"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

L 13066-66

ACC NR: AP5028573

After complete melting of the burden, slagging was carried out. During melting under alumina slags, technical alumina was added in the course of melting; no slagging was performed. In all other respects the melting operations were conventional. It was found that the use of alumina slag with a high Al_2O_3/CaO ratio assures a high plasticity of metal. Use of limy slag (low Al_2O_3/CaO ratio) markedly increases the Ca content of the metal so that plasticity is lost at forging temperatures. This was verified by tests of the impact strength of the metal of the experimental melts. In the specimens with a low Ca content the maxima of impact strength are observed at temperatures of 1000-1100°C. By contrast, for specimens from melts in which limy slag was employed, where the Ca content was high, the maximum impact strength is observed at 850-900°C and is only about half as low as for the specimens melted under alumina slag. An Al_2O_3/CaO ratio of 0.55-0.57 is the limit of plasticity under the conditions of these investigation. Essentially then the degree of reduction of Ca from the slag during melting increases with increasing proportion of the Al used as the reducing agent. Orig. art. has: 2 figures.

SUB CODE: 11, 13/ SUBM DATE: 24Aug64/ ORIG REF: 005/ OTH REF: 000

Card 2/2 HW

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

Royak, KB.

Improving the Quality of Ball-bearing Steel. M. I. Kolosov, I. Ya. Aizenshtok, N. V. Ke[illegible] and D. B. Royak. (*Stal'*, 1955, (5), 431–438). [In Russian]. The results are presented and discussed of investigations, carried out at the Chelyabinsk Metallurgical Works over many years, on the prevention of non-metallic inclusions in ball-bearing steel. Various methods of deoxidising the steel were compared, the most promising being diffusional deoxidation with a carbide slag and ferrosilicon. Other factors dealt with include the time at which ferrochromium is added, the pouring temperature and the method of pouring. The evaluation of steel quality from the content of non-metallic inclusions is also dealt with.—S. K.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

KOLOSOV,M.I., inzhener; ZYZENSHTOK,I.Ya., inzhener; KEYS,N.V., inzhener; ROYAK,D.B., inzhener

Improving the quality of ball bearing steel. Stal' 15 no.5:431-438 My '55. (MLRA 8:6)

1. Chelyabinskiy metallurgicheskiy zavod
(Steel--Electrometallurgy)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, D. M.

ZALMOVER, I.Yu.; ROYAK, D.M.

Botkin's disease following transfusion of blood preserved according to Kliukvina's method. Sov.med. 21 Supplement:29 '57. (MIRA 11:2)
(BLOOD--TRANSFUSION) (HEPATITIS, INFECTIOUS)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

Royak G.S.

USSR.

Accelerating the hardening processes of cements by the addition of sodium sulfate. Yu. M. Butt and G. S. Royak. *Tsement*, 20 [4] 18-22 (1954).—The addition of 0.5 to 1.0% by weight of sodium sulfate to cement during mixing increases its strength during both its early and later periods of hardening. The greatest rise in rate of hardening was observed for pozzolan Portland cement. A considerable increase in strength was also observed for slag Portland cements. In the case of plasticized Portland cement, the addition of sodium sulfate was less effective than for Portland cements. All the cements with sodium sulfate hardened faster when subjected to steaming. B.Z.K.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, G

MOSKVIN, V., prof., doktor tekhn.nauk; ROYAK, G., inzh.

Determining alkalinity of cements by the photometric flame test. (MIRA 11:2)
Stroi. mat. 4 no.1:33 Ja '58.
(Photometry) (Alkalies) (Cements)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

MOYAK, S.S., Cand Tech Sci - (diss) "The effect of alkaline cement on the durability of concrete." Moscow, 1960, 19 pp, (Moscow Engineering Construction Institute imeni V. V. Kuybyshev)

(KL, 38-60, 199)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

Royak, G.S.

Made

1598. Complex accelerators for the cement hardening.—Yu. M. Butt and G. S. Royak (*Zh. Prikl. Khim.*, Leningr., 29, 1, 1956). In Russian. Addition of a mixture of Na_2SO_4 and $CaCl_2$ considerably accelerates the setting of cement in all stages and is particularly effective for slag-cement, both under the conditions of natural setting and under those of heat-moisture treatment. (3 tables.)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, G.S.

