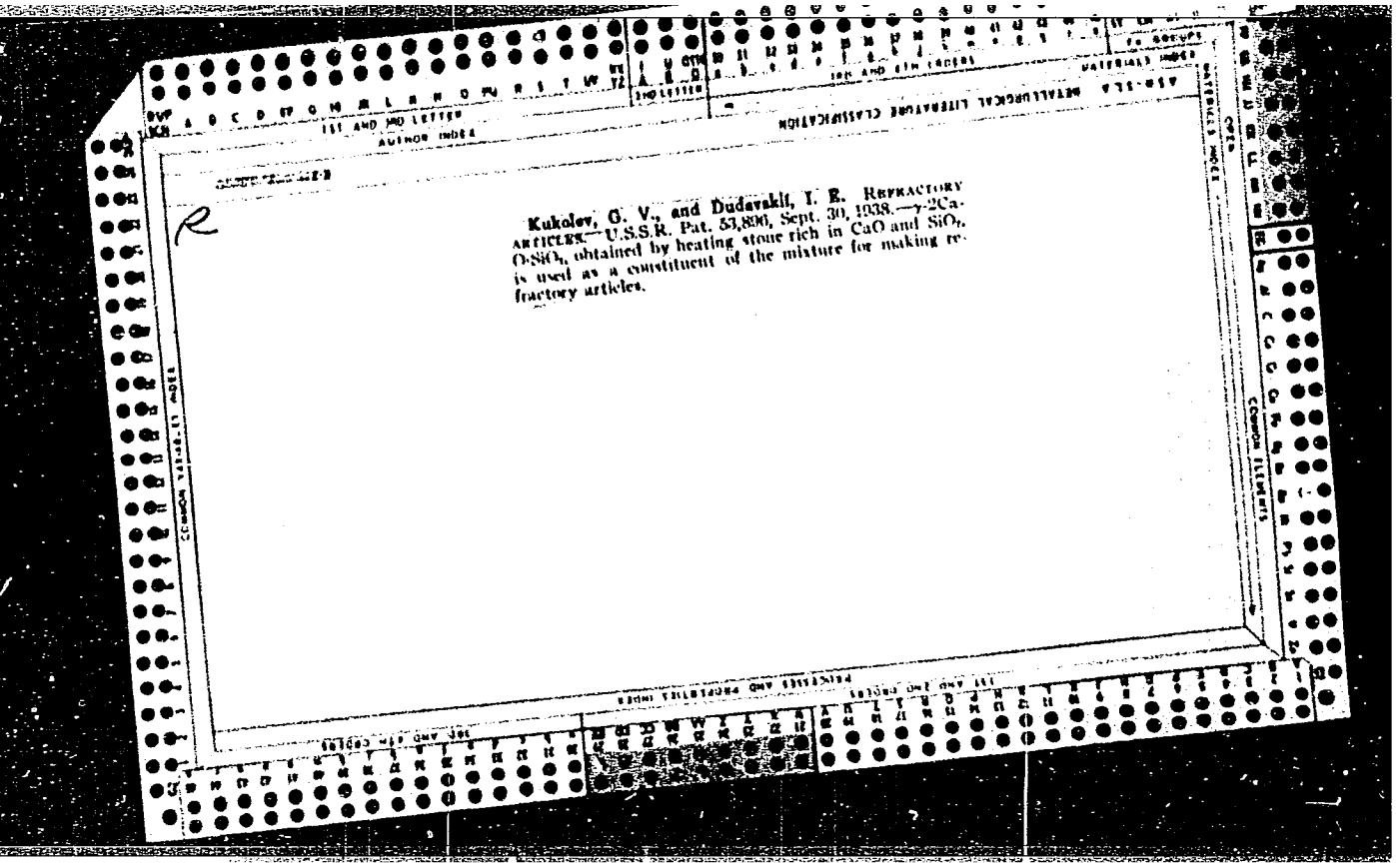




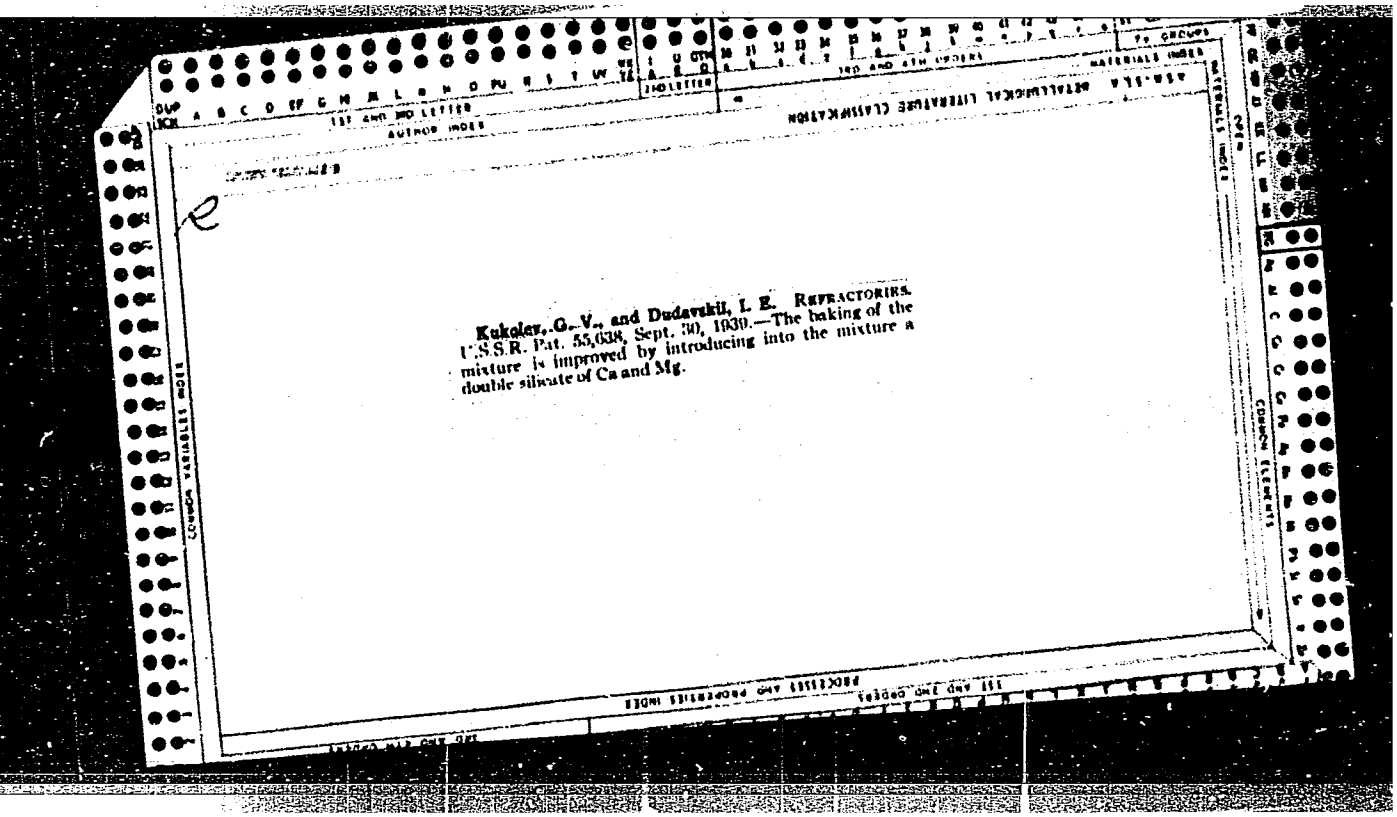
A C.S.

References

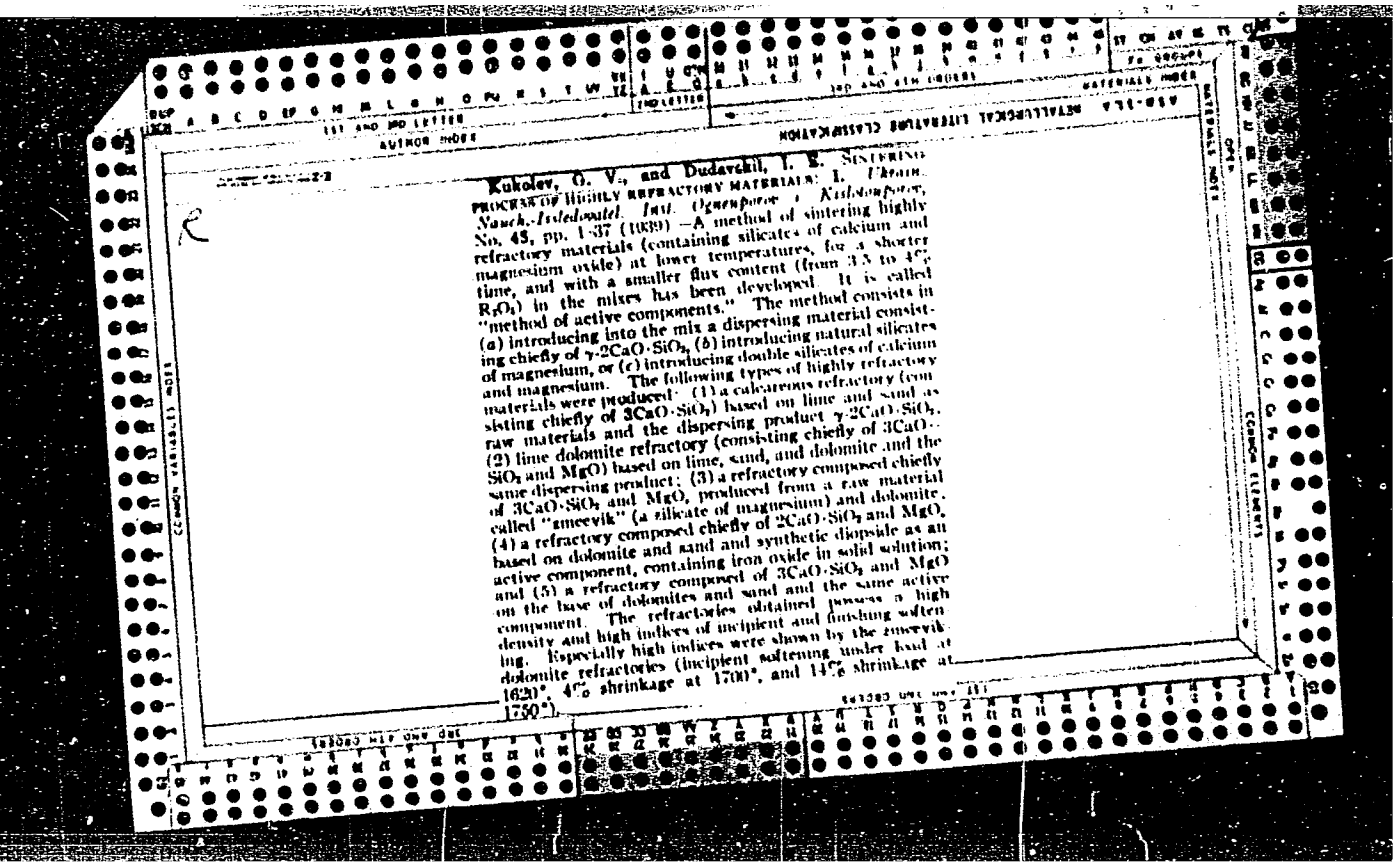
Molding high-duty metallurgical and complicated coke-oven silica brick by the method of high-frequency vibration. O. V. KUROLEV, A. T. ZHLENSKAYA, AND Z. P. SHALIMOVA.—*Ogneupory*, 1937, No. 8, pp. 810-24; abstracted in *Trans. Brit. Ceram. Soc.*, 42 [4] 36A (1943).—An account is given of developmental work on the vibration method of molding, initiated by the Institute of Refractories, Kharkov. Trials are described in which a full-scale experimental vibration machine was employed. The final version of the vibration method of molding, applied as a production process, retains the original sequence of operations and the pressing and vibration devices. See "Shaping . . ." *Ceram. Abs.*, 19 [1] 16 (1940)



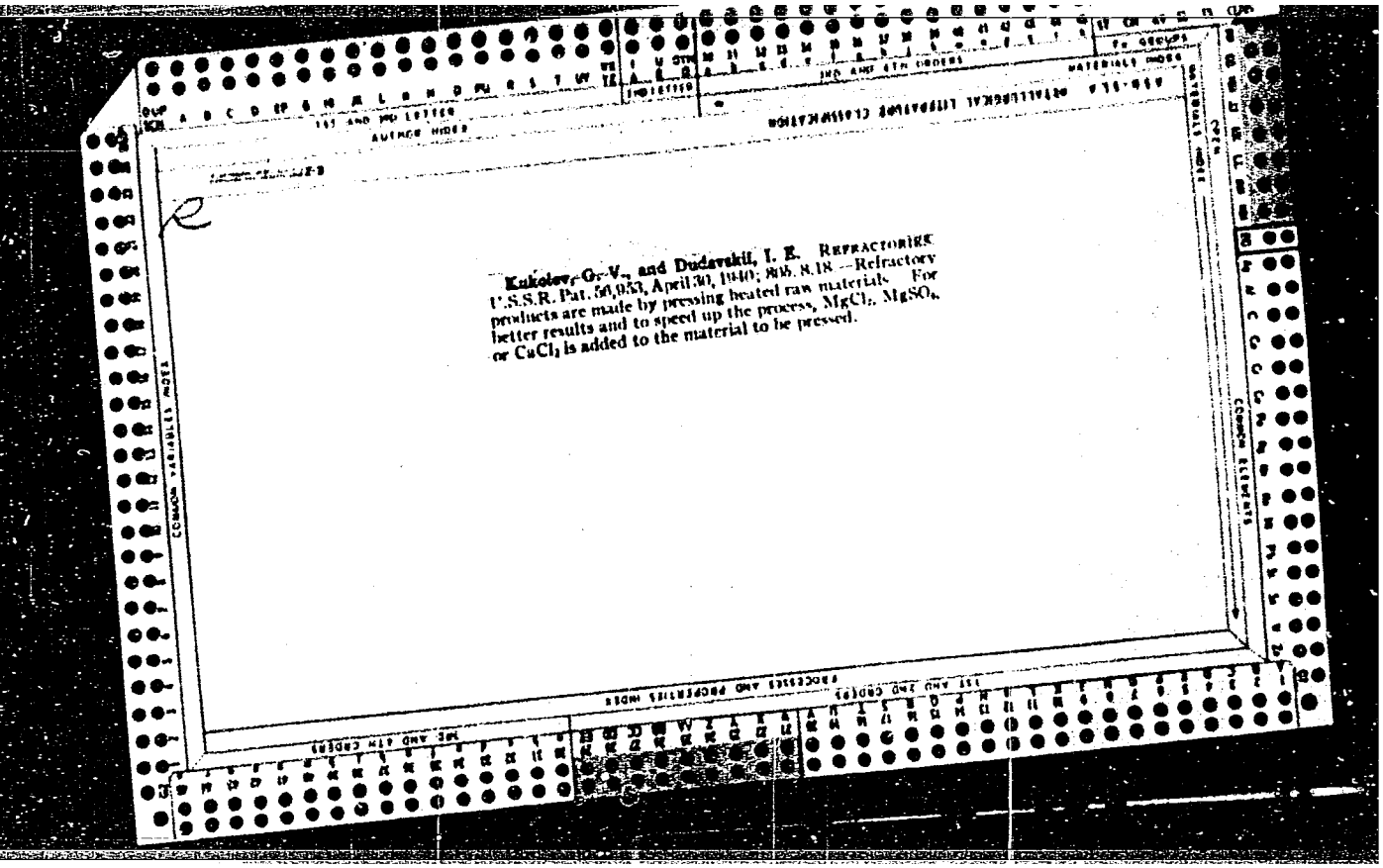
Kukolev, G. V., and Dudavskii, I. E. REFRACTORY ARTICLES.—U.S.S.R. Pat. 53,890, Sept. 30, 1938.—γ-2CaO·SiO$_2$, obtained by heating stone rich in CaO and SiO$_2$, is used as a constituent of the mixture for making refractory articles.



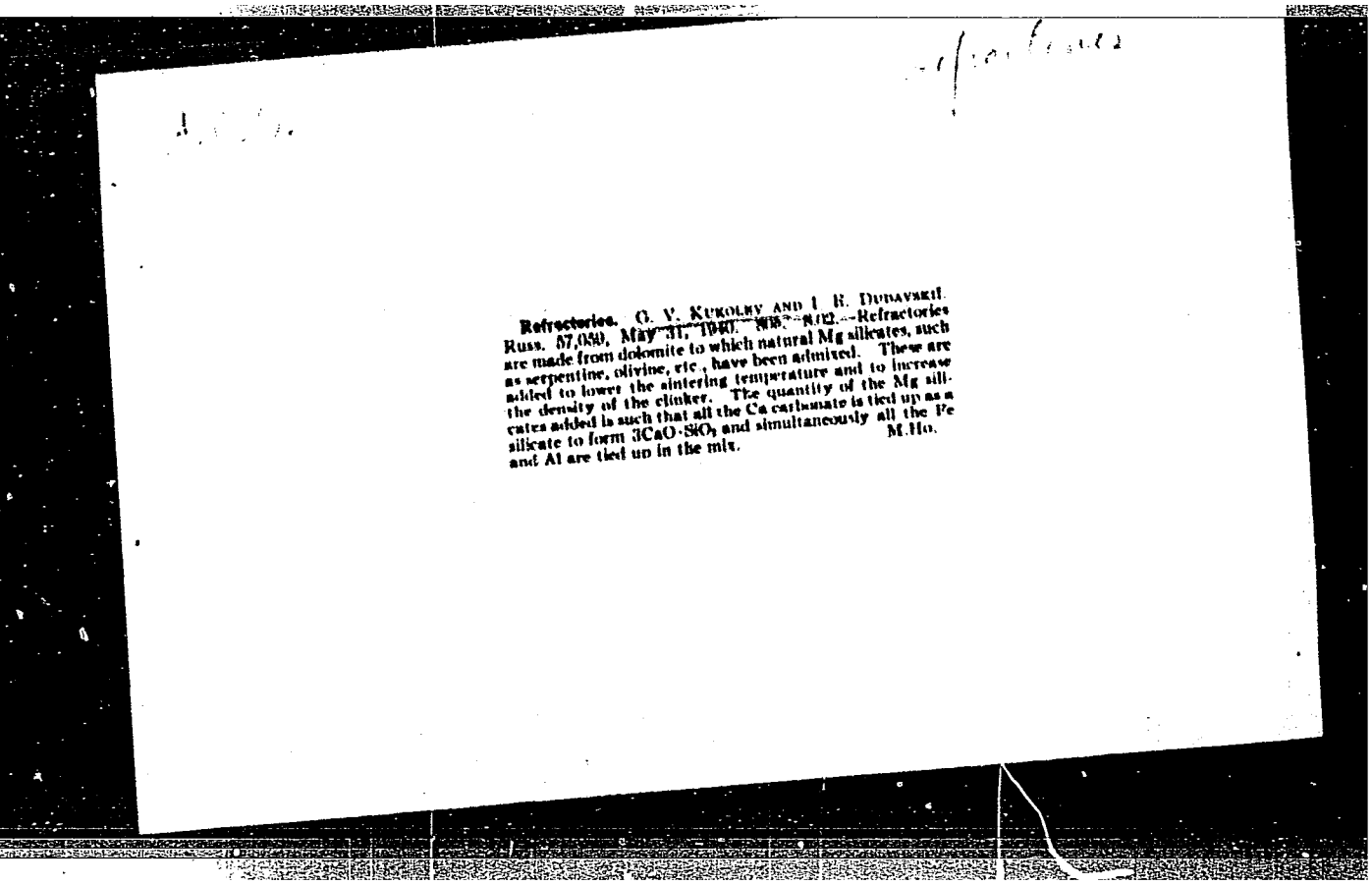
Kukolev, G. V., and Dudavskii, I. E. REFRACTORIES. U.S.S.R. Pat. 55,638, Sept. 30, 1939.—The baking of the mixture is improved by introducing into the mixture a double silicate of Ca and Mg.



Kukolev, O. V., and Dudarchik, I. E. SINTERING PROCESS OF HIGHLY REFRACTORY MATERIALS. I. Ukrain. Nauch.-Issledovatel. Inst. Ogneuporov i Kislosporov, No. 45, pp. 1-37 (1939).—A method of sintering highly refractory materials (containing silicates of calcium and magnesium oxide) at lower temperatures, for a shorter time, and with a smaller flux content (from 3.5 to 4% R_2O_3) in the mixes has been developed. It is called "method of active components." The method consists in (a) introducing into the mix a dispersing material consisting chiefly of γ-$2CaO \cdot SiO_2$, (b) introducing natural silicates of magnesium, or (c) introducing double silicates of calcium and magnesium. The following types of highly refractory materials were produced: (1) a calcareous refractory (consisting chiefly of $3CaO \cdot SiO_2$) based on lime and sand as raw materials and the dispersing product γ-$2CaO \cdot SiO_2$; (2) lime dolomite refractory (consisting chiefly of $3CaO \cdot SiO_2$ and MgO) based on lime, sand, and dolomite and the same dispersing product; (3) a refractory composed chiefly of $3CaO \cdot SiO_2$ and MgO, produced from a raw material called "smeevik" (a silicate of magnesium) and dolomite; (4) a refractory composed chiefly of $2CaO \cdot SiO_2$ and MgO, based on dolomite and sand and synthetic diopside as an active component, containing iron oxide in solid solution; and (5) a refractory composed of $3CaO \cdot SiO_2$ and MgO on the base of dolomites and sand and the same active component. The refractories obtained possess a high density and high indices of incipient and finishing softening. Especially high indices were shown by the smeevik-dolomite refractories (incipient softening under load at 1620°, 4% shrinkage at 1700°, and 14% shrinkage at 1750°).



Kukolev, G. V., and Dudavskii, I. E. REFRACTORIES U.S.S.R. Pat. 56,053, April 30, 1940; RZh. 8.18.—Refractory products are made by pressing heated raw materials. For better results and to speed up the process, $MgCl_2$, $MgSO_4$, or $CuCl_2$ is added to the material to be pressed.