Accelerating the hardening processes of cements by the addition of sodium sulfate. Yu. M. Butt and G. S. Royak. *Tsement* 20, No. 4, 18-22(1954).—Addn. of [redacted] Na_2SO_4 to cement during mixing increases its strength during both its early and later periods of hardening. Greatest acceleration of hardening is observed with pozzolan portland cement. A considerable increase in strength is also observed with slag portland cements. In case of plasticized portland cements, addn. of Na_2SO_4 is less effective than for portland cements. All the cements contg. Na_2SO_4 hardened faster when subjected to steaming.

B. Z. Kamich

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, G. S.

Complex accelerating hardeners of cement. Yu. M. Butt and G. S. Royak. *J. Appl. Chem. U.S.S.R.* 29, 5-8 (1956)(Engl. translation).—See *C.A.* 50, 10365*b*.
B. M. R.

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APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

Royak G.S.

Complex accelerating hardeners of cement. Yu. M. Butt and G. S. Royak. *Zhur. Prikład. Khim.* 29, 7-10 (1956).—The gypsum content in cement is increased from 2 to 3% by the addn. of aq. solns. of 1% $CaCl_2$ and 0.5% Na_2SO_4 to the cement contg. 2% $CaSO_4 \cdot {}^1/_2H_2O$. The soly. of CaO is increased 1.77 times and rate of hydrolysis of $3CaO.SiO_2$ is accelerated. During the first 3 days the hardening and the crushing strength are increased very rapidly, and continue to increase, more slowly, for 2 months. This is true of hardening under normal conditions and after treatment with steam (75°) for 6 hrs. I. Bencowitz

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APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, G.S.

Composition and hydration of alkali-containing cement phases. (MIRA 11:11)
TSement 24 no.5:21-24 S-O '58.
(Cement klinkers--Analysis) (Hydration)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

~~G S R~~
Royak, G.S.

Metto

Complex hardening accelerators of cements. Yu. M. Butt and G. S. Royak. *Zhur. Priklad. Khim.*, 29 [1] 7-10 (1956).—Complex additions consisting of sodium sulfate and calcium chloride lead to considerable acceleration of hardening during all periods and are especially effective for slag-Portland cements under conditions of natural hardening and hydrothermal treatment. In the case of slag-Portland cements, the addition causes simultaneous alkaline and sulfate stimulation of the slags, which leads to formation of the corresponding hydrosilicates, hydroaluminates, and hydroaluminate of Ca and, hence, to intensive increase in strength. 2 references. Cf. *Ceram. Abstr.*, 1955, Jan., p. 2a. B.Z.K.

2

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

AUTHOR: Royak, G.S. SOV-101-58-5-5/10

TITLE: The Composition and Hydration of Alkali-Containing Phases of Cement (O sostave i gidratatsii shchelochesoderzhashchikh faz tsementa)

PERIODICAL: Tsement, 1958, Nr 5, pp 21-24 (USSR)

ABSTRACT: The alkali contained in Portland cement amounts to only 1 - 1.5%, but it influences the construction properties and the life of the concrete, if fillers are used which together with the alkali may cause destructive reactions. Microscopic investigation does not detect the alkali content in the clinkers. It is presently supposed that sodium alkali forms the compound NC_8A_3 in the clinker, which is stabilized by a small quantity of SiO_2. Chemical methods in which the selective solubility of substances is used to determine the mineralogical alkali content of the clinkers are here described. The results of five industrial clinker types tested in the experiments are shown in Table 1. The quantitative analysis was carried out by the flame-photometric method. The results of the analysis are given in Table 2. It is evident that the greatest part of potassium alkali is contained in C_3A and glass. A new fact is the presence of sodium

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

SOV-101-58-5-5/10

The Composition and Hydration of Alkali-Containing Phases of Cement

oxide in crystalline C_4AF. The data on the alkali distribution was used to investigate the hydration of cement at various stages of hardening. The results are shown in Table 3. After 25 days of hardening nearly all potassium oxide has passed into the water-soluble state, whereas only 40 - 60% of sodium oxide has reached this state. It is evident that potassium alkalis are distributed in the quickly hydrating phases of cement. A considerable quantity of potassium oxide is contained not in the C_2S, but in the aluminate phase. There are 3 tables and 9 references, 4 of which are Soviet, 4 American, and 1 German.

1. Cement--Properties 2. Cement--Chemical reactions 3. Sodium alloys--Analysis 4. Photometers--Applications

Card 2/2

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

BUTT, Yu.M.; ROYAK, G.S.

Complex accelerators for cement hardening. Zhur.prikl.khim. 29 no.1:7-10 Ja '56. (MLRA 9:5)

(Cement)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, G. S.

Complex accelerators of hardening of cement. Yu. M. Butt and G. S. Royak (*Zh. prikl. Khim.*, 1956, 29, 7—10).—Portland, ~~Portland-slag,~~ and pozzolana cement clinkers with 2% of $CaSO_4.\frac{1}{2}H_2O$ are made up with sand and with aq. $CaCl_2$ to 1%, and with aq. Na_2SO_4 to 0·5%, concn. in the aq. phase. The resulting cement blocks are stronger than those made up with water alone, at all times from 2 days to 2 months after mixing. R. TRUSCOR.

Maths

2

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, G.S.

BUTT, Yu.M., professor, doktor tekhnicheskikh nauk; ROYAK, G.S., inzhener.

Accelerating the hardening processes of cement by an addition of sodium sulphate. TSement 20 no.4:18-22 Jl-Ag '54. (MLRA 7:9)
(Cement)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, M.

Volpyanskaya Hydroelectric Power Station serves several collective farms. Sel'.stroi. 11 no.10:10-11 O '56. (MLRA 9:12)

1. Inzhener "Belgiprosel'elektro."
(Volpyanskaya Hydroelectric Power Station)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

PROCESSES AND PROPERTIES INDEX

18

ca

The preparation of sulfur dioxide and portland cement from gypsum. S. Royak, M. Gershman, K. Miloslavskii and E. Nagerova. *J. Chem. Ind.* (Moscow) 1933, No. 7, 35–41.—A mixt. of $CaSO_4$, clay and coke burned in N_2 contg. 1-2% O_2 yields portland cement and SO_2. The C reduces $CaSO_4$ to CaS, which reacts with the remaining $CaSO_4$ to give CaO and SO_2. Fe_2O_3 helps the process. Burning of the mixt. should be slow. H. M. Leicester

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

CA

18

The preparation of sulfur dioxide and portland cement from gypsum. S. Royak, M. Gershman, K. Miloslavskii and E. Nagerova. *J. Chem. Ind.* (Moscow) 1933, No. 7, 35-41.—A mixt. of $CaSO_4$, clay and coke burned in N_2 contg. 1-2% O_2 yields portland cement and SO_2. The C reduces $CaSO_4$ to CaS, which reacts with the remaining $CaSO_4$ to give CaO and SO_2. Fe_2O_3 helps the process. Burning of the mixt. should be slow. H. M. Leicester

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

MOSKVIN, Vladimir Mikhaylovich, doktor tekhn. nauk; ROYAK, Genrikh Solomonovich, kand. tekhn. nauk; GLEZAROVA, I.L., red. izd-va; MIKHEYEVA, A.A., tekhn. red.

[Concrete corrosion caused by the action of cement alkalis on the silica in the aggregate]Korroziia betona pri deistvii shchelochei tsementa na kremnezem zapolnitelia. Moskva, Gosstroiizdat, 1962. 162 p. (MIRA 16:4)
(Concrete--Corrosion)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

MOSKVIN, V.M.; ROYAK, G.S., inzh.

One of the complex problems of the corrosion of concrete. Izv. ASiA no.4:48-53 '61. (MIRA 16:11)

1. Chlen-korrespondent Akademii stroitel'stva i arkhitektury SSSR (for Moskvin).

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

IVANOV, F.M., kand.tekhn.nauk; ROYAK, G.S., kand.tekhn.nauk

Effect of the hardening temperature on the expansion of portland cement mortars with various additions of gypsum. Nauch. soob. NIITSementa no.12:30-35 '61. (MIRA 15:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut transportnogo stroitel'stva.