Refractories. G. V. Kukolev and I. R. Dunayskii. Russ. 57,089, May 31, 1940. 8 pp. (In Russ.)—Refractories are made from dolomite to which natural Mg silicates, such as serpentine, olivine, etc., have been admixed. These are added to lower the sintering temperature and to increase the density of the clinker. The quantity of the Mg silicates added is such that all the Ca carbonate is tied up as a silicate to form $3CaO \cdot SiO_2$ and simultaneously all the Fe and Al are tied up in the mix. M.Ho.

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

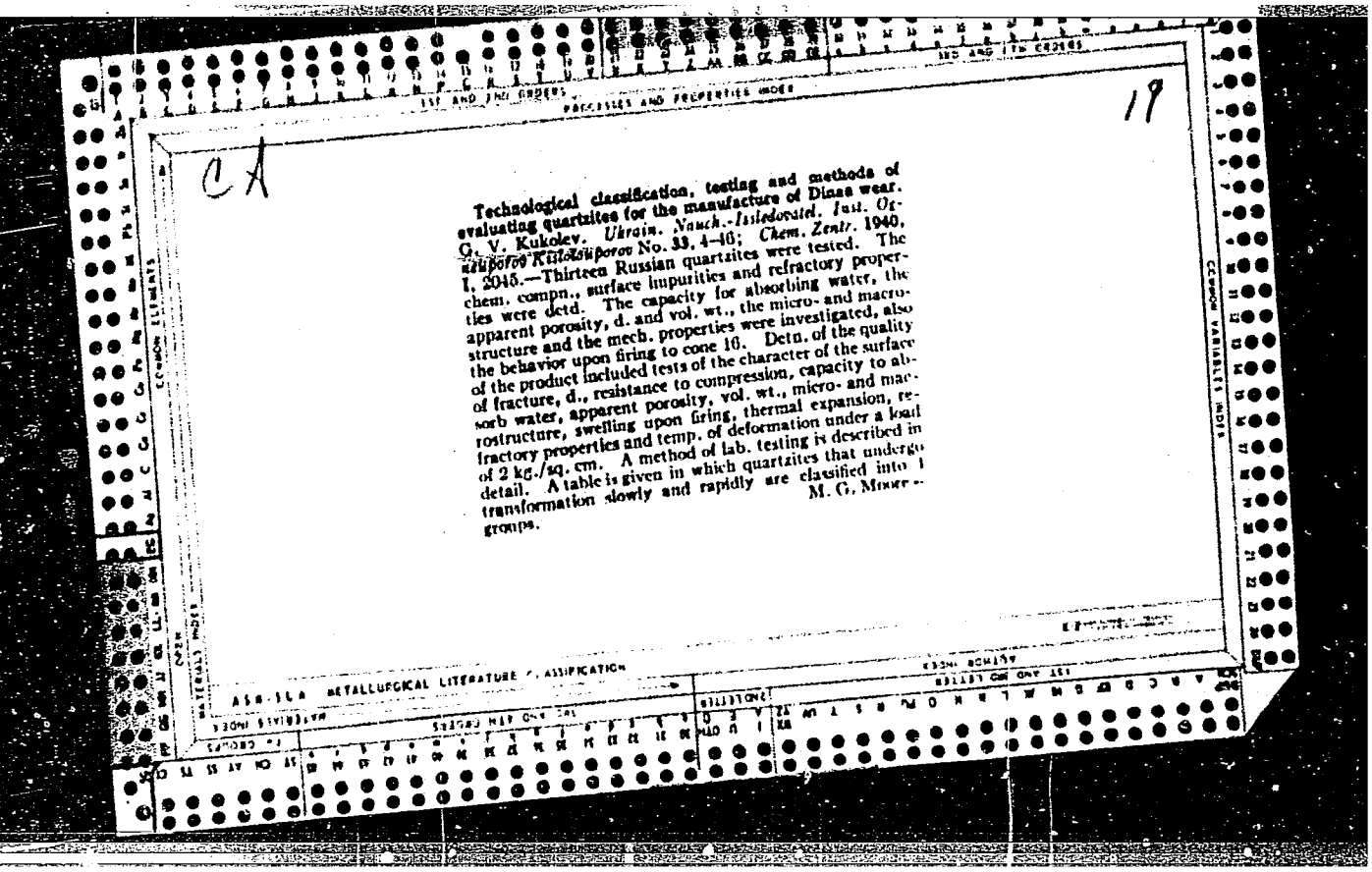
3RD AND 4TH ORDERS

17

C4

Quartz-grog (semiacid) masses. G. V. Kukolev and G. I. Slaburskii. *Ukrain. Nauch.-Issledovatel. Inst. Ogneupornov Kislotouporov* No. 25, 9-95; *Chem. Zentr.* 1940, I, 1728.—Expts. are reported on the production of refractory quartz-grog materials from various Russian clays, kaolins, quartzites and quartz sands. Grog can be saved by using numerous other materials, such as cryst. quartzites, amorphous quartzites, sandstones, sand, primary kaolins or clays rich in quartz. The quartz must have a low porosity so as to form but little fine powder. Quartzite contg. a large proportion of amorphous cement is unsuitable since it acts as an undesirable flux. About 40% quartz material, 40% binding clay and 20% grog should be used and the grog should not contain less than 78% SiO_2. M. G. Moore

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



CA

19

Technological classification, testing and methods of evaluating quartzites for the manufacture of Dinas wear. G. V. Kukolev. *Ukrain. Nauch.-Issledovatel. Inst. Ogneuporov Kislotnikh Ogneuporov* No. 33, 4–46; *Chem. Zentr.* 1940, I, 2045.—Thirteen Russian quartzites were tested. The chem. compn., surface impurities and refractory properties were detd. The capacity for absorbing water, the apparent porosity, d. and vol. wt., the micro- and macrostructure and the mech. properties were investigated, also the behavior upon firing to cone 16. Detn. of the quality of the product included tests of the character of the surface of fracture, d., resistance to compression, capacity to absorb water, apparent porosity, vol. wt., micro- and macrostructure, swelling upon firing, thermal expansion, refractory properties and temp. of deformation under a load of 2 kg./sq. cm. A method of lab. testing is described in detail. A table is given in which quartzites that undergo transformation slowly and rapidly are classified into 1 groups.

M. G. Moore

KUKOLEV, G. V.

Kukolev, G.V., Dudavskii, I.E., Amerikov, A.V., and Shtainberg, E.I. SINTERING OF HIGHLY REFRACTORY MATERIALS. Sbornik Rabot Ukrain. Nauch.-Issledovatel. Inst. Ogneuporov., No. 46, 117-54 (1940).- A number of methods are given for the production of dolomite refractories.

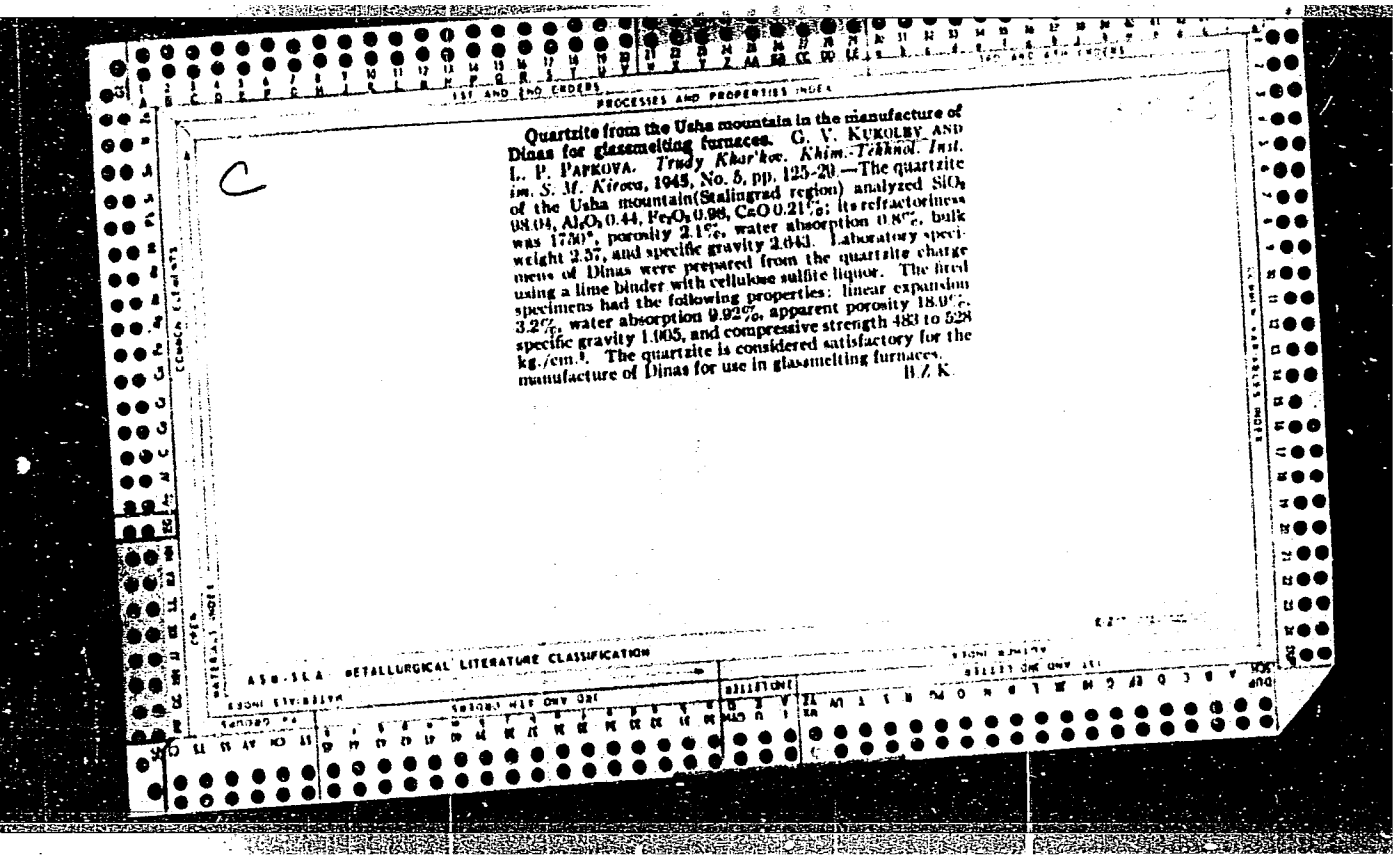
A.C.S

Refractories

Application of phase equilibria to highly refractory dolomitic compositions. G. V. KUKOLEV AND R. I. NOVOSELOVA. *Ogneupory*, 1941, No. 4/5, pp. 34-39.— The system discussed is CaO-MgO-SiO$_2$-Al$_2$O$_3$. The compositions analyzed are taken from the phase diagram compiled by McMurdie and Insley (*Ceram. Abs.*, 15 [8] 260 (1936)). Best results in resistance to high temperatures and to slag corrosion may be expected from dolomitic refractories containing a minimum of R_2O_3 and having a maximum coefficient of saturation and a maximum content of free CaO or MgO. In this respect dolomitic compositions containing free CaO or mixed water-resistant dolomitic-magnesitic masses are preferable to water-resistant purely dolomitic, i.e., containing no free CaO, compositions. The most refractory compositions in this class are those whose coefficient of saturation approaches unity and which contain a minimum of sesquioxides. Where $Al_2O_3/Fe_2O_3 < 0.64$, the coefficient of saturation is calculated from the following formula:

$$\text{coeff. of satn.} = \frac{CaO - 0.7Fe_2O_3 - 1.1Al_2O_3 - 1.8R_2O_3}{2.8SiO_2}$$

and where $Al_2O_3/Fe_2O_3 > 0.64$, the coefficients of Fe_2O_3 and Al_2O_3 in the formula become 0.35 and 1.65, respectively. M.Ho.



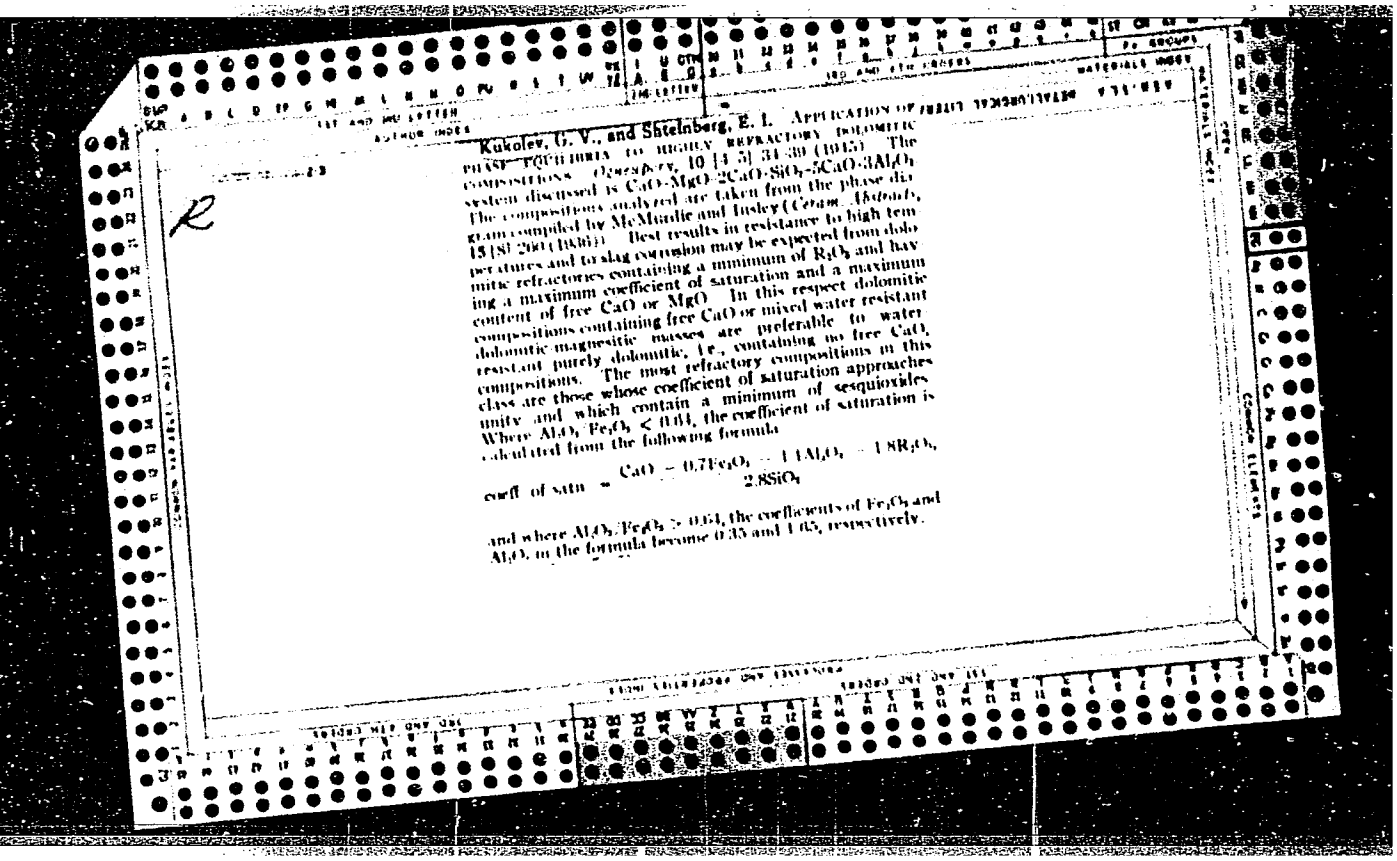
PROCESSES AND PROPERTIES INDEX

C

Quartzite from the Usha mountain in the manufacture of Dinas for glassmelting furnaces. G. V. KUKOLEV AND L. P. PAPKOVA. *Trudy Khar'kov. Khim.-Tekhnol. Inst. im. S. M. Kirova*, 1949, No. 5, pp. 125-20.—The quartzite of the Usha mountain(Stalingrad region) analyzed SiO_2 98.04, Al_2O_3 0.44, Fe_2O_3 0.98, CaO 0.21%; its refractoriness was 1750°, porosity 2.1%, water absorption 0.8%, bulk weight 2.57, and specific gravity 2.643. Laboratory specimens of Dinas were prepared from the quartzite charge using a lime binder with cellulose sulfite liquor. The fired specimens had the following properties: linear expansion 3.2%, water absorption 9.92%, apparent porosity 18.0%, specific gravity 1.905, and compressive strength 483 to 528 kg./cm.². The quartzite is considered satisfactory for the manufacture of Dinas for use in glassmelting furnaces.

B. Z. K.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



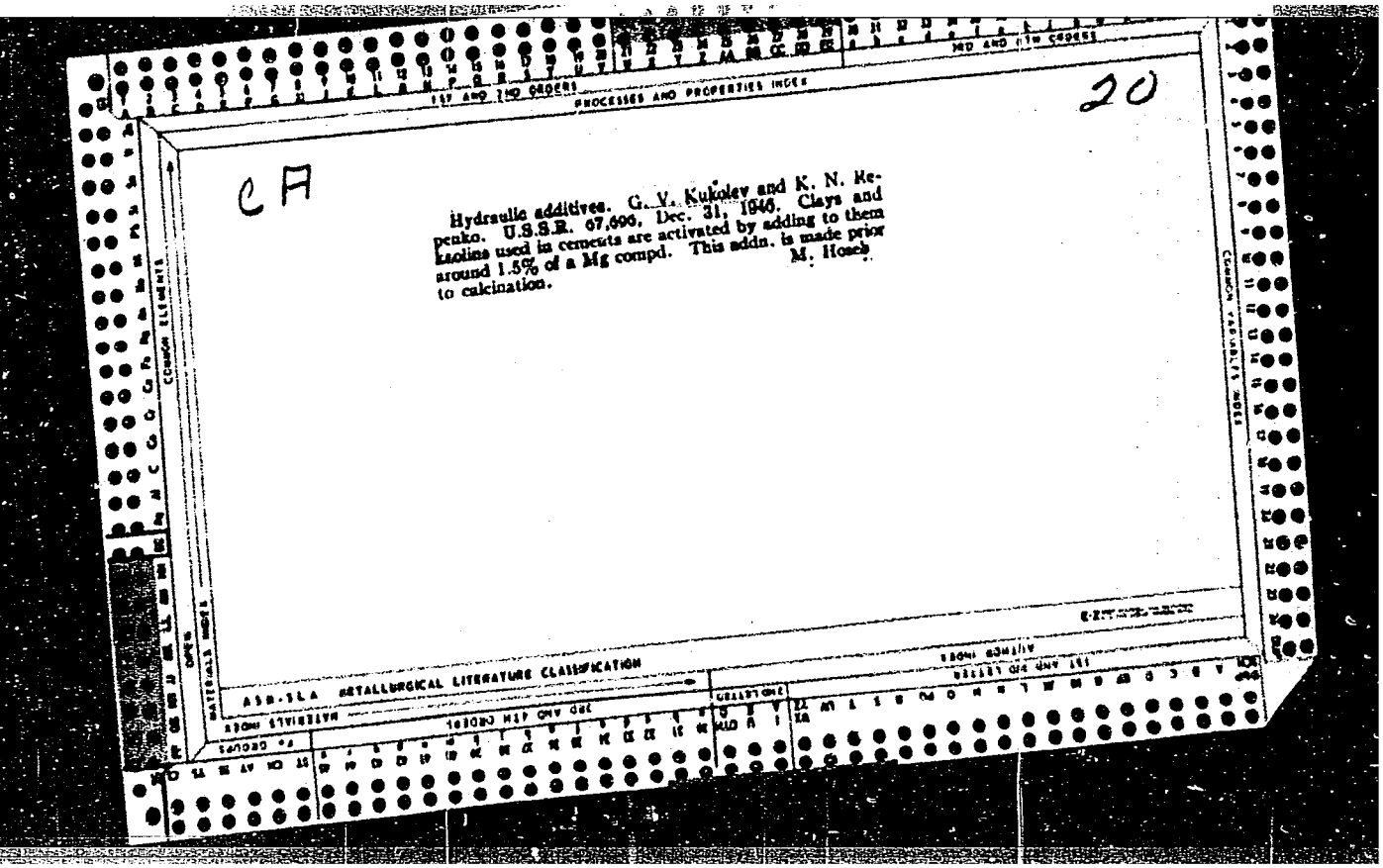
Kukolev, G. V., and Shtelnberg, E. I. APPLICATION OF [illegible] TO HIGHLY REFRACTORY DOLOMITIC [illegible] PHASE EQUILIBRIA IN [illegible] COMPOSITIONS. Ogneupory, 10 [4-5] 31-39 (1945). The system discussed is CaO-MgO-2CaO·SiO$_2$-5CaO·3Al$_2$O$_3$. The compositions analyzed are taken from the phase dia- gram compiled by McMurdie and Insley (Ceram. Abstr., 15 [8] 200 (1936)). Best results in resistance to high tem- peratures and to slag corrosion may be expected from dolo- mitic refractories containing a minimum of R$_2$O$_3$ and hav- ing a maximum coefficient of saturation and a maximum content of free CaO or MgO. In this respect dolomitic compositions containing free CaO or mixed water resistant dolomitic-magnesitic masses are preferable to water resistant purely dolomitic, i.e., containing no free CaO, compositions. The most refractory compositions in this class are those whose coefficient of saturation approaches unity and which contain a minimum of sesquioxides. Where Al$_2$O$_3$/Fe$_2$O$_3$ < 0.64, the coefficient of saturation is calculated from the following formula:

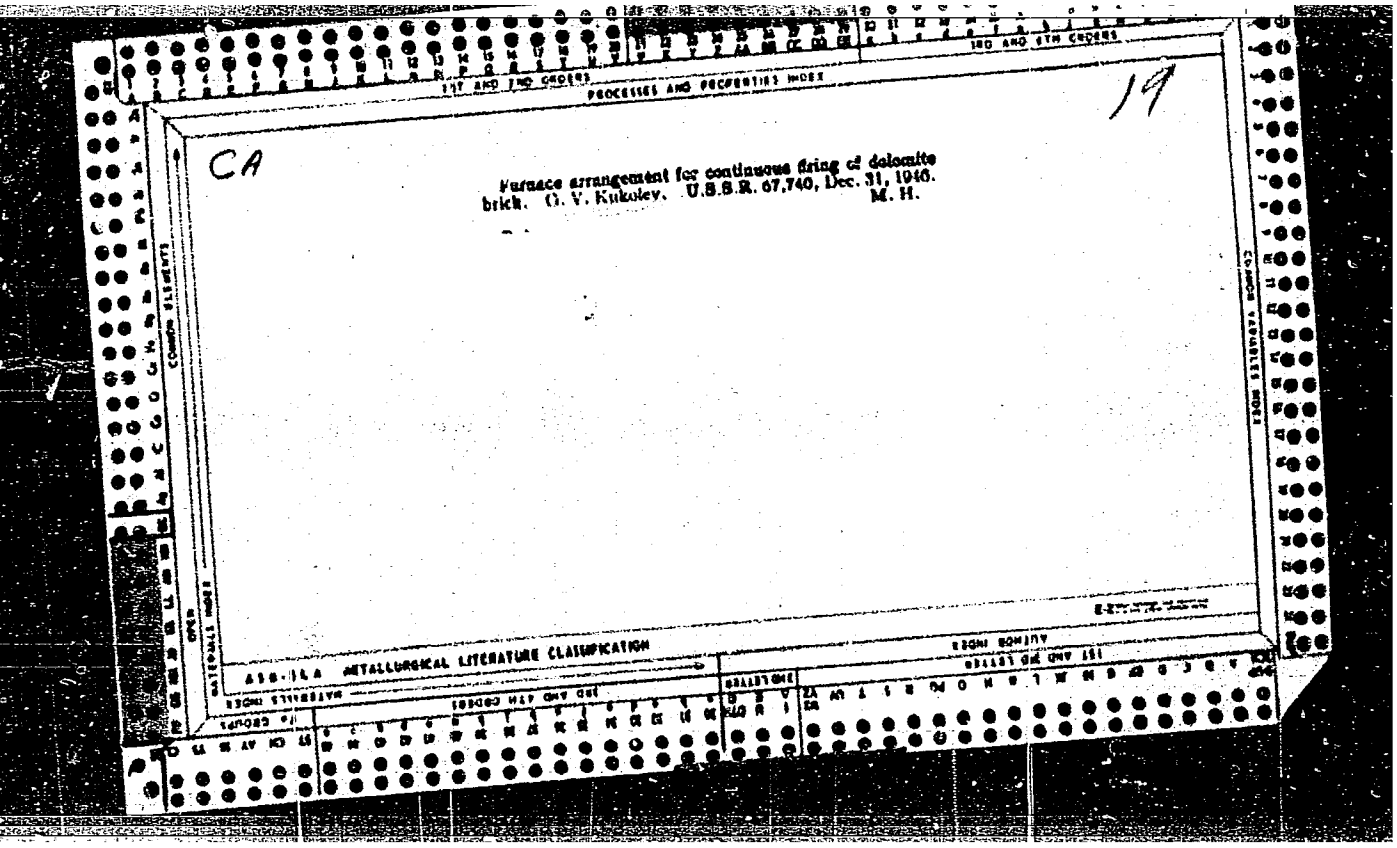
$$\text{coeff. of satn} = \frac{\text{CaO} - 0.7\text{Fe}_2\text{O}_3 - 1.1\text{Al}_2\text{O}_3 - 1.8\text{R}_2\text{O}_3}{2.8\text{SiO}_2}$$

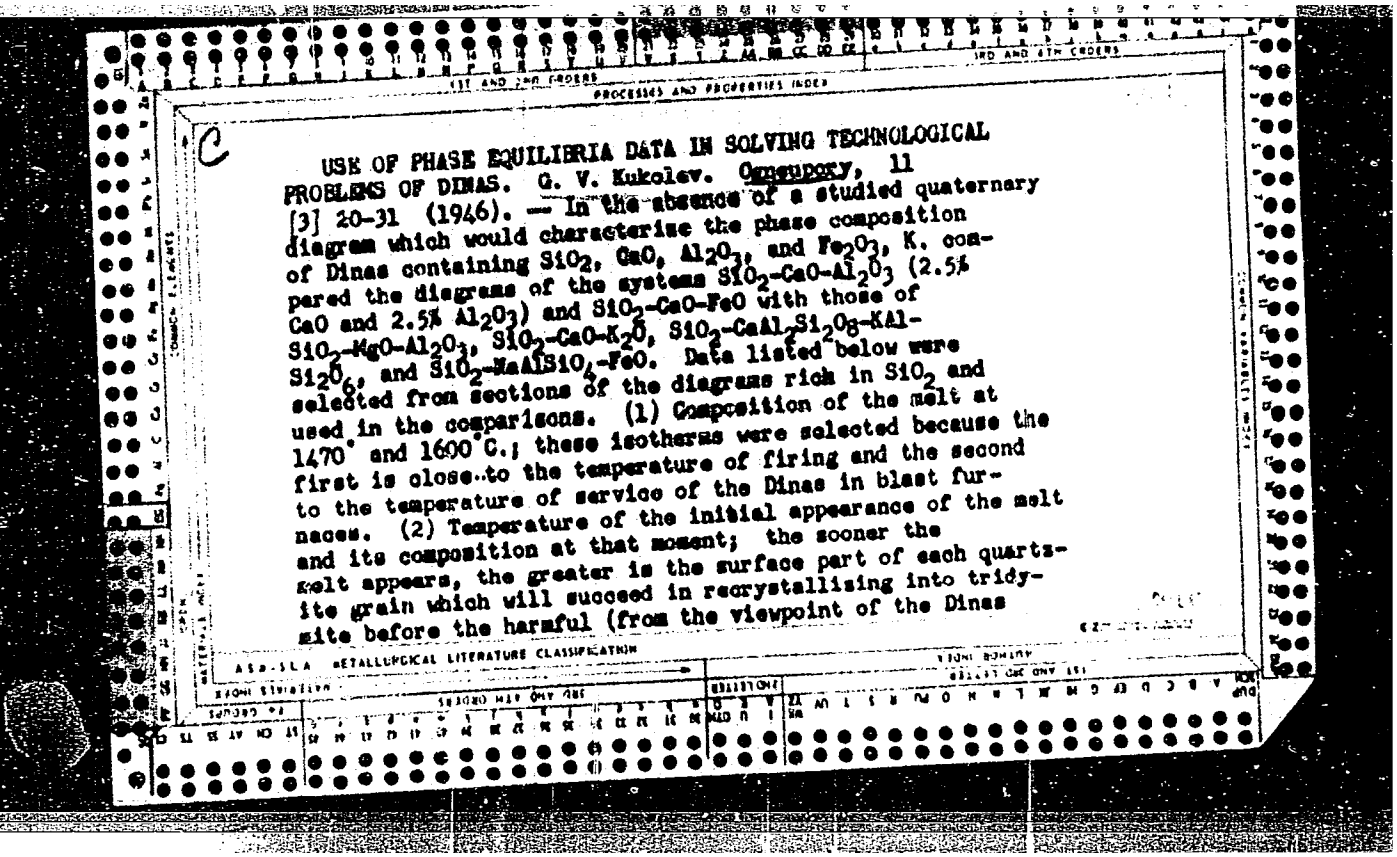
and where Al$_2$O$_3$/Fe$_2$O$_3$ > 0.64, the coefficients of Fe$_2$O$_3$ and Al$_2$O$_3$ in the formula become 0.35 and 1.65, respectively.

KUKOLEV, G. V.

WATER RESISTANT DOLOMITE CLINKER FOR THE MANUFACTURE OF DOLOMITE BRICK. G. V. Kukolev. Ogneupory, 10 [9-10] 32-43 (1945). -- Water resistant and water moldable dolomite clinker (for brickmaking) having 4.1 to 4.5% sesquioxides and a coefficient of saturation of 0.9 to 0.96 was prepared from 89 dolomite, 5.2 phosphorite, and 5.8% quartzite. The materials were first coarsely ground, then finely ground (wet), and finally fired in a rotary furnace using coal dust as fuel. The volatiles in the fuel were within the range of 17 to 25%; the mixture of raw materials was proportioned on the assumption that it would be necessary to add ash to the fuel in order that the coefficient of saturation of the clinker should be not lower than 0.90 and the P_2O_5 content 0.9 to 1.2%. A flowsheet of the process is given. B.Z.K.

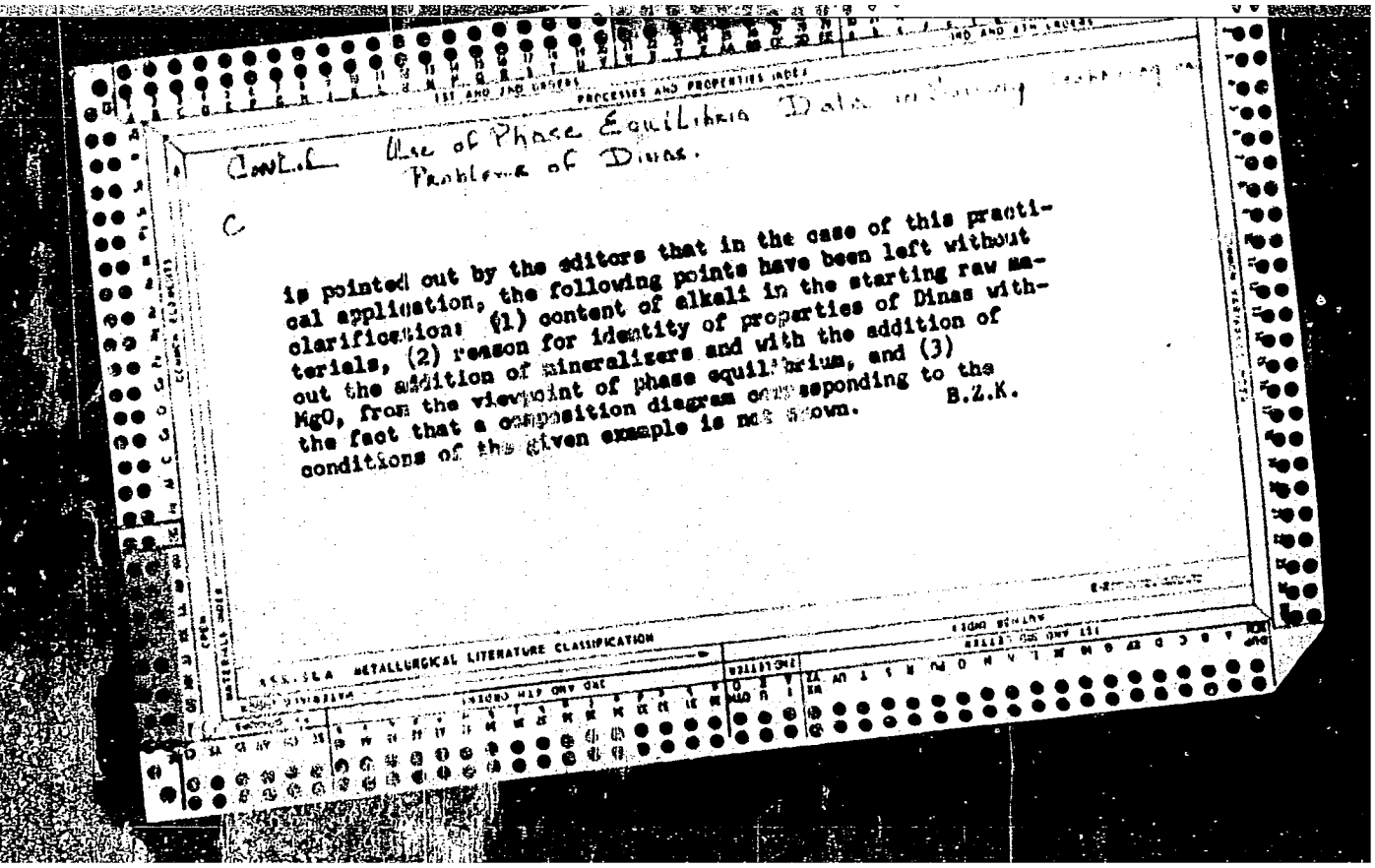






USE OF PHASE EQUILIBRIA DATA IN SOLVING TECHNOLOGICAL PROBLEMS OF DINAS. G. V. Kukolev. Ogneupory, 11 [3] 20-31 (1946). — In the absence of a studied quaternary diagram which would characterize the phase composition of Dinas containing SiO_2, CaO, Al_2O_3, and Fe_2O_3, K. compared the diagrams of the systems SiO_2-CaO-Al_2O_3 (2.5% CaO and 2.5% Al_2O_3) and SiO_2-CaO-FeO with those of SiO_2-MgO-Al_2O_3, SiO_2-CaO-K_2O, SiO_2-$CaAl_2Si_2O_8$-$KAlSi_2O_6$, and SiO_2-$NaAlSiO_4$-FeO. Data listed below were selected from sections of the diagrams rich in SiO_2 and used in the comparisons. (1) Composition of the melt at 1470° and 1600° C.; these isotherms were selected because the first is close to the temperature of firing and the second to the temperature of service of the Dinas in blast furnaces. (2) Temperature of the initial appearance of the melt and its composition at that moment; the sooner the melt appears, the greater is the surface part of each quartzite grain which will succeed in recrystallising into tridymite before the harmful (from the viewpoint of the Dinas

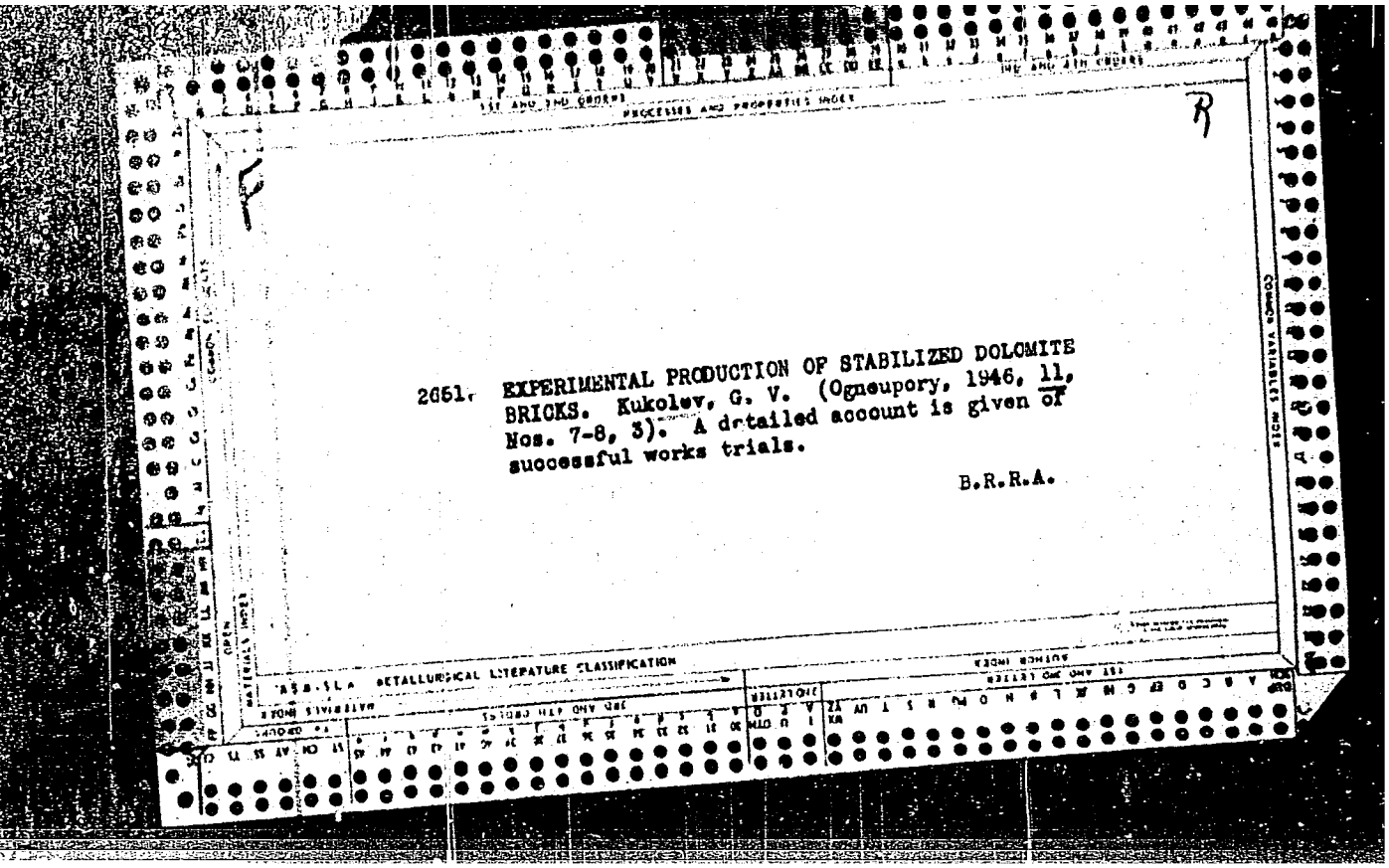
structure) dry transformation of the inner parts of the grains takes place. (3) Percentage increase of the melt for each 100°C. rise in temperature above 1470°C.; this moment is highly important because admixtures or mineralisers that favor the growth of the melt at high temperatures are unfavorable for the retention of refractory characteristics by the Dinas at high temperatures. (4) Amount of the melt for 1% of fluxes at 1470°; this factor demonstrates the power of the fluxing action of the admixtures. Calculations were made according to the equation % melt = 100a/b, where a is the nonprecipitating component of the [illegible] component in the melt at the given temperature (%). For each system, calculations were made for 6 to 8 points of mixtures having 93 to 98.5% SiO_2 and various amounts of admixtures; the SiO_2 range includes the content of SiO_2 in the quartzites and in the Dinas. Data obtained from these diagrams were used in a practical case when Dinas made from micaceous quartzites proved unsatisfactory in blast-furnace service. The Dinas quality was greatly improved by using MgO as bond instead of the CaO as was shown by comparison of the diagrams. It



Cont.d Use of Phase Equilibria Data ...
Problems of Diras.

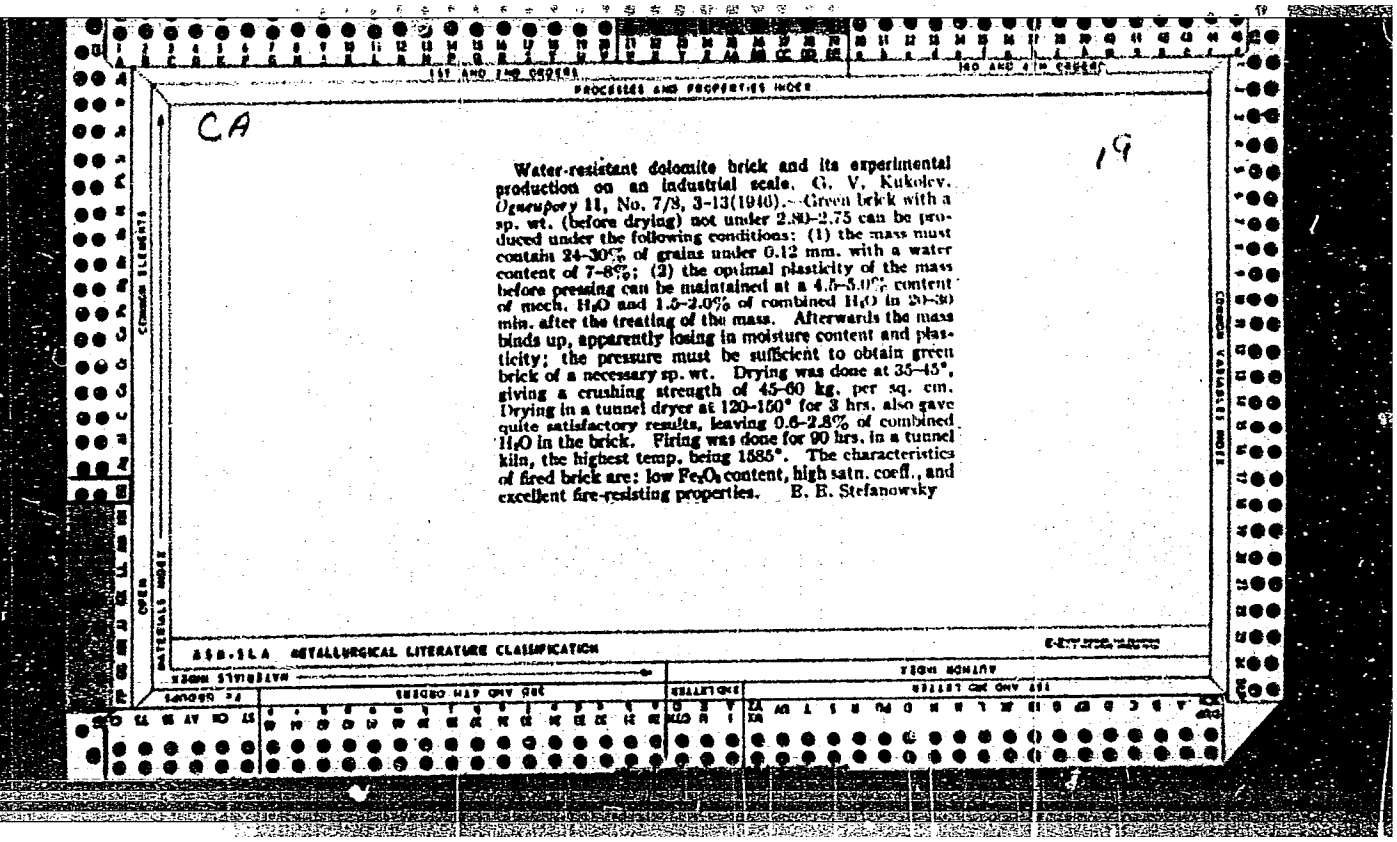
C

is pointed out by the editors that in the case of this practical application, the following points have been left without clarification: (1) content of alkali in the starting raw materials, (2) reason for identity of properties of Dinas without the addition of mineralizers and with the addition of MgO, from the viewpoint of phase equilibrium, and (3) the fact that a composition diagram corresponding to the conditions of the given example is not shown. B.Z.K.



2651. EXPERIMENTAL PRODUCTION OF STABILIZED DOLOMITE BRICKS. Kukolev, G. V. (Ogneupory, 1946, 11, Nos. 7-8, 3). A detailed account is given of successful works trials.