(Portland cement)
(Gypsum)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

MOSKVIN, V.M., doktor tekhn. nauk; ROYAK, G.S., inzh.

Interaction of cement alkalies with aggregates in concretes. Trudy NIIZHB no.9:96-111 '59 (MIRA 13:3)
(Concrete--Corrosion) (Alkalies)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

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S/179/61/000/005/021/022
E081/E477

AUTHOR: Royak, L.A. (Leningrad)

TITLE: A unique approximate characteristic equation for a circular cylindrical shell

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Mekhanika i mashinostroyeniye. no.5, 1961, 142-146

TEXT: The characteristic equation of the potential function for a cylindrical shell has the form

$$k^8 - 4bk^6 + ck^4 - dk^2 + e = 0 \qquad (1.0)$$

Values of the coefficients b, c and d as obtained by various authors are tabulated and the equation

$$(k^2 - m^2)^4 + a^4k^4 = 0 \quad \left(m = \sqrt[4]{n^2(n^2-1)}\right) \qquad (2.1)$$

is considered as an approximate solution of Eq.(1.0) where n is the number of terms of the resolution. (Abstractor's note: n is not defined.) The errors of the roots of Eq.(2.1) are evaluated and the roots themselves tabulated. The strains and

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

31082
S/179/61/000/005/021/022
E081/E477

A unique approximate ...

displacements in an infinite linear shell subjected to any type of loading may then be obtained by superposition; as an example, an infinite linear shell subjected to concentrated loading is analysed and the numerical quantities required for the solution of this problem are tabulated. There are 4 tables and 7 Soviet-bloc references.

SUBMITTED: May 5, 1961

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APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

SAPUNOV, G.I.; SEMIK, V.V.; ROYAK, L.F.

Automatic photoelectronic scales. Ogneupory 28 no.11:495-497 '63. (MIRA 16:12)

1. Panteleymonovskiy ogneupornyy zavod im. K. Marksa.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

GLEBOV, S., kand. tekhn. nauk; ROYAK, S., kand. tekhn. nauk

Using cinder and slags from the electric power stations near Moscow in producing building materials. Stroi. mat. 2 no.10:13 O '56. (MIRA 12:3)

(Cinder) (Slag)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M., dotsent, kand.tekhn.nauk; MALININ, Yu.S., kand.tekhn.nauk; MAYANTS, M.M., inzh.

Study of the hydration process of tricalcium silicate during heat and moisture treatment. Trudy NIITSement no.17:64-75 '62. (MIRA 16:5)

(Calcium silicates)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.[illegible], prof.; [illegible], V.[illegible], inzh.; [illegible], [illegible].U., inzh.

Intensification of the processes of fine grinding of linker with the aid of surface active agents. Tsement 30 no.5:5-8 S-O '64. (MIRA 17:12)

1. Gosudarstvennyy vsesoyuznyy nauchno-issledovatel'skiy institut tsementnoy promyshlennosti.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M., kand.tekhn.nauk; PROKHVATILOVA, I.A., inzh.

Structure and properties of calcium germanates. Trudy NIITSement no.17:76-84 '62. (MIRA 16:5)

(Calcium--Germanates)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M.; PROKHVATILOVA, I.A.

Calcium germanates and their properties. Dokl. AN SSSR 141 no.4: 880-883 D '61. (MIRA 14:11)

1. Predstavleno akademikom S.I. Vol'fkovichem.
(Calcium germanate)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

BUDNIKOV, P.P.; ROYAK, S.M.; LOPATNIKOVA, L.Ya.; DMITRIYEV, A.M.

Composition and stability of calcium hydrosilicates subjected to hydrothermal treatment at 700 atm. and 200 C. Dokl. AN SSSR 134 no.3:591-594 S '60. (MIRA 13:9)

1. Chlen-korrespondent AN SSSR (for Budnikov).
(Calcium silicate)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

SKRAMTAYEV, B.G., doktor tekhn. nauk prof.; ROYAK, S.M., prof.; CHERKASOVA, A.F. kand. tekhn. nauk; TARASENKO, A.M., inzh.

Relation of strength characteristics of cement and of concrete. Trudy NIITSement no.19:84-97 '63. (MIRA 17:11)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

BUDNIKOV, Petr Petrovich, zasl. deyatel' nauki i tekhniki RSFSR i Ukrainskoy SSR, prof., doktor tekhn. nauk; MATVEYEV, M.A. prof. otv. red.; BULAVIN, I.A., prof., red.; BUTT, Yu.M., prof., red.; KESHISHYAN, T.N., prof., red.; KUKOLEV, G.V., prof., red.; ROYAK, S.M., prof., red.

[Chemistry and technology of building materials and ceramics] Khimiia i tekhnologiia stroitel'nykh materialov i keramiki. Moskva, Stroiizdat, 1965. 607 p. (MIRA 18:12)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M., prof.; MYSHLYAYEVA, V.V., kand. tekhn. nauk; CHERNYAKHOVSKIY, V.A., inzh.

Structure of periclase in cement clinkers. Trudy NIITSement no.18: 29-49 '63. (MIRA 18:9)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M., prof.; KROYCHUK, L.A., inzh.

Production of portland cement clinkers from two-component mixtures on the basis of belite slurry. Trudy NIITSement no.18:50-62 '63. (MIRA 18:9)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

BUDNIKOV, P.P., red.; BUTT, Yu.M., red.; KRAVCHENKO, I.V., red.; ROYAK, S.M., red.; KHOLIN, I.I., red.; GLEZAROVA, I.L., red. izd-va; GOL'BERG, T.M., tekhn. red.

[New developments in the chemistry and technology of cement]Novoe v khimii i tekhnologii tsementa; trudy. Moskva, Gosstroiizdat, 1962. 295 p. (MIRA 16:1)

1. Soveshchaniye po khimii i tekhnologii tsementa, Moscow, 1961.

(Cement)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

BUDNIKOV, P.P.; ROYAK, S.M.; KROYCHUK, L.A.

Effect of the mineralizer on the production of highly active clinker from the wastes of the complex processing of nepheline rocks. Dokl. AN SSSR 157 no.5:1206-1209 Ag '64. (MIRA 17:9)

1. Gosudarstvennyy vsesoyuznyy nauchno-issledovatel'skiy institut tsementnoy promyshlennosti. 2. Chlen-korrespondent AN SSSR (for Budnikov).

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

SKRAMTAYEV, B. G.; ROYAK, S. M.

Standardization of cement. Standartizatsiia 26 no.10:29-32 O '62. (MIRA 15:10)

(Cement—Standards)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M.; ALESHINA, O.K.

The role of solid phase reaction in clinker formation. TSement 28 no.2:11-12 Mr-Ap '62. (MIRA 15:8)

1. Gosudarstvennyy vsesoyuznyy nauchno-issledovatel'skiy institut tsementnoy promyshlennosti.
(Cement clinkers)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

CHEREPOVSKIY, Serafim Sergeyevich; ALESHINA, Ol'ga Kuz'minichna; ROYAK, S.M., prof., nauchn. red.; TYUTYUNIK, M.S., red.

[Production of white and colored Portland cement] Proizvodstvo belogo i tsvetnogo portlandtsementa. Moskva, Stroiizdat, 1964. 125 p. (MIRA 17:9)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M., dotsent, kand.tekhn.nauk; DMITRIYEV, A.M., inzh.

Hardening of cement under conditions of high temperatures and pressures. Nauch. soob. NIITSementa no.9:19-30 '60. (MIRA 14:5)
(Cement)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

KRYKHTIN, G.S.; PIROTSKIY, V.Z.; ROYAK, S.M.

Effect of water introduced into the mill on the clinker grinding process. TSement 27 no.3:4-8 My-Je '61. (MIRA 14:7)
(Cement clinkers)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M., dotsent kand.tekhn.nauk; VLASOVA, M.T., inzh.; KAPKIN, M.M., kand.tekhn.nauk; KRYKHTIN, G.S., kand.tekhn.nauk

Using multistage method in grinding mixed cements. Trudy NIITSement no.12:51-83 '59. (MIRA 13:5)
(Cement) (Milling machinery)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M., prof.; MYSHLYAYEVA, V.V., kand. tekhn. nauk; CHERNYAKHOVSKIY, V.A., inzh.