B.R.R.A.



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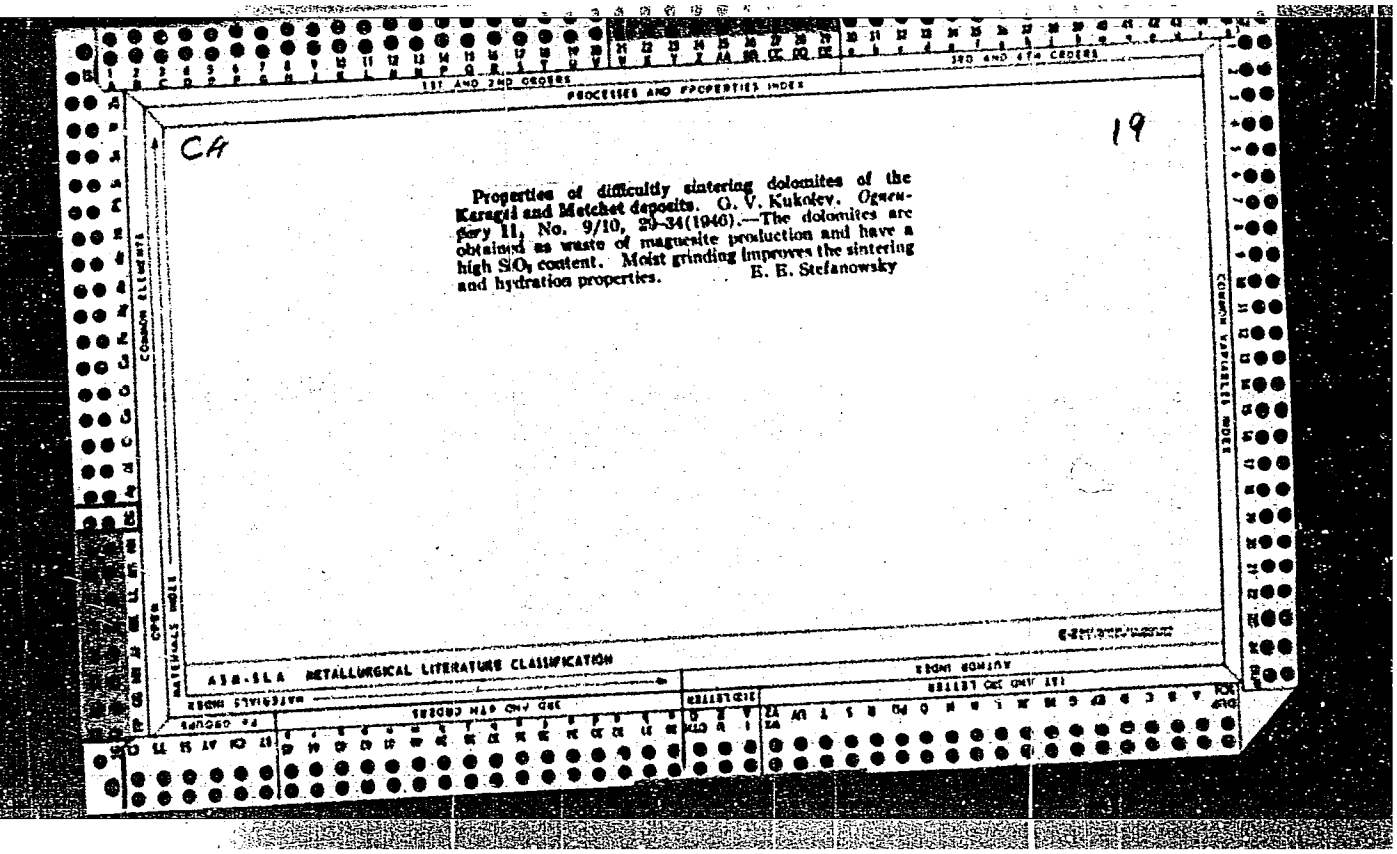
19

Water-resistant dolomite brick and its experimental production on an industrial scale. G. V. Kukolev. *Ogneupory* 11, No. 7/8, 3-13(1940).—Green brick with a sp. wt. (before drying) not under 2.80–2.75 can be produced under the following conditions: (1) the mass must contain 24–30% of grains under 0.12 mm. with a water content of 7–8%; (2) the optimal plasticity of the mass before pressing can be maintained at a 4.5–5.0% content of mech. H_2O and 1.5–2.0% of combined H_2O in 20–30 min. after the treating of the mass. Afterwards the mass binds up, apparently losing in moisture content and plasticity; the pressure must be sufficient to obtain green brick of a necessary sp. wt. Drying was done at 35–45°, giving a crushing strength of 45–60 kg. per sq. cm. Drying in a tunnel dryer at 120–150° for 3 hrs. also gave quite satisfactory results, leaving 0.6–2.8% of combined H_2O in the brick. Firing was done for 90 hrs. in a tunnel kiln, the highest temp. being 1585°. The characteristics of fired brick are: low Fe_2O_3 content, high satn. coeff., and excellent fire-resisting properties. B. B. Stefanowsky



CA

19

Properties of difficultly sintering dolomites of the Karagai and Metchet deposits. G. V. Kukolev. *Ogneupory* 11, No. 9/10, 29–34(1946).—The dolomites are obtained as waste of magnesite production and have a high SiO_2 content. Moist grinding improves the sintering and hydration properties. E. E. Stefanowsky

KUKOLEV, G. V.

Jun 1947

USSR/Engineering
Metallurgical Plants
Dolomite

"Dolomite Bricks in Metallurgy," Prof G. V. Kukolev, Dr Tech Sci; D. I. Kivin, Engr, All-Union Inst Fireproof Materials, 5 pp

"Stal'" No 6

PA 58T34

Use of dolomite bricks in important elements of furnaces was unsatisfactory because of their shrinkage and deformation due to high temperatures. From experiments, high-quality, water-resistant dolomite brick developed to replace magnesium and chrome-magnesium bricks. New brick will effect on quantity

58T34

[redacted]

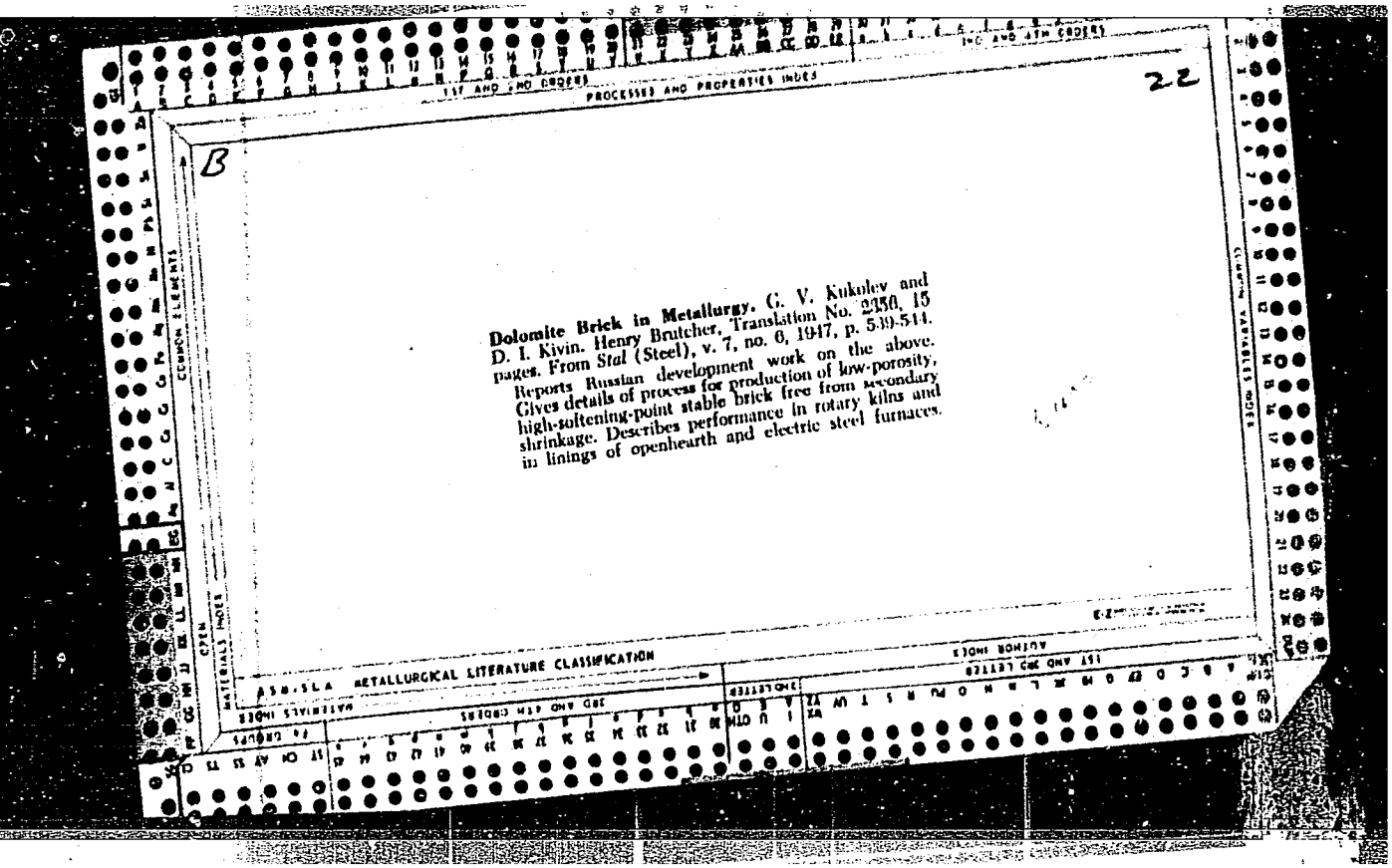
Jun 1947

USSR/Engineering (Contd)

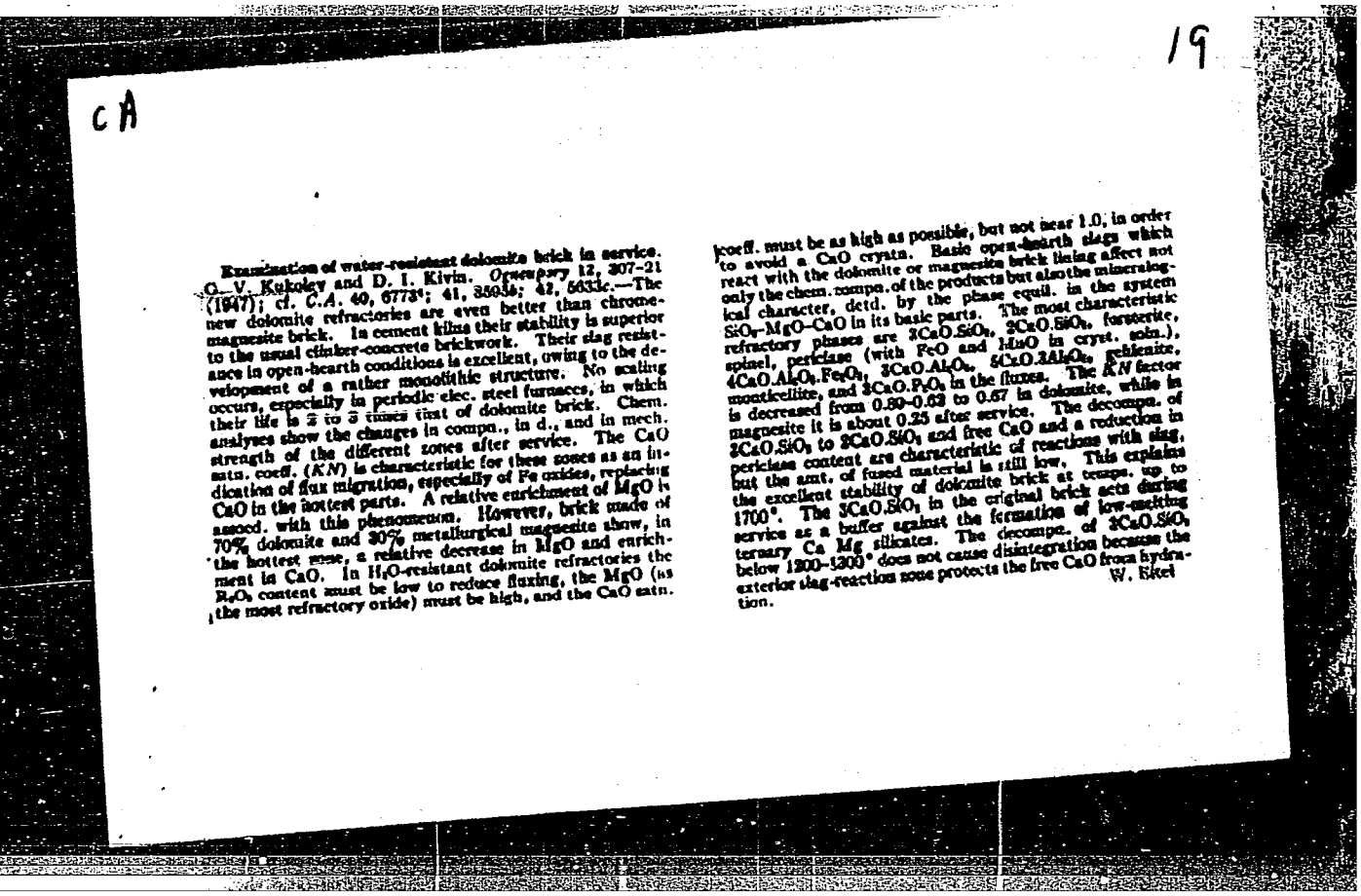
and quality of steel casting for present Five-Year Plan, since dolomite resources are available at almost all metallurgical processing areas.

58T34

[redacted]



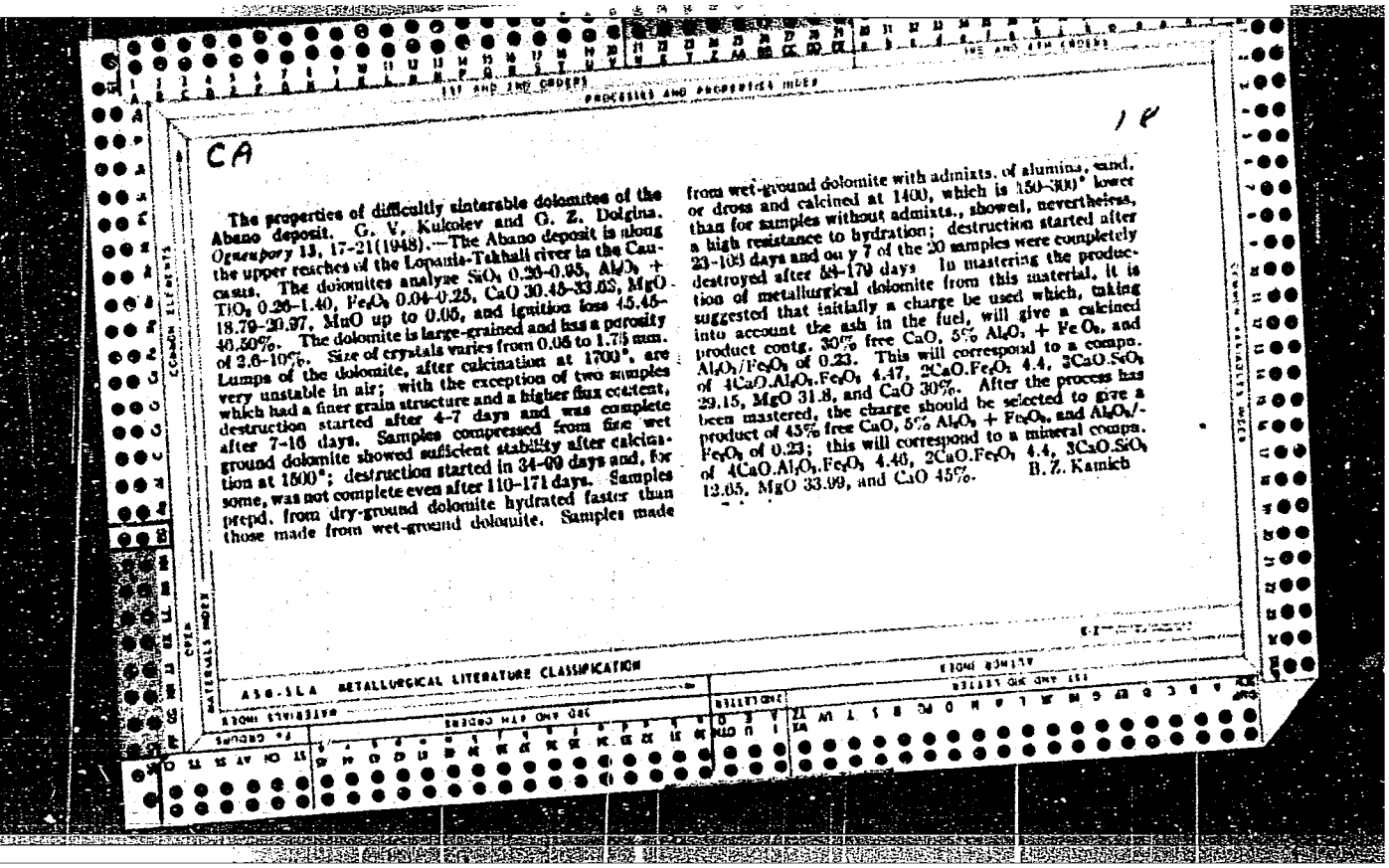
Dolomite Brick in Metallurgy. G. V. Kukolev and D. I. Kivin. Henry Brutcher, Translation No. 2350, 15 pages. From *Stal* (Steel), v. 7, no. 6, 1947, p. 539-544. Reports Russian development work on the above. Gives details of process for production of low-porosity, high-softening-point stable brick free from secondary shrinkage. Describes performance in rotary kilns and in linings of openhearth and electric steel furnaces.



19

CA

Examination of water-resistant dolomite brick in service. G. V. Kukolev and D. I. Kivin. *Ogneupory* 12, 307–21 (1947); cf. *C.A.* 40, 6773⁴; 41, 3593ᵇ; 42, 5633c.—The new dolomite refractories are even better than chrome-magnesite brick. In cement kilns their stability is superior to the usual clinker-concrete brickwork. Their slag resistance in open-hearth conditions is excellent, owing to the development of a rather monolithic structure. No scaling occurs, especially in periodic elec. steel furnaces, in which their life is 2 to 3 times that of dolomite brick. Chem. analyses show the changes in compn., in d., and in mech. strength of the different zones after service. The CaO satn. coeff. (*KN*) is characteristic for these zones as an indication of flux migration, especially of Fe oxides, replacing CaO in the hottest parts. A relative enrichment of MgO is assocd. with this phenomenon. However, brick made of 70% dolomite and 30% metallurgical magnesite show, in the hottest zone, a relative decrease in MgO and enrichment in CaO. In H_2O-resistant dolomite refractories the R_2O_3 content must be low to reduce fluxing, the MgO (as the most refractory oxide) must be high, and the CaO satn. coeff. must be as high as possible, but not near 1.0, in order to avoid a CaO crysts. Basic open-hearth slags which react with the dolomite or magnesite brick lining affect not only the chem. compn. of the products but also the mineralogical character, detd. by the phase equil. in the system SiO_2–MgO–CaO in its basic parts. The most characteristic refractory phases are $3CaO.SiO_2$, $2CaO.SiO_2$, forsterite, spinel, periclase (with FeO and MnO in cryst. soln.), $4CaO.Al_2O_3.Fe_2O_3$, $3CaO.Al_2O_3$, $5CaO.3Al_2O_3$, gehlenite, monticellite, and $3CaO.P_2O_5$ in the fluxes. The *KN* factor is decreased from 0.80–0.63 to 0.67 in dolomite, while in magnesite it is about 0.25 after service. The decompn. of $3CaO.SiO_2$ to $2CaO.SiO_2$ and free CaO and a reduction in periclase content are characteristic of reactions with slag, but the amt. of fused material is still low. This explains the excellent stability of dolomite brick at temps. up to 1700°. The $3CaO.SiO_2$ in the original brick acts during service as a buffer against the formation of low-melting ternary Ca Mg silicates. The decompn. of $2CaO.SiO_2$ below 1200–1300° does not cause disintegration because the exterior slag-reaction zone protects the free CaO from hydration. W. Eitel