Study of the properties of cement with an increased magnesium oxide content after prolonged hardening. Trudy NIITSement no.19:30-51 '63. (MIRA 17:11)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

S/891/62/000/000/005/006
A057/A126

AUTHORS: Sheykin, A.Ye., Royak, S.M.

TITLE: High-resistant quick-hardening cements

SOURCE: Novoye v khimii i tekhnologii tsementa; trudy soveshchaniya po khimii i tekhnologii tsementa, 1961 g. Ed. by P.P. Budnikov and others, Moscow, Gosstroyizdat, 1962, 93 - 111

TEXT: This is a thorough discussion of the production of high-resistant quick-hardening cements considering the effect of various factors and their interrelation. The authors make corresponding suggestions and quote some examples from the Soviet cement industry. Their conclusions are: Quick hardening high-resistant portland cements can be produced if all measurements for an increase of the cement activity are considered in the production, especially the following: 1) The raw mixture must be calculated for an optimum mineralogical composition of the clinker (for instance a clinker with 55 - 60% C_3S and 6 - 11% C_3A): 2) The raw material must be ground to a grain size passing a no. 008 sieve, and mineralizers be added to increase the reactivity of the clinker phases.

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S/891/62/000/000/005/006
A057/A126

High-resistant quick-hardening cements

3) The raw mixture must have a constant chemical composition. 4) Calcination must be carried out with an ash-free fuel at maximum 1,500°C in the calcination zone and subsequent quick air-cooling of the clinker from minimum 1,300°C. 5) The fine milling of the clinker must be carried out with mills working in a close cycle and adjusted to an optimum grain size; 6) No active minerals should be added to the cement. However, up to 5% tripoli can be added to fine-ground cements. According to P.P. Budnikov, L.D. Yershov et al, the present authors and many other investigators, the strength of cement increases with the alite content in the raw material. The optimum composition of a clinker for quick-hardening portland cements is about 60% (C_3S + C_3A) at a ratio of 50 - 55% C_3S to 8 - 10% C_3A. This optimum ratio is apparently due to an effect on the viscosity of the liquid phase, the stability of crystal hydrates, the formation of isomorphic mixtures of crystal hydrates, and the change in the composition of solid metastable solutions. The strength of the product is effected by the content of alumo-ferrite phase, which drops with a rising C_3A content. There are 6 tables.

Card 2/2

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

BANIT, F., nauchn. red.; ROYAK, S.M., red.; MESHIK, T.G., red.; DANYUSHEVSKAYA, Z.D., red.

[Dust elimination from technological processes; a collection of translations] Obespylivanie tekhnologicheskikh protsessov; sbornik perevodov. Moskva, No.1. 1962. 159 p. (MIRA 17:4)

1. Moscow. Gosudarstvennyy vsesoyuznyy nauchno-issledovatel'skiy institut tsementnoi promyshlennosti.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M.; KROYCHUK, L.A.; KUZNETSOVA, Yu.F.

Using belite sludge from the production of alumina. TSement 29 no.3:8-10 My-Je '63. (MIRA 17:1)

1. Vsesoyuznyy gosudarstvennyy nauchno-issledovatel'skiy institut tsementnoy promyshlennosti.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

S/063/63/008/002/010/015
A057/A126

AUTHOR: Royak, S.M., Professor

TITLE: The cement production with complex reprocessing of nephelines

PERIODICAL: Zhurnal vsesoyuznogo khimicheskogo obshchestva imeni D.I. Mendeleyeva, v. 8, no. 2, 1963, 189 - 191

TEXT: The technology of complex reprocessing of nepheline was developed by Soviet scientists (I.L. Talmud, Zhurn. VKhO im. D.I. Mendeleyeva, v. 2, no. 6, 1957) and the first plant producing by this method cement, soda products, and alumina started in 1962 in Volkhovo in the Leningrad district. The present paper discusses the production of cement by the mentioned technology. After lixiviation of alumina a slurry containing β-dicalcium silicate, alumina and alkali admixtures, is transferred to the cement plant. The slurry contains 38 - 40% water and is called belite slurry. It must be mixed continuously because of its settling property. The raw mixture for the manufacture of the cement clinker is obtained by wet milling of 41% belite slurry with 53% lime, 4.5% bauxite, and 1.5% pyrite cinders. The chemical composition of the raw mixture is controlled