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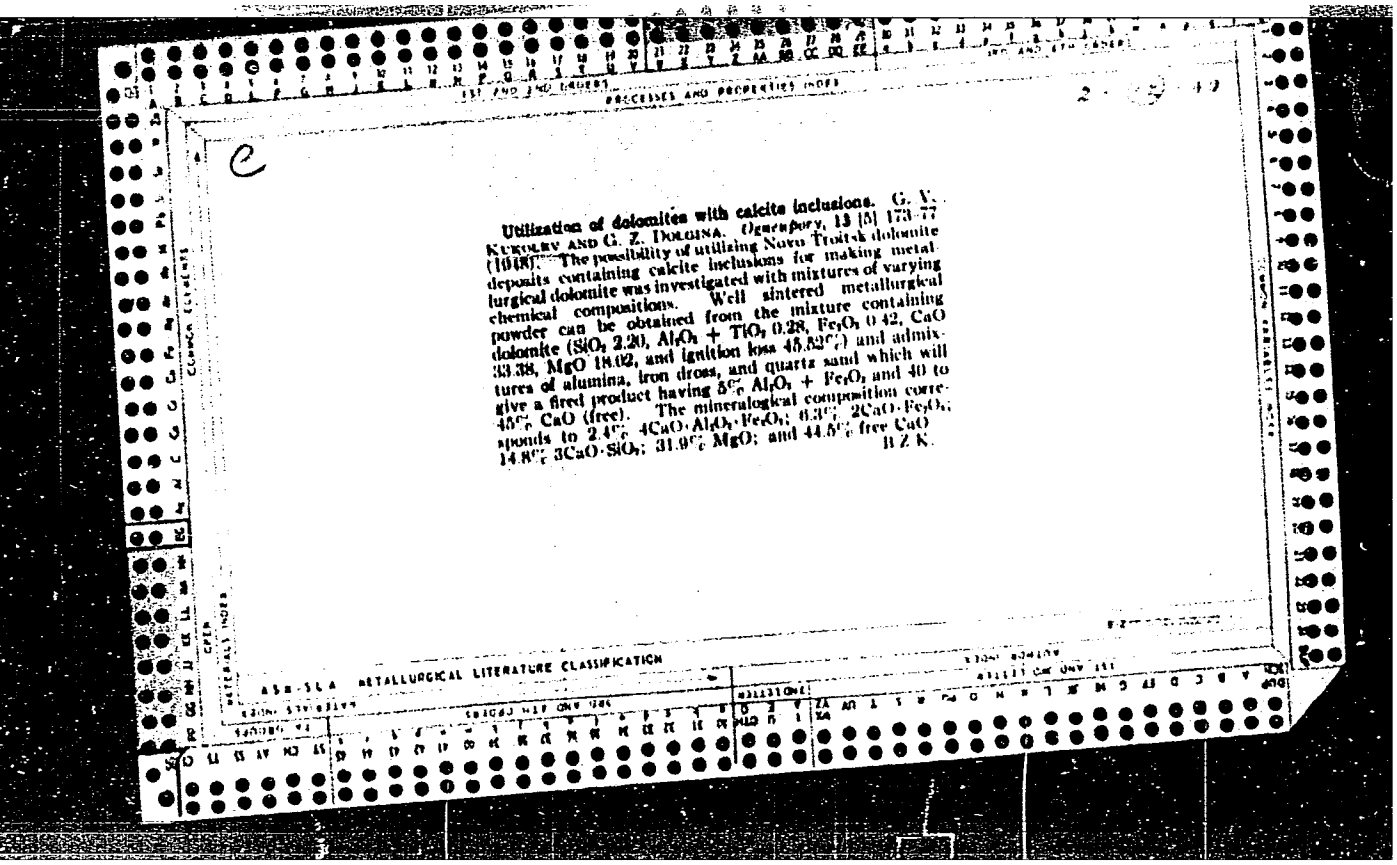
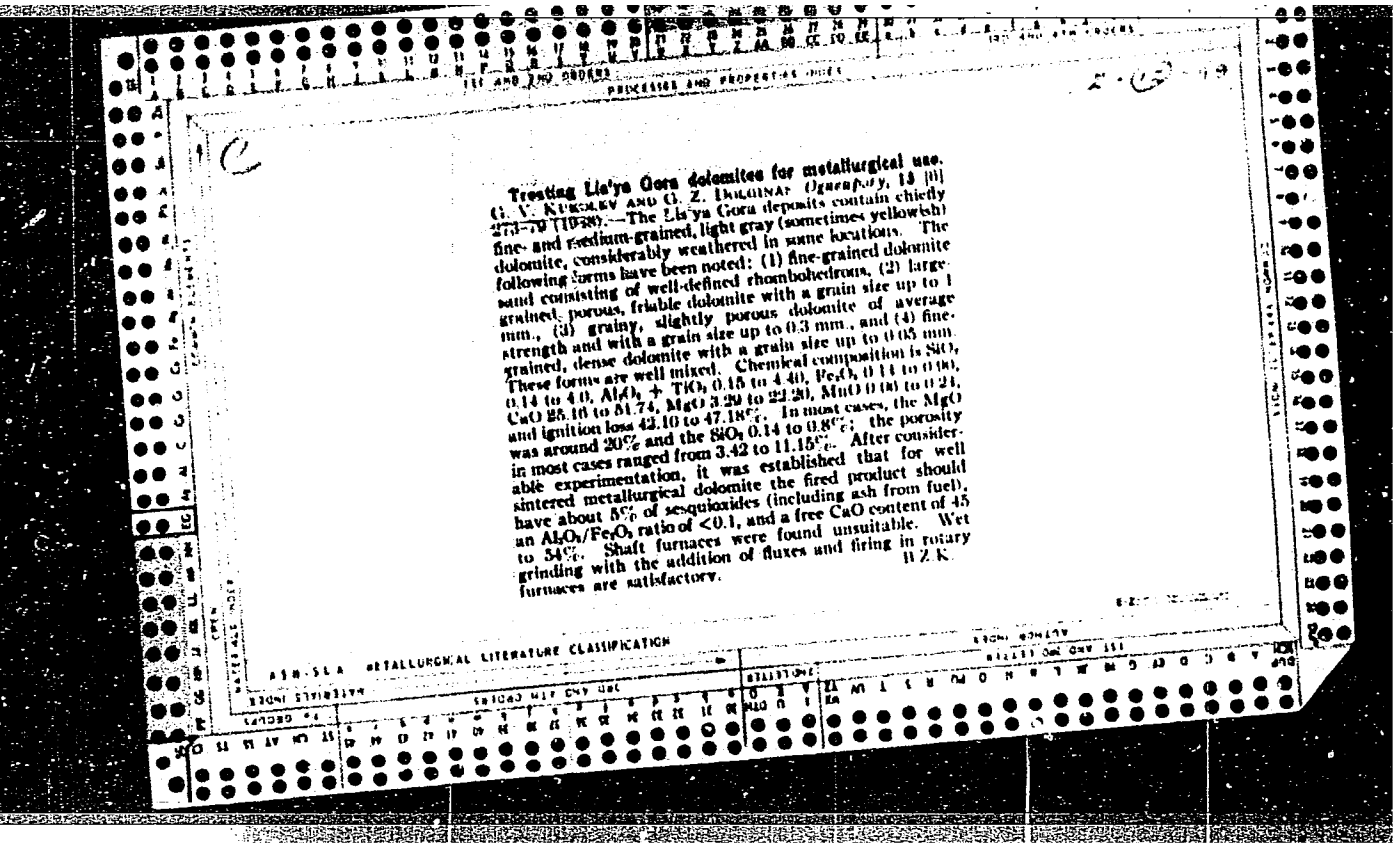
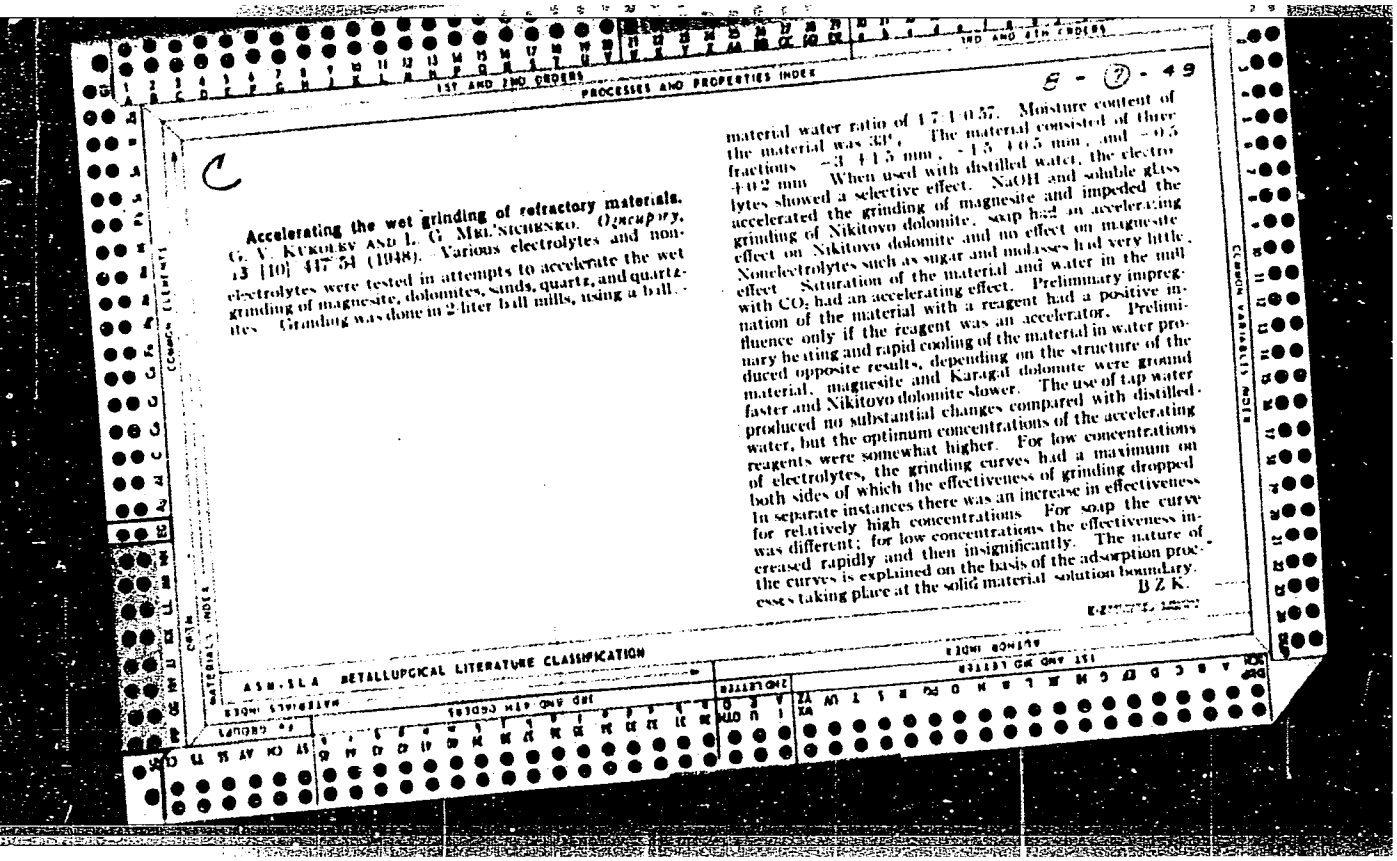
The properties of difficultly sinterable dolomites of the Abano deposit. G. V. Kukolev and G. Z. Dolgina. *Ogneupory* 13, 17-21(1948).—The Abano deposit is along the upper reaches of the Lopania-Tukhali river in the Caucasus. The dolomites analyse SiO_2 0.20–0.95, Al_2O_3 + TiO_2 0.26–1.40, Fe_2O_3 0.04–0.25, CaO 30.48–33.05, MgO 18.79–20.97, MnO up to 0.05, and ignition loss 45.45–46.50%. The dolomite is large-grained and has a porosity of 2.6–10%. Size of crystals varies from 0.05 to 1.75 mm. Lumps of the dolomite, after calcination at 1700°, are very unstable in air; with the exception of two samples which had a finer grain structure and a higher flux content, destruction started after 4–7 days and was complete after 7–16 days. Samples compressed from fine wet ground dolomite showed sufficient stability after calcination at 1600°; destruction started in 34–99 days and, for some, was not complete even after 110–171 days. Samples prepd. from dry-ground dolomite hydrated faster than those made from wet-ground dolomite. Samples made from wet-ground dolomite with admixts. of alumina, sand, or dross and calcined at 1400, which is 150–300° lower than for samples without admixts., showed, nevertheless, a high resistance to hydration; destruction started after 23–109 days and only 7 of the 20 samples were completely destroyed after 88–170 days. In mastering the production of metallurgical dolomite from this material, it is suggested that initially a charge be used which, taking into account the ash in the fuel, will give a calcined product contg. 30% free CaO, 5% Al_2O_3 + Fe_2O_3, and Al_2O_3/Fe_2O_3 of 0.23. This will correspond to a compn. of $4CaO.Al_2O_3.Fe_2O_3$ 4.47, $2CaO.Fe_2O_3$ 4.4, $3CaO.SiO_2$ 29.15, MgO 31.8, and CaO 30%. After the process has been mastered, the charge should be selected to give a product of 45% free CaO, 5% Al_2O_3 + Fe_2O_3, and Al_2O_3/Fe_2O_3 of 0.23; this will correspond to a mineral compn. of $4CaO.Al_2O_3.Fe_2O_3$ 4.46, $2CaO.Fe_2O_3$ 4.4, $3CaO.SiO_2$ 12.05, MgO 33.99, and CaO 45%. B. Z. Kamich



Utilization of dolomites with calcite inclusions. G. V. KUKUEV AND G. Z. DOLGINA. *Ogneupory*, 13 [5] 173–77 (1948). The possibility of utilizing Novo Troitsk dolomite deposits containing calcite inclusions for making metallurgical dolomite was investigated with mixtures of varying chemical compositions. Well sintered metallurgical powder can be obtained from the mixture containing dolomite (SiO_2 2.20, Al_2O_3 + TiO_2 0.28, Fe_2O_3 0.42, CaO 33.38, MgO 18.02, and ignition loss 45.82%) and admixtures of alumina, iron dross, and quartz sand which will give a fired product having 5% Al_2O_3 + Fe_2O_3 and 40 to 45% CaO (free). The mineralogical composition corresponds to 2.4% $4CaO \cdot Al_2O_3 \cdot Fe_2O_3$; 0.3% $2CaO \cdot Fe_2O_3$; 14.8% $3CaO \cdot SiO_2$; 31.9% MgO; and 44.8% free CaO. B Z K.



Treating Lia'ya Gora dolomites for metallurgical use. G. V. KUSKOV AND G. Z. [illegible] *Ogneupory*, 13 [10] 473–79 (1948).—The Lia'ya Gora deposits contain chiefly fine- and medium-grained, light gray (sometimes yellowish) dolomite, considerably weathered in some locations. The following forms have been noted: (1) fine-grained dolomite sand consisting of well-defined rhombohedrons, (2) large-grained, porous, friable dolomite with a grain size up to 1 mm., (3) grainy, slightly porous dolomite of average strength and with a grain size up to 0.3 mm., and (4) fine-grained, dense dolomite with a grain size up to 0.05 mm. These forms are well mixed. Chemical composition is SiO_2 0.14 to 4.0, Al_2O_3 + TiO, 0.15 to 4.40, Fe_2O_3 0.14 to 0.80, CaO 25.10 to 31.74, MgO 3.29 to 22.20, MnO 0.08 to 0.24, and ignition loss 42.10 to 47.18%. In most cases, the MgO was around 20% and the SiO_2 0.14 to 0.8%; the porosity in most cases ranged from 3.42 to 11.15%. After considerable experimentation, it was established that for well sintered metallurgical dolomite the fired product should have about 5% of sesquioxides (including ash from fuel), an Al_2O_3/Fe_2O_3 ratio of <0.1, and a free CaO content of 45 to 54%. Shaft furnaces were found unsuitable. Wet grinding with the addition of fluxes and firing in rotary furnaces are satisfactory. H Z K



PROCESSES AND PROPERTIES INDEX

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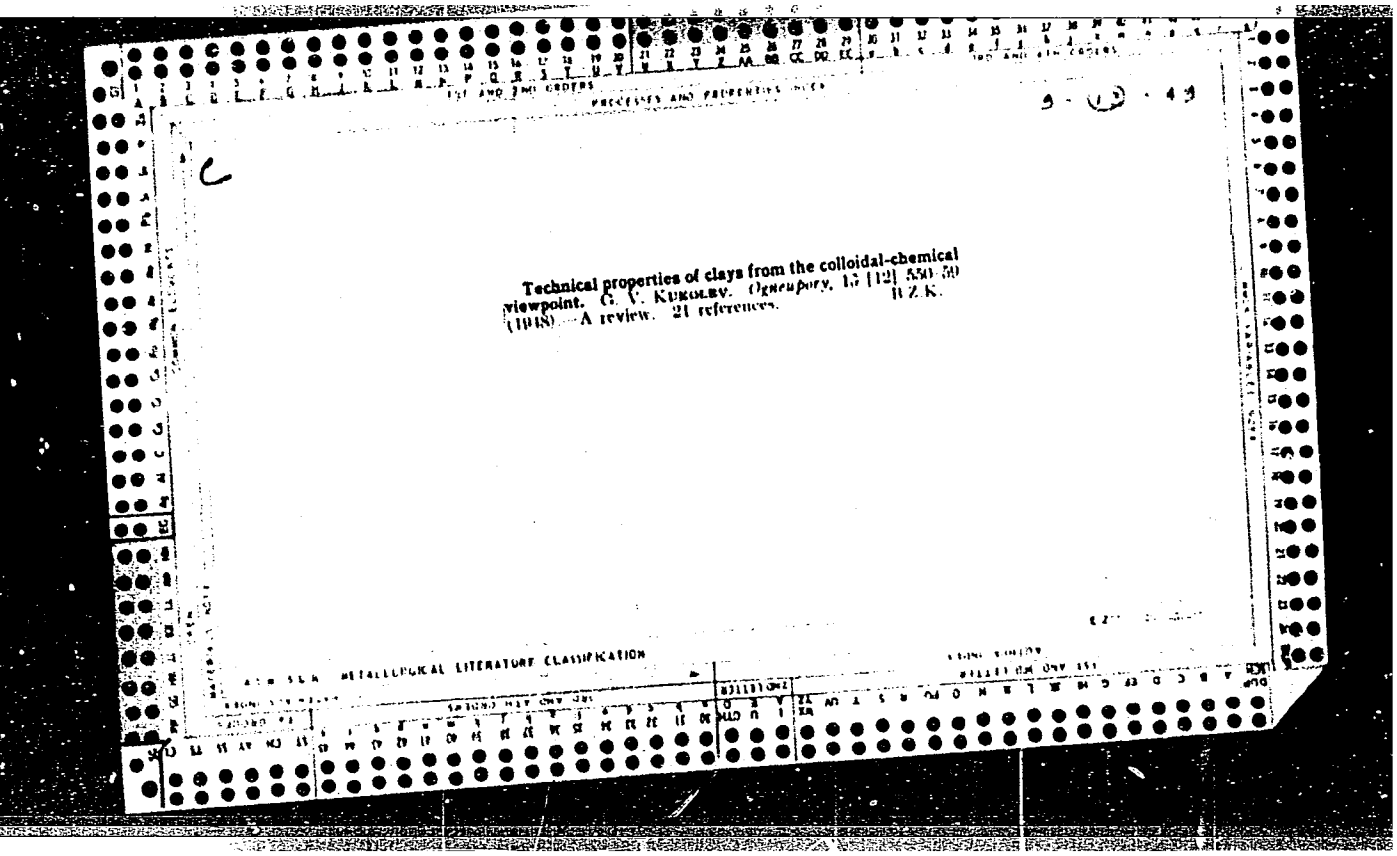
C

Accelerating the wet grinding of refractory materials. G. V. KUKOLEV AND L. G. MEL'NICHENKO. *Ogneupory*, 13 [10] 447-54 (1948). Various electrolytes and nonelectrolytes were tested in attempts to accelerate the wet grinding of magnesite, dolomites, sands, quartz, and quartzites. Grinding was done in 2-liter ball mills, using a ball-material water ratio of 1.7:1.0:57. Moisture content of the material was 3%. The material consisted of three fractions: −3 + 1.5 mm., −1.5 + 0.5 mm., and −0.5 +0.2 mm. When used with distilled water, the electrolytes showed a selective effect. NaOH and soluble glass accelerated the grinding of magnesite and impeded the grinding of Nikitovo dolomite; soap had an accelerating effect on Nikitovo dolomite and no effect on magnesite. Nonelectrolytes such as sugar and molasses had very little effect. Saturation of the material and water in the mill with CO_2 had an accelerating effect. Preliminary impregnation of the material with a reagent had a positive influence only if the reagent was an accelerator. Preliminary heating and rapid cooling of the material in water produced opposite results, depending on the structure of the material. Magnesite and Karagal dolomite were ground faster and Nikitovo dolomite slower. The use of tap water produced no substantial changes compared with distilled water, but the optimum concentrations of the accelerating reagents were somewhat higher. For low concentrations of electrolytes, the grinding curves had a maximum on both sides of which the effectiveness of grinding dropped. In separate instances there was an increase in effectiveness for relatively high concentrations. For soap the curve was different; for low concentrations the effectiveness increased rapidly and then insignificantly. The nature of the curves is explained on the basis of the adsorption processes taking place at the solid material–solution boundary.

B Z K.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



Technical properties of clays from the colloidal-chemical viewpoint. G. V. Kukolev. *Ogneupory*, 15 [12] 550–59 (1948).—A review. 21 references. U.Z.K.

METALLURGICAL LITERATURE CLASSIFICATION

KUKOLEV, G. V. PROF

USSR/Engineering Jun 48
Agglutination
Dolomite

"Technology of Processing Lis'yegorsk Dolomites," Prof G. V. Kukolev, Dr Tech Sci; G. Z. Dolgina, Jr Sci Asst, 6 pp

"Ogneupory" Vol XIII, No 6

Report of experiments. Tables show chemical composition, porosity and specific gravity of various dolomites, their agglutination at various temperatures, and effect of heating at 1,500° for 2 hours.

6/49T40

KUKOLEV, G. V. PA 12/49T20

USSR/Chemistry - Silicates Jul 48
Chemistry - Physical Chemistry,
of Silicates

"Review of 'Physical Chemistry of Silicates' by A. I. Avgustinik," G. V. Kukolev, Prof, Dr Tech Sci, 4½ pp

"Ogneupory" Vol XIII, No 7

Book has many merits, but also indisputable defects. Besides discussing theoretical and practical aspects of silicate chemistry, author describes part played by USSR scientists in its development.

12/49T20

KUKOLEV, G. V.

Jan/Feb 49

USSR/Chemistry - Silicates
Chemistry - Physical Chemistry

"Review of A. I. Avgustinik's Manual, 'Physical Chemistry of Silicates,'" G. V. Kukolev, 2 pp

"Uspekhi Khimii" No 1

Review is generally favorable but points out that, except for preponderance of errors of negligence, book would be really valuable. Attributes many errors to publishers, but suggests that author study up on subject before revising his work. Published by Goskhimizdat, Leningrad and Moscow, 1947; approved by Min of Higher Learning USSR as a text.

28/49T4

[redacted]

KUKOLEV, G. V. Prof

PA 52/49T38

USSR/Engineering
Refractories
Refractory Materials

Feb 49

"Concrete Refractories With Increased Fire-Resistant Properties," Prof G. V. Kukolev, Dr Tech Sci, A. I. Royzen, Grad Stud, 8 pp

"Ogneupory" No 2

Fire-resistant concrete manufactured with aluminum cements has a very high fire-resistant quality. However, it cannot be used efficiently at temperatures above 1,250°. Conducted tests with batches containing 60-70% Al_2O_3 and 6-8% SiO_2, which gave good performance at temperatures as high

52/49T38

USSR/Engineering (Contd)

Feb 49

as 1,500°. Urges further research on cement fire-resistant products.

52/49T38

KUKOLEV, G. V.

23295. O ferrotsemente. Trudy zark. Khim-tekhnol. in-ta im. kirova, vyp. 7, 1949, c. 103-14. ---Bibliogr; 5 Nazv.

SO: LETOPIS' NO. 31, 1949

KUKOLEV, G. V.

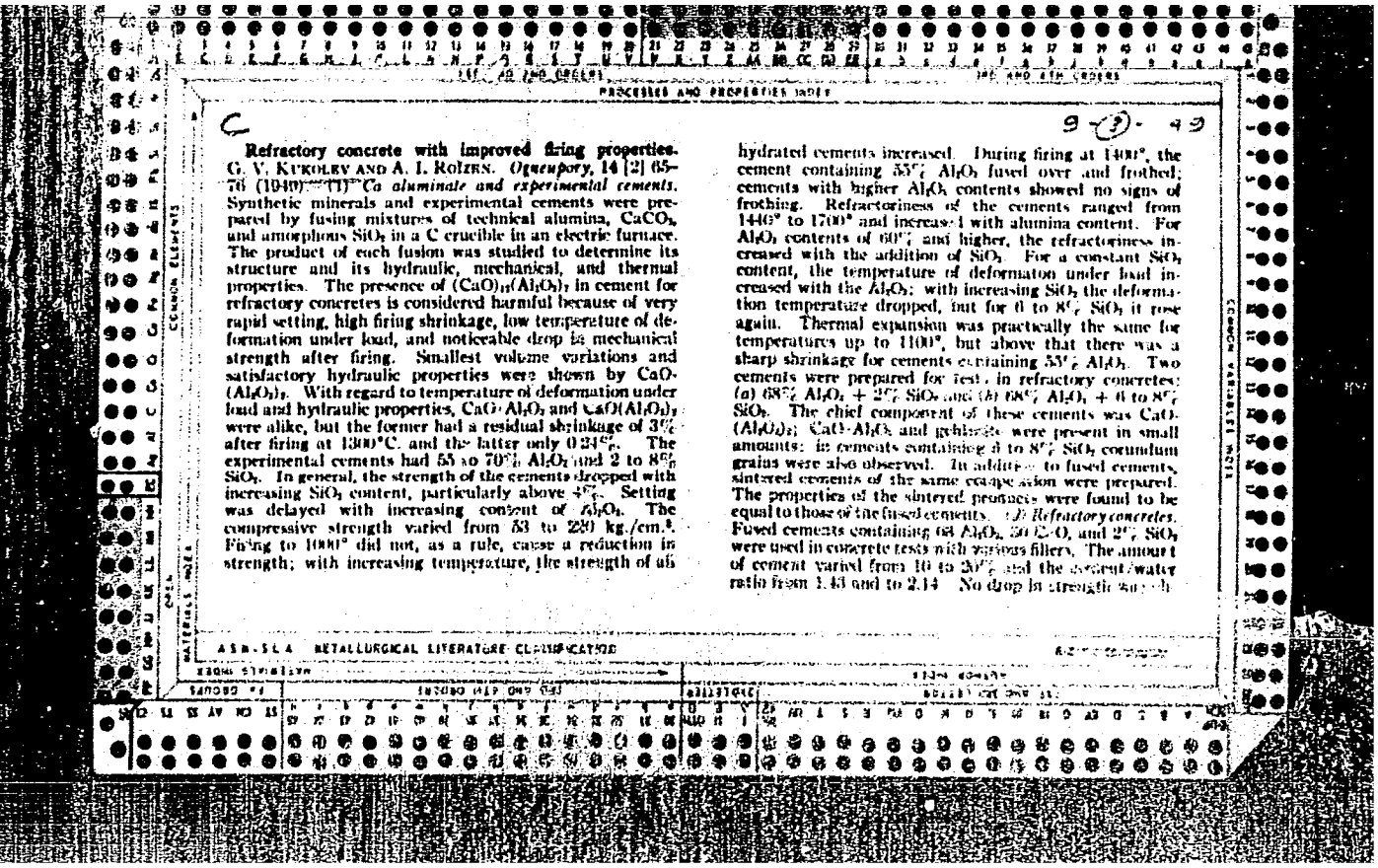
23294. Ob uskorenii mokrogo tonkogo razmola nekotorykh syrk materialov v silikatnoy promyshlennosti. Trudy zhark. Khim.-Tekhnol. in-ta im. Kirova, vyp. 7, 1949 c.115-24

SO: LETOPIS' NO. 31, 1949

KUKOLEV, G. V.

23296. Fiziko-Khimicheskoye protessy tverdeniya ferrotsementa. Zhurnal prikl. khimii, 1949, No. 7, c.661-66 ---Bibliogr: 7 Nazv.

SO: LETOPIS' NO. 31, 1949



PROCESSES AND PROPERTIES INDEX

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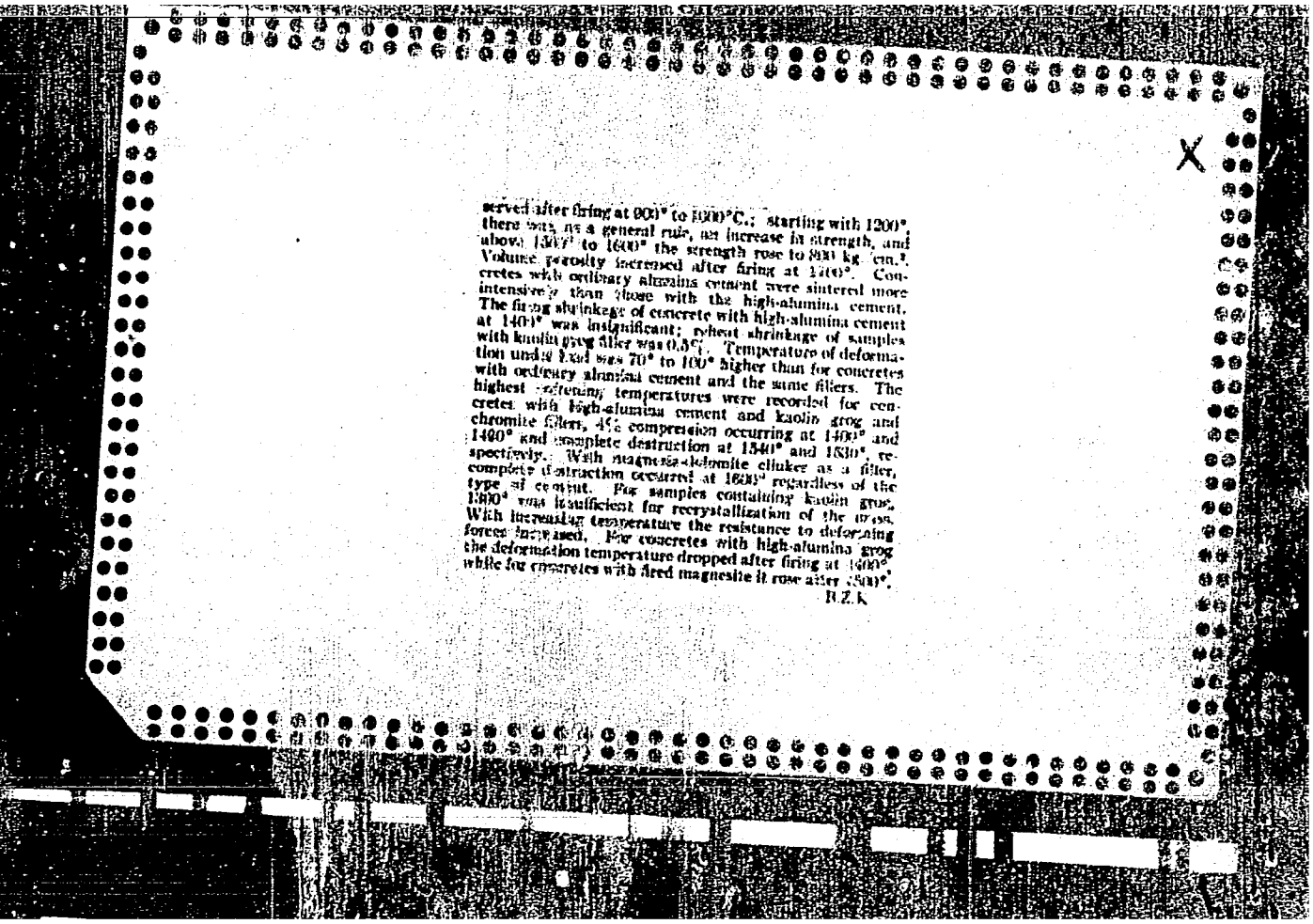
9-(3)-49

Refractory concrete with improved firing properties. G. V. Kukolev and A. I. Rolzen. *Ogneupory*, 14 [2] 65–76 (1949). (1) *Ca aluminate and experimental cements.* Synthetic minerals and experimental cements were prepared by fusing mixtures of technical alumina, $CaCO_3$, and amorphous SiO_2 in a C crucible in an electric furnace. The product of each fusion was studied to determine its structure and its hydraulic, mechanical, and thermal properties. The presence of $(CaO)_{12}(Al_2O_3)_7$ in cement for refractory concretes is considered harmful because of very rapid setting, high firing shrinkage, low temperature of deformation under load, and noticeable drop in mechanical strength after firing. Smallest volume variations and satisfactory hydraulic properties were shown by $CaO \cdot (Al_2O_3)_2$. With regard to temperature of deformation under load and hydraulic properties, $CaO \cdot Al_2O_3$ and $CaO(Al_2O_3)_2$ were alike, but the former had a residual shrinkage of 3% after firing at 1300°C. and the latter only 0.24%. The experimental cements had 55 to 70% Al_2O_3 and 2 to 8% SiO_2. In general, the strength of the cements dropped with increasing SiO_2 content, particularly above 4%. Setting was delayed with increasing content of Al_2O_3. The compressive strength varied from 53 to 220 kg./cm.^{2}. Firing to 1000° did not, as a rule, cause a reduction in strength; with increasing temperature, the strength of all hydrated cements increased. During firing at 1400°, the cement containing 55% Al_2O_3 fused over and frothed; cements with higher Al_2O_3 contents showed no signs of frothing. Refractoriness of the cements ranged from 1440° to 1700° and increased with alumina content. For Al_2O_3 contents of 60% and higher, the refractoriness increased with the addition of SiO_2. For a constant SiO_2 content, the temperature of deformation under load increased with the Al_2O_3; with increasing SiO_2 the deformation temperature dropped, but for 6 to 8% SiO_2 it rose again. Thermal expansion was practically the same for temperatures up to 1100°, but above that there was a sharp shrinkage for cements containing 55% Al_2O_3. Two cements were prepared for tests in refractory concretes: (*a*) 68% Al_2O_3 + 2% SiO_2 and (*b*) 68% Al_2O_3 + 6 to 8% SiO_2. The chief component of these cements was $CaO \cdot (Al_2O_3)_2$; $CaO \cdot Al_2O_3$ and gehlenite were present in small amounts; in cements containing 6 to 8% SiO_2 corundum grains were also observed. In addition to fused cements, sintered cements of the same composition were prepared. The properties of the sintered products were found to be equal to those of the fused cements. (2) *Refractory concretes.* Fused cements containing 68% Al_2O_3, 30% CaO, and 2% SiO_2 were used in concrete tests with various fillers. The amount of cement varied from 10 to 20% and the cement/water ratio from 1.43 and to 2.14. No drop in strength [illegible]

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



served after firing at 900° to 1000°C.; starting with 1200°, there was, as a general rule, an increase in strength, and above 1300° to 1600° the strength rose to 800 kg./cm.². Volume porosity increased after firing at 1400°. Concretes with ordinary alumina cement were sintered more intensively than those with the high-alumina cement. The firing shrinkage of concrete with high-alumina cement at 1400° was insignificant; wheat shrinkage of samples with kaolin grog filler was 0.5%. Temperature of deformation under load was 70° to 100° higher than for concretes with ordinary alumina cement and the same fillers. The highest refractory temperatures were recorded for concretes with high-alumina cement and kaolin grog and chromite fillers, 4% compression occurring at 1400° and 1420° and complete destruction at 1540° and 1580°, respectively. With magnesia-dolomite clinker as a filler, complete destruction occurred at 1620° regardless of the type of cement. For samples containing kaolin grog, 1300° was insufficient for recrystallization of the mass. With increasing temperature the resistance to deforming forces increased. For concretes with high-alumina grog the deformation temperature dropped after firing at 1400°, while for concretes with fired magnesite it rose after 1500°.

B.Z.K.

KUKOLEV, G. V.

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

Making dense kaolin refractories at low firing temperatures. G. V. KUKOLEV AND M. I. YALYMOVA. *Ogneupory*, 14 [1] 487–99 (1949).—The work was based on the use of $MgCl_2$ to accelerate the sintering of kaolin. A study of the physicochemical characteristics of the sintering process and an analysis of the phase diagram show that the acceleration is caused by the action of the $MgCl_2$ on the ability of the solid phase to sinter. The $MgCl_2$ should be added in amounts of 1.5 to 2% to the kaolin during the making of test briquettes which are to be fired for grog. For sufficiently dispersed kaolin, the method (plastic or semidry) of making briquettes has no effect upon the quality of the grog. In the case of coarsely dispersed kaolin, the plastic method should be used. The addition of $MgCl_2$ during the gradual drying of plastic briquettes produces only a small difference in the slattering of different parts of the briquette and causes no defect in the external appearance of the shapes. Kaolin briquettes having an $MgCl_2$ admixture should be fired at temperatures up to 1300° to 1350°C. (2 to 6 hr.) instead of 1470° to 1500° without admixture. To obtain the most dense shapes, the mix should consist of 80% kaolin grog and 20% clay. Shapes should be fired at temperatures up to 1350° to have a porosity of 15 to 17%; this compares with 1480° to 1500° and 20% porosity without the admixture of $MgCl_2$. The admixture lowered the refractoriness by 30° but not the temperature of deformation under load (both starting and complete destruction); data on reheat shrinkage at 1400° and 1600° also show an improvement. Compressive strength was as high as 400 kg./sq. cm. Even the most dense brick withstood 28 heat-shock cycles (to 0° followed by water cooling). Results are tabulated and graphed.

B.Z.K.

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

Physicochemical processes of hardening of ferrocement. G. V. KUKOLEV AND V. D. OSTAPENKO. *Zhur. Applied Chem.* [*J. Applied Chem. U.S.S.R.*] 22 [7] 661–66 (1949).—The determination of free CaO in ferrocement containing 25% quicklime and 75% furnace dust indicates that the CaO is consumed about equally in air and water storage. In air storage, carbonation of the CaO predominates, and, to a smaller extent, hydroferrite is formed; in water storage in the absence of air, the formation of Ca hydroferrite consumes most of the CaO. Determinations of the CO_2 indicate that the process of carbonation of the ferrocement in air storage proceeds intensively during the initial stages of hardening, slows down with time, and is completed at the end of one year.

B.Z.K.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

KUKOLEV, G. V.

PHASE X

TREASURE ISLAND BIBLIOGRAPHICAL REPORT AID 707 - X

BOOK

Authors: BUDNIKOV, P. P.; BEREZHNOY, A. S.; BULAVIN, I. A.; GRISSIK, B. M.; KUKOLEV, G. V.; POLUBOYARINOV, D. N. Call No.: TP807.B9

Full Title: MANUFACTURE OF CERAMICS AND REFRACTORY MATERIALS

Transliterated Title: Tekhnologiya keramiki i ogneuporov

PUBLISHING DATA

Originating Agency: None

Publishing House: State Publishing House of Literature on Construction Materials

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.

CA

19

Sintering processes and methods of improving metallurgical dolomite. G. V. Kukolev and G. Z. Dolgina (Kharkov Inst. Refractories, Kharkov). *Ogneupory* 15, 536–44(1950).—Mixts. of synthetic clinkers were prepd. in which $4CaO.Al_2O_3.Fe_2O_3$ + $2CaO.Fe_2O_3$ was 5, 10, and 20% and free lime 15.30 and 35%. Samples made from these mixts. were fired for 2 hrs. at 1450° in a kryptol furnace, and then by detns. of bulk wt. and porosity were made. With C_4AF + C_2F const. and free CaO increasing, the bulk wt. increased and apparent porosity decreased; the same was true when free CaO was const. and C_4AF + C_2F increased but the improvement in sintering was not as pronounced when C_4AF + C_2F content reached 20%. High content of sesquioxides and silica is to be avoided if good sintering is to be attained. Resistance of dolomites of different mineralogical compns. against open-hearth slag (SiO_2 21.98, Al_2O_3 3.23, Fe_2O_3 21.19, MnO 10.99, CaO 30.32, MgO 5.62, P_2O_5 1.74, and Cr_2O_3 1.93%) was tested by detg. refractoriness of dolomite-slag mixts. Resistance was found to depend on content of free CaO (MgO content being normal), $4CaO.Al_2O_3.Fe_2O_3$, and $2CaO.Fe_2O_3$ (or $3CaO.Al_2O_3$) and hence on amt. of SiO_2. Dolomites with large amt. of fluxes absorbed almost 3 times less slag than very pure dolomite, before the mixt. began to flow at 1650°. Above 1590°, refractoriness of dolomites was a direct function of K = % free CaO/(%C_4AF + %C_2F). A curve can be utilized to calc. refractoriness of dolomite if MgO content is normal or close to normal and CaO/MgO does not differ much from the theoretical value of 1.39. Refractoriness t can then be calcd. from $t = a\tan\alpha + 1590°$ where a is a scale coeff. and α is the angle between the curve and abscissa (K). The chief means for reducing the sintering temp. of pure dolomites is to restort to wet fine-grinding. Sintering is accelerated by trivalent oxides in the following decreasing order: $Mn_2O_3 > Fe_2O_3 > Al_2O_3 > Cr_2O_3$. Extent of sintering for these admixts. is greater if dolomite is low in silica. Quartz hinders sintering without admixts. and also retards the accelerating effect of admixts. Salts of alkali retard sintering, although they increase amt. of liquid phase and lower its viscosity. An unfavorable effect was also shown by CaF_2, $CaCl_2$, MoO_3, and NiO. For favorable action, the melt should contain structural groups corresponding to the lattice of the recrystg. and sintering solid phase, in this case CaO and MgO. Addn. of oxides, which change the ratio of ions O:Me, should change the oxygen environment of the cations and, thus, the suitability of the structural groups in the melt to build the lattice of the recrystg. phases (CaO and MgO). Trivalent oxides, which accelerate sintering, give the least deviation of the magnitude O:Me, corresponding to CaO and MgO. All oxides which retard sintering give considerable deviation from O:Me, either way. Poor sintering is not connected with increased viscosity of the melt, because admixts. of Na_2O and MoO_3, which retard sintering considerably, decrease the viscosity of the melt. Complete substitution of Al_2O_3 for Fe_2O_3 resulted in drop in viscosity; Al_2O_3 has a smaller accelerating effect on sintering than does Fe_2O_3. Sintering of dolomites with admixts. is not detd. by the extent of fluidity and wetting capacity of the melt; conversely, admixts., such as alkali oxides, retard the sintering considerably, lower the viscosity, and improve the wetting capacity. B. Z. K.

KUKOLEV, G. V.

KUKOLEV, G.V.

[Chemistry of silicon and physical chemistry of silicates] Khimiia kremniia i fizicheskaia khimiia silikatov. Moskva, Gos. izd-vo lit-ry po stroit. materialam, 1951. [Photocopy] (MLRA 7:8)
(Silicon) (Silicates)

KUKOLEV, G.V.

PHASE I TREASURE ISLAND BIBLIOGRAPHIC REPORT AID 168 - I

BOOK

Call No.: AF475479

Author: KUKOLEV, G. V.

Full Title: CHEMISTRY OF SILICON AND PHYSICAL CHEMISTRY OF SILICATES

Transliterated Title: Khimiya kremniya i fizicheskaya khimiya silikatov

Publishing Data

Originating Agency: None

Publishing House: State Publishing House of Literature on Construction Materials.

Date: 1951 No. pp.: 645 No. of copies: 3,000

Editorial Staff

Editor: Glezarova, I.

Tech. Ed.: None

Editor-in-Chief (Scientific): Tsyurupa, I. Appraiser: None

Text Data

Coverage: This textbook is more detailed and comprehensive than any other Russian textbook on the topic available for comparison. However, while the preface speaks of the growing importance of silicon in the technology of glass, ceramics, and special steels, there is no mention made of specific industrial applications. The approach is general and theoretical. In addition to silicon and its compounds, salts important in silica technology are discussed.

The book is of interest because it is probably the most extensive statement in Russian of the chemistry of silicon and the physical chemistry of silicates.

1/2

Khimiya kremniya i fizicheskaya khimiya silikatov AID 168 - I

Purpose: Approved by the Ministry of Higher Education for students specializing in silica technology.

Facilities: Names of many Russian scientists important in the historical development of silica technology are mentioned in the preface.

No. of Russian and Slavic References: Total 51, 50 Russian (1936-1951)

Available: A.I.D., Library of Congress (In technically imperfect enlargement print copy often illegible).

2/2

R

F

SINTERING PROCESS AND METHODS OF IMPROVING QUALITY OF METALLURGICAL [redacted] DOLOMITE. Kukolev, G.V and Dolgina, G.Z. (Ogneupory (Refractories), Feb. 1951, 63-67; abstr. in Chem. Abstr., 1951, vol. 45, 10530, 10531). Results obtained from dolomite calcined at different temperatures and with different admixtures are described.

KUKOLEV, G. V.

USSR/Engineering - Refractories, Kilns May 51

"Efficient Operation of the Fire Shafts of Ring Kilns Using Fuel With a High Ash Content," Prof Dr G. V. Kukolev, Ye. I. Ved', Engr, Khar'kov Polytech Inst imeni Lenin

"Ogneupory" No 5, pp 201-211

Studied process of burning Chelyabinsk brown coal in fire shafts of ring kilns used for buring refractories. Proper operation of fire shafts allows more efficient use of low-grade, high-ash-content solid fuels. Conditions for efficient combustion presented graphically.

LC 182T63

CA

19

Sintering processes and means of improving quality of metallurgical dolomite. G. V. Kukolev and O. Z. Dolgina (Kharkov Inst. Refractories). *Ogneupory* 16, 63-8(1951);

cf. *C.A.* 45, 8220*f*.—Lump dolomite calcined at 1700° showed low stability against hydration in air; destruction started on the 7th day and was complete after 16 days. Wet ground dolomite calcined at 1550° showed good stability and with admixts. of Al_2O_3 and Fe_2O_3 became stable after calcination at 1400°. Samples having 30 and 45% free CaO showed greater stability with the addn. of 5% Al_2O_3 + Fe_2O_3 than those with 8% Al_2O_3 + Fe_2O_3; for 15% free CaO, there was no substantial difference. Wet ground dolomite with admixts. made into cylinders and calcined showed greater stability than upon subsequent grinding. Tests with dolomite of 35.2 and 22.5% free CaO in open-hearth furnaces showed consumption of 35.6 kg./ton of steel for the former and 41 kg./ton for the latter. Production of dolomite with large content of free CaO (with MgO content being normal) will require the use of pure and difficultly sinterable raw material and the reconstruction of existing plants to sinter the material. There is an abundance of deposits of such dolomite in the Soviet Union.

B. Z. Kamich

BCS

Fuels, Kilns, Firing

[25. The rational operation of feed shafts (in ring kilns) with high-ash fuels.—G. V. Kukolev and E. I. Ved (*Ogneupory*, 16, 301, 1951). As a result of expts. a suitable ...ing schedule is given, a graph showing the correct increase in depth of the fuel bed ...d the proportionate increase in air supply with time. (8 figs., 3 tables.)

USSR/Chemistry - Surface Active Agents Mar 51

"Acceleration of Wet Grinding of Cement Raw Materials and Lowering of the Moisture Content of the Slurry," G. V. Kukolev, L. G. Mel'nichenko

"Zhur Prik Khim" Vol XXIV, No 3, pp 231-241

Examd effect of additives in reducing viscosity of cement slurries, including that of Ambrosiyevskiy Cement Plant. Alk sulfite--soda and alk sulfite--NaOH admixt found to give greatest increase in fluidity, improve dispersion, increase efficiency of grinding and mixing operations, and decrease water content of slurry, thus increasing fuel econ.

177T24

CA

21

Accelerating the wet grinding of raw materials for cement and reducing the moisture content of the slurry. G. V. Kukolev and L. G. Melnichenko. *J. Applied Chem. U.S.S.R.* 24, 235–65(1951)(Engl. translation).—The effect

decreases in the order Na_2CO_3, $NaO.SiO_2$, NaOH. The presence of sol. salts or org. matter, i.e. sulfite-cellulose lye or peat ext., in addn. increases the effect. The additives act on clay but not on $CaCO_3$. Oscar Guire

KUKOLEV, G. V., Prof.; MISHULOVICH, L. Ya.;

Glass Manufacture

Non-sagger firing of ceramic tiles in a tunnel furnace. Stek. i ker., 9, No. 6, 1952.

9. Monthly List of Russian Accessions, Library of Congress, October 1952. Unclassified.

KUKOLEV G V

4

Use of high pressure in making ceramic plates. G. V. Kuko-lev, I. Ya. Mishilovich, and Va. M. Strelov. *Steklo i Keram.* 9 [10] 8-10 (1952).—The use of high pressures in making floor plates can be of distinct advantage. An increase from 250 to 500–600 kg./cm.² makes it possible to reduce the moisture of mixes from 8–9 to 3–4% and thereby eliminate the need for drying before firing or at least to reduce the drying time. Increase in pressure also makes it possible to reduce the firing temperature by 40 to 50°.

KUKOLEV, G. V.

Silicates; Silicon

"Chemistry of silicon and physical chemistry of silicates. " Reviewed by P.P. Budnikov. Ogneupory 17 No. 2, 1952.

Monthly List of Russian Accessions, Library of Congress, May 1952, UNCLASSIFIED

KUKOLEV, G.V., Prof. LIVSON, Z.A., Docent

Refractory Materials

Experience of the Khar'kov Tile Factory with moistening the raw material for the prodcution of refractory bricks with steam, Ogneupory 17, No. 6, 1952.

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

1. KUKOLEV, G. V. Dr.; VED', YE. I.

2. USSR (600)

4. Refractory Materials

7. Increasing the uniformity of heating the charge of refractory products in annular kilns. Ogneupory 17 no. 9, 1952.

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

KUKOLEV, G. V. Report

Chemical Abst.
Vol. 48 No. 9
May 10, 1954
Cement, Concrete, and Other
Building Materials

Hydraulic and ceramic properties of Al_2O_3-enriched aluminate cements. G. V. Kukolev and A. I. Rojzen. *J. Appl. Chem. U.S.S.R.* 25, 531–11(1952)(Engl. translation).—See *C.A.* 48, 909g.
H. L. H.

KUKOLEV, G.V.; YALYMOVA, M.A.

Characteristics of the interaction of magnesium chloride with kaolin in sintering the latter. (In: Akademiia nauk SSSR. Voprosy petrografii i mineralogii. Moskva, 1953. Vol. 2, p.256-270) (MLRA 7:4)
(Kaolin) (Ceramics)

Kukolev, G. W.

3

(2)

Hydraulic and ceramic properties of alumina cements with a high alumina content. G. W. Kukolev and A. Ya. Rolzen (*Silikat Tech.*, 1953, 4, 267).—Systematic investigations of the system CaO–Al_2O_3–SiO_2 by melting and sintering led to the development of cements containing Al_2O_3 60—70 and SiO_2 2—6%. They consist mainly of $CaO.2Al_2O_3$ and $CaO.Al_2O_3$, have high refractoriness and refractoriness under load, and show only a slight loss in strength at the critical temp., a slight shrinkage, and a low thermal expansion. Good refractory concretes were made with the cements.

BRIT. CERAM. ABSTR., (C).

KUKOLEV, G.V.

(2) 3

Improving the properties of sanitary-ware slips by means of a combination peptizer. G. V. KUKOLEV AND L. A. SHCHUKAREVA. *Steklo i Keram.*, 10 [7] 15–18 (1953).—The combination peptizer consisted of a water-glass extract of humic acids from peat or brown coal, in which the ratio of humic acids to Na_2O was 1:4. In comparison with a mixture of water glass and soda, it reduces the moisture of sanitary-ware slips by 2 to 3%, decreases the amount of alkali in the mix, reduces consumption of water glass, increases the life of gypsum molds, and accelerates considerably (50%) the formation of the shape in the molds. B.Z.K.

Long-lasting patterns containing caustic magnesite for gypsum molds. M. A. MATVEEV. *Steklo i Keram.*, 10 [11] 16–18 (1953).—The mix should contain caustic magnesite 60, finely ground sand (marshallite) 30 to 34, and powdered asbestos 6 to 10%. Residues of magnesite, sand, and asbestos should not exceed 10, 5, and 3% on sieves having 4900, 6400, and 900 openings per cm.^{2}. Reduction of the specific gravity of magnesite from 1.3 to 1.2 decreases the setting time from 6 to 3 hr. but lowers the strength almost half. Optimum drying time is 3 hr. at 100°. Strength increases during storage. B.Z.K.

KUKOLEV, G.V.

B. T. R.
Vol. 3 No. 3
March 1954
Ceramics and Concrete.

2952' Problem of Improving the Properties of Sanitary-Ware Slip by Using a Combined Peptizer. (Russian.) G. V. Kukolev and L. A. Shchukareva. *Steklo i Keramika*, v. 10, no. 7, July 1953, p. 15-16.

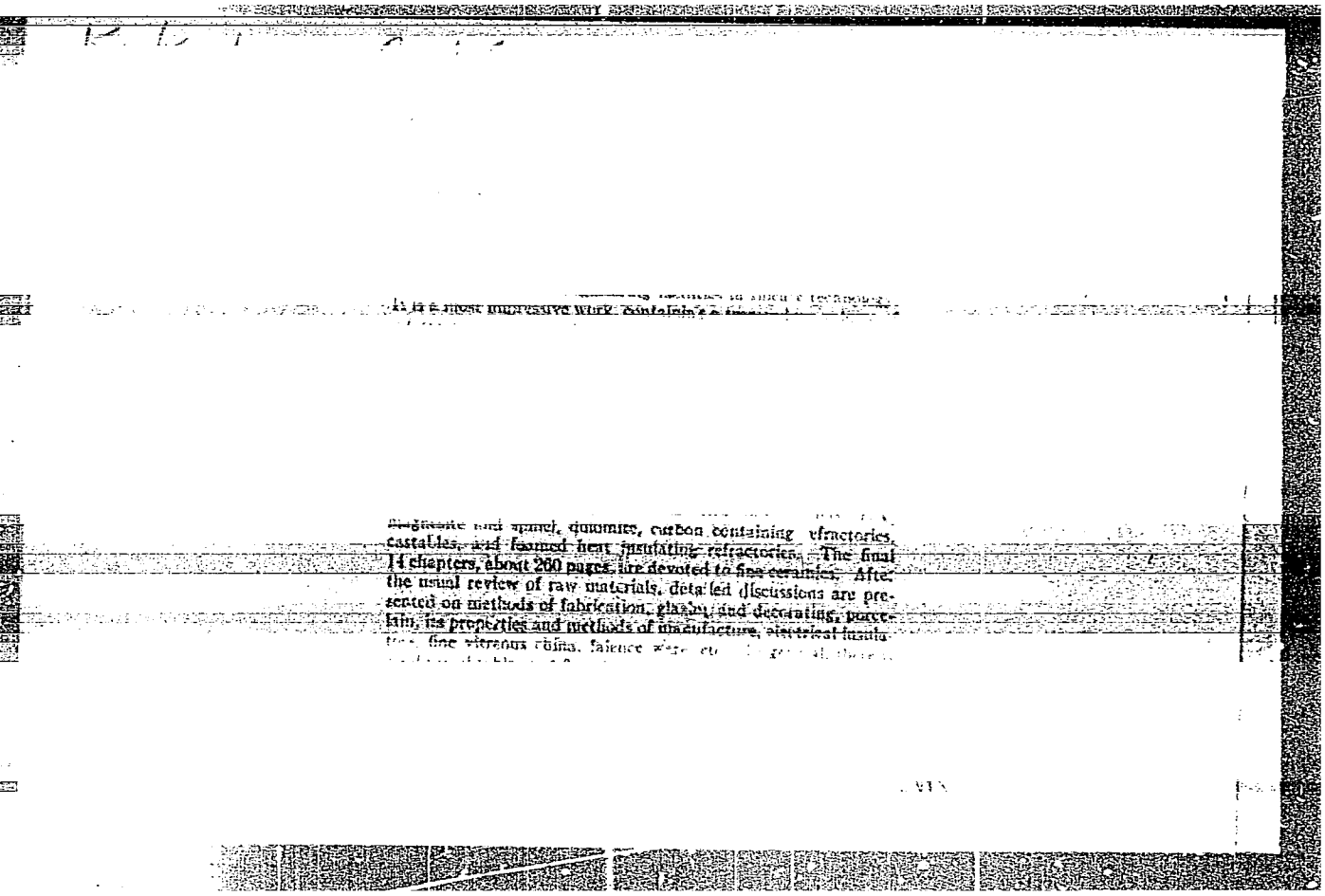
Discusses use of peptizers for improving slip properties. Tables. 8 ref.

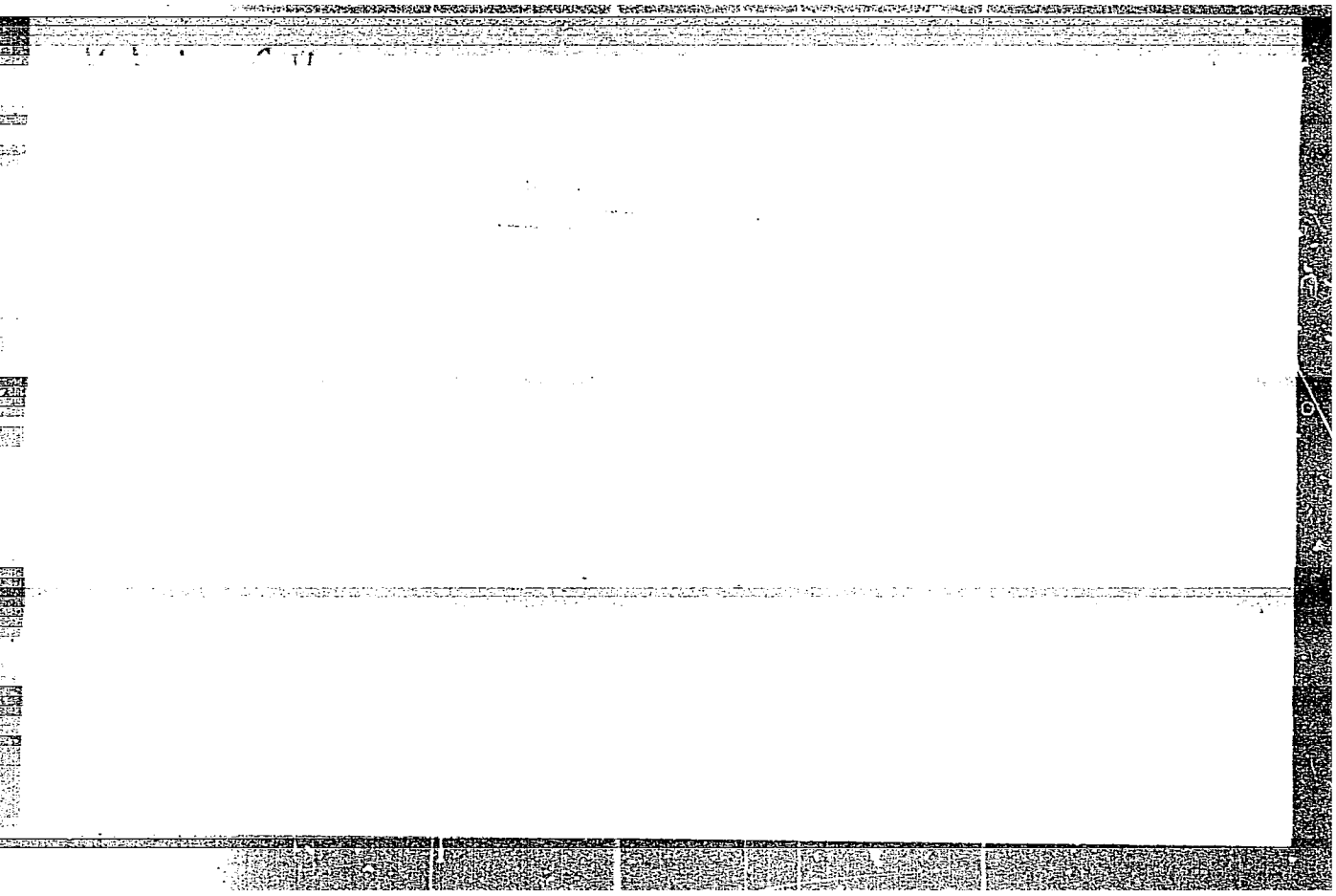
SOLOMIN, N.V., doktor tekhnicheskikh nauk, professor; KUKOLEV, G.V., doktor tekhnicheskikh nauk, professor, redaktor. (editor)

[Refractory materials for glass furnaces] Ogneupory dlia steklovarennykh pechei; proizvodstvo i primenenie. Pod red. G.V.Kukoleva. Moskva, Gos. izd-vo lit-ry po stroit. materialam, 1953. 190 p. (MLRA 7:6)
(Refractory materials) (Glass manufacture)

KUKOLEV, G. V.

"Chemistry of Silicon and Physical Chemistry of Silicates", State Publishing House of Literature on Building Materials, Moscow, p 618, 1954.





APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000927310015-3"

Kukolev, G. V.

USSR/ Engineering - Ceramic properties

Card 1/1 Pub 104 - 8/9

Authors : Kukolev, G. V., Professor., and Syrkin, Ya. M.

Title : Properties of ceramic masses controlled by means of colloidal-chemical media

Periodical : Stek. i ker. 2, 23-29, Feb 1954

Abstract : The factors affecting the technical properties of a clay-water system are listed. Various colloidal-chemical means for controlling the properties of ceramic masses are discussed. Investigations showed that colloidal-chemical media make it possible to control such important technical characteristics of clayey masses as specific shear stress, consistency and tenacity after desiccation. Nine USSR references (1933-1950), Tables; graphs.

Institution: .....

Submitted: .....

Kukolev, G. V.

Structure-mechanical properties of enamel frit suspensions. G. V. Kukolev and L. D. Svirskiĭ (V. I. Lenin Polytech. Inst., Kharkov). *Kolloid. Zhur.* 16, 29-35(1954).—Suspensions of 90 parts frits (e.g., SiO_2 57, Al_2O_3 7, K_2O 4, Na_2O 15, B_2O_3 5, CaF_2 5, MnO_2 7%) + 4 parts clay in aq. solns. of $MgSO_4$ were studied in a coaxial-cylinder viscometer. The static yield stress θ, detd. by 2 methods, was independent of the app. dimensions. It increased with the $MgSO_4$ concn. (e.g., 180 and 320 dynes/sq. cm.) in 0.74 and 0.98% $MgSO_4$, resp.). The structural viscosity η increased with the frequency ω of revolutions of the external cylinder, because turbulent flow set in at larger ω. The ω at which it started was greater, the greater was the particle size and the greater was θ; the latter effect was due to gradual destruction of the structure at large ω. The suspensions which proved satisfactory in production had θ between 110 and 180 rad η near 1 poise at the onset of turbulency and near 15 poises at the rate of spreading used in production.

J. J. Bikerman

BOTVINKIN, O.K.; YEVSTROP'YEV, K.S., doktor khimicheskikh nauk, professor, retsenzent; TOROPOV, N.A., doktor tekhn.nauk, professor, retsenzent; MAZURIN, O.V., kandidat khim. nauk, retsenzent; KUKOLEV, G.V., doktor tekhnicheskikh nauk, peofessor, retsenzent; ALKIND, I.Ya., kandidat tekhnicheskikh nauk, redaktor; DEMINA, G.A., redaktor; LYUDKOVSKAYA, N.I., tekhnicheskiy redaktor.

[Physical chemistry of silicates] Fizicheskaia khimiia silikatov. Izd. 2-oe, perer. i dop. Moskva, Gos.izd-vo lit-ry po stroit. materialam, 1955. 285 p. (MLRA (9:5)

1.Kafedra obshchey tekhnologii silikatov Leningradskogo ordena Trudovogo Krasnogo Znameni Tekhnologicheskogo instituta imeni Lensoveta (for Yevstrop'yev, Toropov, Mazurin).
(Silicates)

KUKOLEV, G. V.

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)

KUKOLEV, G.V.

USSR/ Engineering - Industrial processes

Card 1/1 Pub. 104 - 7/11

Authors : Iosevich, A. I.; Kukolev, G. V.; and Petrov, G. V.

Title : Use of peat extracts on liquid glass as dross peptizing agent

Periodical : Stek. i ker. 2, page 22, Feb 1955

Abstract : The advantages derived by using peat extracts as dross peptizing agents, instead of the conventional sodium carbonate, are discussed. The dross, obtained by applying peat extracts to the molten glass, was found to be more volatile, to contain less moisture and have a lower rate of solidification. The time required for the formation of the crock is much reduced by the application of peat extracts. Tables.

Institution: .....

Submitted: .....

Kolloidny Zh.

Effect of the nature of notched bars on the wedge pressure in aqueous films and the water-retaining ability of clay and kaolin. G. V. Fokeev and Ya. M. Sorkin (V. I. Lenin Polytech. Inst., Cherkassy). *Kolloid. Zhur.* 17, 90–5(1955). —0.5 g. of wet clay were squeezed between filter paper at pressure P (kg. wt./sq. cm.) for 30 min. and the vol. V cc. of H_2O still remaining in 1 g. of sample was detd. At moderate P, equations $V\sqrt{P} = K_1$ and $V\sqrt[3]{P} = K_2$ were valid for A clay and A kaolin, resp. The const. K_1 was 0.575 for natural clay and was 0.641 for Al satd. clay, 0.630 for H clay, 0.565 for Ca clay, and 0.704 for Na clay. Also for kaolin, K_1 increased from Al to H to Ca to Na. In the region of P between 60 and 70 (for Al clay), between 80 and 90 (for Na clay), etc., V was independent of P, presumably because contact between solid particles was attained, and the above equations were invalid at higher P. When the anions in the Na clay were exchanged for other anions, K_1 and const. K_2 were highest for OH^- and decreased in the order $OH^- > CO_3^{--} > AcO^- > SO_4^{--} > Cl^-$. Also in the case of I^-, K_2 was high. (Engl. translation).

J. J. Bikerman

KUKOLEV G. V.

// Liquefaction of kaolin and clay suspensions. G. V. Kukolev and I. Ya. Piven. *Colloid J.* (U.S.S.R.) 17, MT 341-8(1955)(Engl. translation).—See *C.A.* 50, 2335*h*.
B. M. B.

(1)

Kukolev, G. V.

MT

Liquefaction of kaolin and clay suspensions. G. V. Kukolev and I. Ya. Piven (Polytech. Inst., Kharkov). *Kolloid. Zhur.* 17, 357–63(1955).—The viscosity η of kaolin suspensions was lowered by small additions of water glass and, especially, of (water glass + alk. extract of lignite) but greater additions of these reagents raised η again. NH_4 increased, and NH_4 ext. of lignite decreased, the η. Sulfite liquor and tannin in concns. below 0.025% lowered η. When water glass alone was used, a max. of the electrokinetic potential corresponded to the min. of η. Lignite extns. impaired the whiteness of kaolin but were recommended for process of enrichments of kaolin. J. J. Bikerman

(1)

Kukolev, G. V.

USSR/Physical Chemistry - Kinetics. Combustion. Explosives. Topochemistry. Catalysis, B-9

Abst Journal: Referat Zhur - Khimiya, No 1, 1957, 432

Author: Kukolev, G. V., and Simkhovich, Z. I.

Institution: None

Title: Kinetics and Mechanism of the Solution of Alum-magnesia Spinel, Forsterite, and Chromite in a Sodium Hydroxide Solution

Original Periodical: Zh. prikl. khim., 1955, Vol 28, No 4, 353-362

Abstract: Finely ground fosterite, alum-magnesia spinel, enriched chromite, and a fosterite-spinel compound were boiled out with a 35% C. P. NaOH solution in a cuprite flask placed in a sand bath with a surface temperature of 200°. The solubility curve is represented to the first approximation by a family of parabolas of the following general form: $x^2 = kz + b$ (where x is the quantity of dissolved substance; z, the time; and b, a parameter). In order to establish the composition of the dehydration of fosterite and spinel was studied. The spinel was

Card 1/2

USSR/Physical Chemistry - Kinetics. Combustion. Explosives. Topochemistry. Catalysis, B-9

Abst Journal: Referat Zhur - Khimiya, No 1, 1957, 432

Abstract: also analyzed chemically before and after boiling with NaOH solution. On the basis of the similarity of the experimental curves obtained with the curves of Grebenshchikov, the assumption is made that a common nature underlies the processes taking place when water acts on glass and alkaline solutions act on fosterite and pinel. The physicochemical processes which occur when aqueous NaOH solutions act on the basic structural components of the alkali-resistant filtration-ceramic consist in the formation of a protective film of magnesium oxides and hydroxides over the fosterite and spinel grains. The approximate thickness of the protective film has been calculated. The extension of the Grebenshchikov theory to the action of alkaline solutions on a number of minerals, rocks, and ceramic materials which contain MgO, makes it possible to predict the alkaline resistance of other compounds from the solubility of the hydroxides of the metals from which they are formed.

Card 2/2

KUKOLEV, G. V.

AID P - 3723

Subject : USSR/Chemistry

Card 1/1 Pub. 152 - 3/16

Authors : Kukolev, G. V. and Ye. N. Leve

Title : Study of the process of caking of aluminum oxide in various systems

Periodical : Zhur. prikl. khim. 28, 8, 807-816, 1955

Abstract : The systems $CaO-SiO_2-Al_2O_3$, $MgO-SiO_2-Al_2O_3$, $Na_2O-SiO_2-Al_2O_3$, and $K_2O-SiO_2-Al_2O_3$ were studied, and the relationship between caking and structural diagrams has been established. Seven diagrams, 17 references, all Russian (1935-1951).

Institution : Kharkov Polytechnic Institute im. V. I. Lenin

Submitted : O 30, 1953

AID P - 3737

Subject : USSR/Chemistry

Card 1/1 Pub. 152 - 1/22

Authors : Kukolev, G. V. and Ye. N. Leve

Title : Effect of the production method and of the degree of dispersion of alumina on its caking in the presence of various additives.

Periodical : Zhur. prikl. khim. 28, 9, 909-915, 1955

Abstract : Finely ground material shows a greater tendency to caking than coarse material. The process of caking is accelerated by addition of TiO_2, Fe_2O_3, or Mn_2O_3. Five diagrams, 15 references, 14 Russian (1935-1952).

Institution : Kharkov Polytechnic Institute im. V. I. Lenin

Submitted : N 30, 1953

Kukolev, G. V.

AID P - 2774

Subject : USSR/Chemistry

Card 1/2 Pub. 152 - 2/19

Authors : Kukolev, G. V. and Z. I. Simkhovich

Title : Kinetics and mechanism of dissolution of magnesium aluminate spinel, forsterite and chromite in a sodium hydroxide solution

Periodical : Zhur. prikl. khim. 28, 14, 353-362, 1955

Abstract : A detailed description of the experiments is given. The effect of temperature on the alkali resistance of the minerals is shown in a table and in a diagram. The spinel showed a higher resistance to alkali than the forsterite. Seven tables, 7 diagrams, 13 references (12 Russian: 1933-1951)

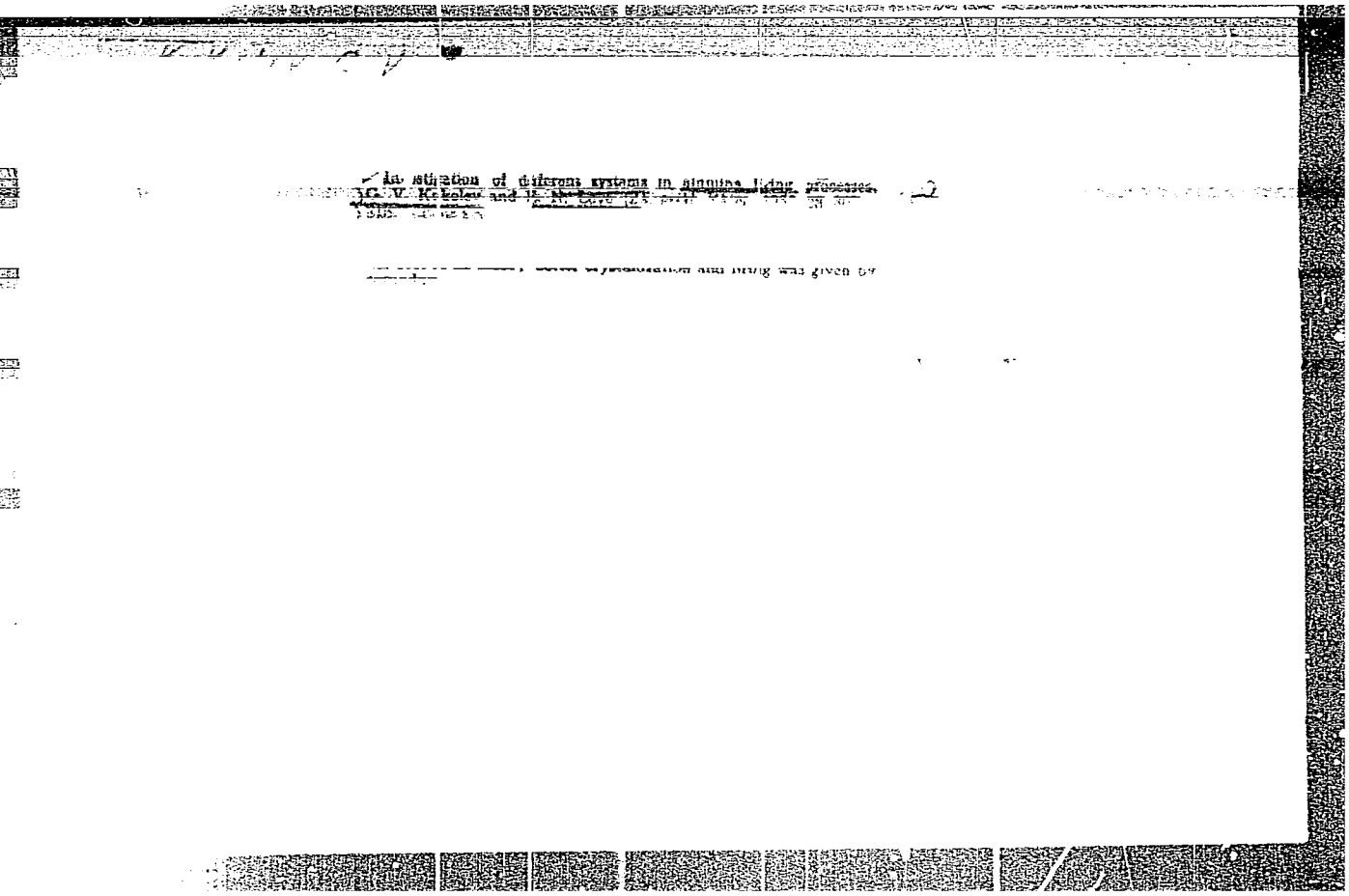
Institution : Khar'kov Polytechnic Institute im. V. I. Lenin and Khar'kov Branch of the All-Union Scientific Research

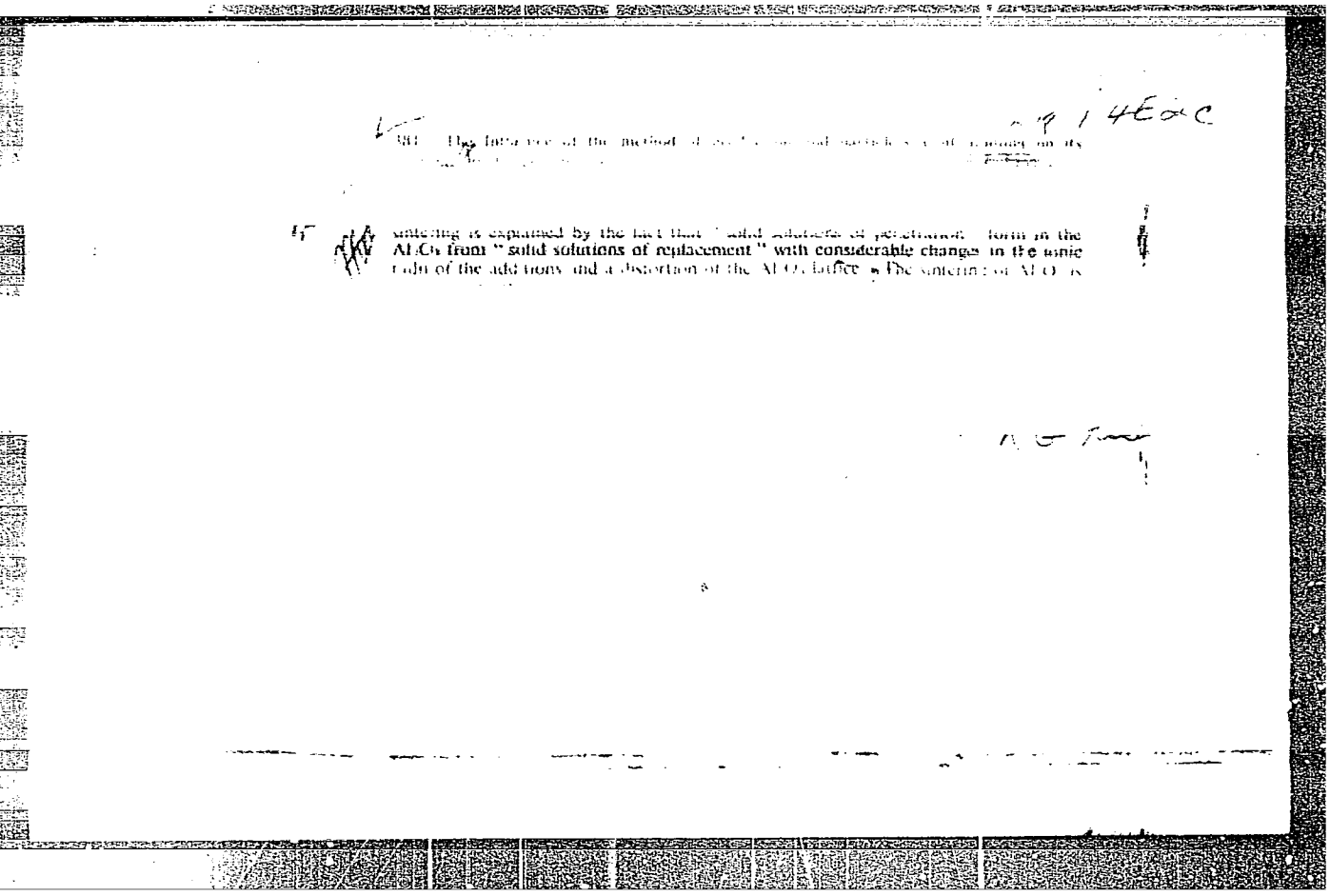
Zhur. prikl. khim. 28, 14, 353-362, 1955 AID P - 2774

Card 2/2 Pub. 152 - 2/19

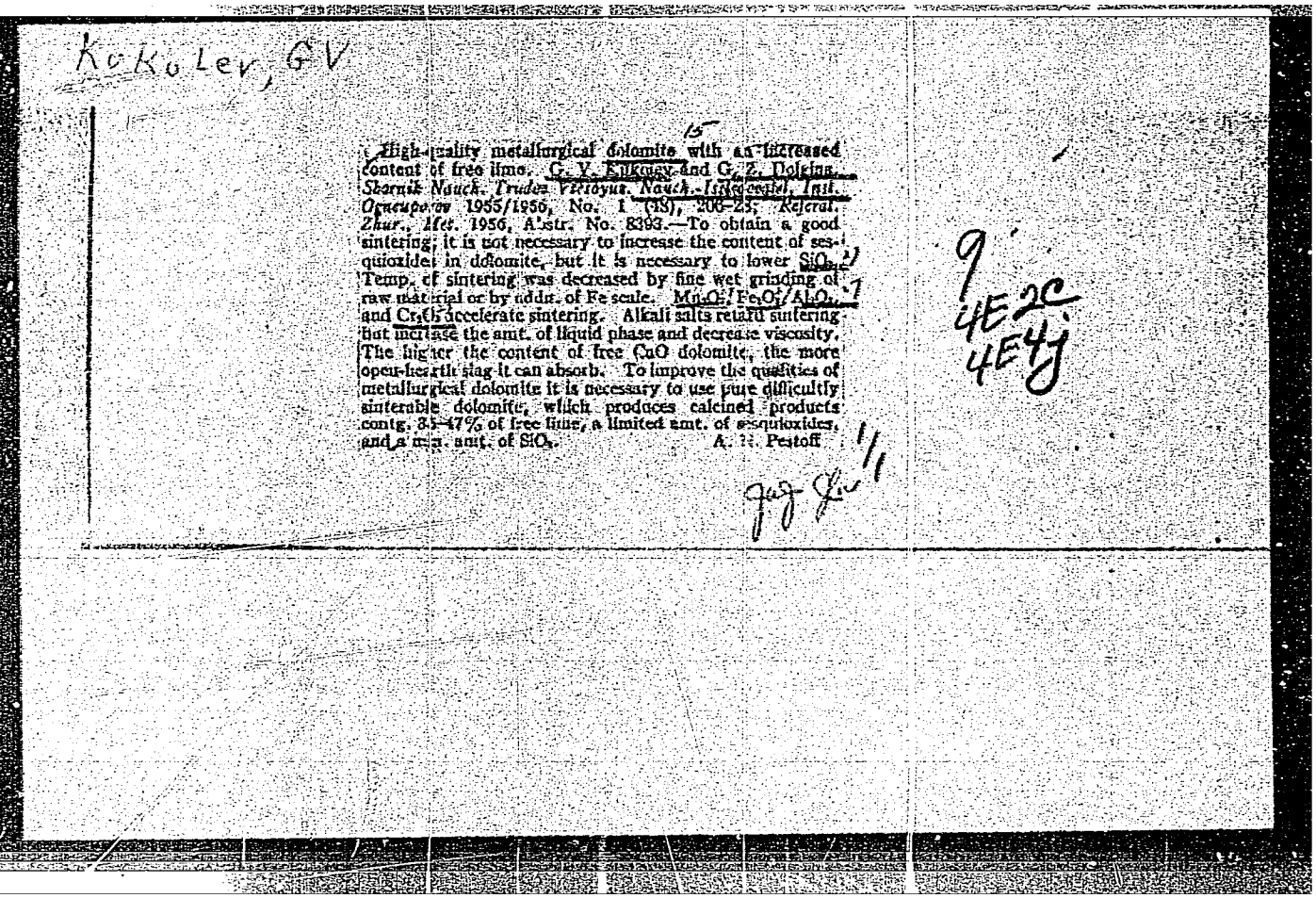
Institute of Chemical Machine Building.

Submitted : Je 22, 1953





sintering is explained by the fact that solid solutions of perovskite form in the Al_2O_3 from "solid solutions of replacement" with considerable changes in the unit cell of the additions and a distortion of the Al_2O_3 lattice. The sintering of Al_2O_3 is



Kukolev, G V

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High-quality metallurgical dolomite with an increased content of free lime. G. V. Kukolev and G. Z. Dolgina. *Sbornik Nauch. Trudov Vostoyn. Nauch.-Issledovatel. Inst. Ogneuporov* 1955/1956, No. 1 (18), 206–23; *Referat. Zhur., Met.* 1956, Abstr. No. 8393.—To obtain a good sintering it is not necessary to increase the content of sesquioxides in dolomite, but it is necessary to lower SiO_2. Temp. of sintering was decreased by fine wet grinding of raw material or by addn. of Fe scale. MnO, Fe_2O_3, Al_2O_3, and Cr_2O_3 accelerate sintering. Alkali salts retard sintering but increase the amt. of liquid phase and decrease viscosity. The higher the content of free CaO dolomite, the more open-hearth slag it can absorb. To improve the qualities of metallurgical dolomite it is necessary to use pure difficultly sinterable dolomite, which produces calcined products contg. 35–47% of free lime, a limited amt. of sesquioxides, and a min. amt. of SiO_2. A. H. Petroff

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4E4J

15-57-4-4052

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 4, p 3 (USSR)

AUTHORS: Kukolev, G. V., Rebinder, P. A.

TITLE: Petr Petrovich Budnikov (Petr Petrovich Budnikov)

PERIODICAL: Sb. nauch rabot po khimii i tekhnol. silikatov. Moscow, Promstroyizdat, 1956, pp 3-7.

ABSTRACT: See RZhGeo, 1956, 9159.

Card 1/1

KUKOLEV, G.V.

15-57-8-11301

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 8, p 169 (USSR)

AUTHOR: Kukolev, G. V.

TITLE: Colloidal-Chemical Properties and Regulation of the Indices of Plastic Flow in Clay Suspensions (Kolloidno-khimicheskiye svoystva i regulirovaniye pokazatekey plasticheskogo potoka glinistykh suspenziy)

PERIODICAL: V sb: Fiz.-khim. osnovy keramiki Moscow, Promstroyizdat, 1956, pp 50-65

ABSTRACT: Bibliographic entry

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SOV/137-57-6-9527

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr. 6, p 29 (USSR)

AUTHORS: Kukolev, G.V., Zelenskaya, A.T.

TITLE: On the Sulfur in Metallurgical Dolomite (O sere v metallurgicheskom dolomite)

PERIODICAL: Sb. nauch. raboot po khimii i tekhnol. silikatov. Moscow, Promstroyizdat, 1956, pp 327-332

ABSTRACT: A study is made of the reasons for contamination of dolomite (D) by S, and methods of purification are sought for Nikitovka and Yelenovka D of the following % compositions respectively: SiO_2 2.55 and 0.12, Al_2O_3 0.96 and 0.26, Fe_2O_3 0.20 and 0.34, MgO 20.55 and 19.62, CaO 29.5 and 33.9, P_2O_5 - and 0.04; SO_3 0.03 and —; losses on roasting 45.10 and 45.72. Roasting of D in shaft ovens, cupolas, and rotary ovens shows that in the 1st and 2nd of these alternatives roasting results in the S contents rising to 0.76% owing to the S in the fuel, but only in roasting in rotary ovens, where there is less direct contact between the D and the fuel, does the S content drop noticeably. A special equipment is used to study the reaction of

Card 1/2

SOV/137-57-6-9527

On the Sulfur in Metallurgical Dolomite

SO_2 and D in the 800-1500°C interval. Curves of S absorption by various dolomite mixtures, both with and without addition of gypsum, are presented. The concentration of SO_2 in the gas fluctuates between 0.9 and 10.7%. D intensively absorbs SO_2 at lower temperatures, but the S content drops as the roasting temperature rises. Addition of chromite (0.5-2%) and introduction of anthracite (0.4-15%) into the mixture failed to result in complete decomposition of the gypsum. Addition of finely ground metallurgical D (5-10%), inhibiting the onset of sintering, gave good results, and the S content was cut to 0.01-0.03%. The optimum mixture yielding good S removal, low porosity, and good resistance to hydration is the following: 66.5% Nikitovka D, 28.5% Yelenovka D, and 5% gypsum. The S enters the D from the fuel ash, the gas phase, and the raw material contaminated by gypsum. The best results of roasting are obtained in rotary ovens. As temperature is raised from 800 to 1500°, absorption of S by the D drops. The absorbed S is completely removed at 1700°. The factors inhibiting S removal are a strong reducing medium and the presence in the D of components increasing the amount of melt and impairing sintering (scale, Fe_2O_3, Al_2O_3, Cr_2O_3, FeO_2, and bauxite). Factors facilitating S removal are addition of 5-10% metallurgical D, introduction of up to 2% sodium chloride, and roasting of D rich in gypsum jointly with D poor in fluxing agents (such as that of Yelenovka)

Card 2/2 P.V.

SOV/137-57-6-10599

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 6, p 169 (USSR)

AUTHORS: Kukolev, G.V., Tarasenko, V.N.

TITLE: Heat-resistant Enamel Coatings (Zharostoykiye emalevyye pokrytiya)

PERIODICAL: Tr. Khar'kovsk. politekhn. in-ta, 1956, Vol 8, pp 195-204

ABSTRACT: An investigation of the feasibility of the protection of metal with heat-resisting enamel coating for the manufacture from ordinary steel of boxes for carburizing, parts of heating furnaces, crucibles, and other articles which should be resistant to gas corrosion. When the granulated frits of acid-resistant enamel are milled in a ball mill, various refractory additives previously milled in a similar mill are introduced. The grain size of the slip was 100% 900 mesh/cm^2 and 16-18% +6400 mesh/cm^2. The application of the slip of the under and outer coats of enamel was done by pouring. Two outer layers were applied over the undercoat, the second coat being applied after the first one had been fired and cooled. The firing of the heat-resistant outer layers was performed at the usual temperature (850-900°C). The thickness of the undercoat layer was 0.16-0.2 mm, that of the heat-resistant outer layers was 0.5-0.7 mm.

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SOV/137-57-6-10599

Heat-resistant Enamel Coatings

The coatings were tested for heat resistance by means of soaking the specimens three times in a muffle furnace at 950-970° for six hours, cooling them in air after each heating, and checking the luster, shock resistance, and wear resistance. The tests established that upon firing and successive reheatings, the various refractory additives behave differently: Chromite dissolves poorly in the enamel melt and corundum dissolves only upon a prolonged exposure to heat, whereas technical alumina, diaspore, roasted kaolin, magnesite, and zircon dissolve rapidly. Enamels containing the following additives (in % of the total weight of the enamel with the additive): 1) corundum 50; 2) diaspore 30; 3) chromite 40, corundum 10; 4) chromite 30, technical alumina 30; and 5) chromite 30, diaspore 20, resist the action of 900-950° temperatures better than others.

G.Sh.

Card 2/2