Card 1/2

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in the Volkhovo factory photoelectrocolorimetrically. The subsequent kilning is done in rotating kilns with a 28 - 29 t/h capacity. The removal of alkali from the belite slurry is of great importance and still a problem, since about 1 - - 1.2% alkali remain in the clinker. In the Volkhovo factory methods were investigated for the removal of alkali from the dust of the waste gases. The following composition of the clinker was attained in 1961 (in %): 21.83 SiO_2, 4.97 Al_2O_3, 4.33 Fe_2O_3, 64.95 CaO, 1.62 MgO, ~1 R_2O, - C_3S 58, C_2S 19, C_3A 6, C_4AF 13. The obtained Portland cement showed a mean quality of 475 for an activity of 519 kg/cm^2 in 1961. An improvement to a quality of 800 is planned. The formation of tricalcium silicate is the most important and difficult process of cement clinker kilning because of the required high temperature and long holding time. In the second stage of kilning in rotating kilns mineralizers like calcium fluoride, or sodium silicofluoride might effect a considerable removal of the alkali from the clinker. The application of surface-active substances and high pressure in autoclave hardening of solutions and concretes based on nepheline cement allows the production of high-resistant, frost-resistant ferroconcrete constructions and articles. A new tamponage binder based on belite slurry was successfully used in high-temperature oil wells.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

BUDNIKOV, P.P.; ROYAK, S.M.; KROYCHUK, L.A.

Certain features of clinkerization during the calcination of charges formed by monocalcium hydrosilicate and calcium carbonate. Dokl. AN SSSR 151 no.5:1143-1146 Ag '63. (MIRA 16:9)

1. Gosudarstvennyy vsesoyuznyy nauchno-issledovatel'skiy institut tsementnoy promyshlennosti. 2. Chlen-korrespondent AN SSSR (for Budnikov).

(Calcium silicates) (Calcium carbonate)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M.; KROYCHUK, L.A.

Reactions taken place during burning of cement raw mixtures based on monocalcium silicate hydrate. Zhur. prikl. khim. 36 no.11:2351-2358 N '63. (MIRA 17:1)

1. Gosudarstvennyy vsesoyuznyy nauchno-issledovatel'skiy institut tsementnoy promyshlennosti.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

SHVAGIREV, M.P., inzh., red.; D'YACHKOV, G.D., inzh., red.; ROYAK, S.M., prof., red.; PETROVA, V.V., red.izd-va; RODIONOVA, V.M., tekhn. red.

[Construction specifications and regulations] Stroitel'nye normy i pravila. Moskva, Gosstroiizdat. Pt.1. Sec.V. ch.2. [Inorganic cementing materials and additives for concrete and mortars (SNiP I-V.2-62)] Viazhushchie materialy neorganicheskie i dobavki dlia betonov i rastvorov (SNiP I-V.2-62). 1962. 35 p. (MIRA 16:6)

1. Russia (1923- U.S.S.R.) Gosudarstvennyy komitet po delam stroitel'stva. 2. Gosstroy SSSR (for Shvagirev). 3. Mezhdu-vedomstvennaya komissiya po peresmotru stroitel'nykh norm i pravil (for D'yachkov). 4. Nauchno-issledovatel'skiy institut tsementnoy promyshlennosti Glavnogo upravleniya proyektnykh rabot Ministerstva stroitel'stva SSSR pri Gosudarstvennom komitete Soveta Ministrov SSSR po delam stroitel'stva (for Royak).
(Aggregates (Building materials)) (Concrete)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

BUDNIKOV, P.P., akademik; ROYAK, S.M.; MALININ, Yu.S.; MAYANTS, M.M.

Hydration kinetics of Portland cement clinker minerals in hydrothermal treatment. Dokl. AN SSSR 148 no.1:91-94 Ja '63. (MIRA 16:2)

1. Vsesoyuznyy gosudarstvennyy nauchno-issledovatel'skiy institut tsementnoy promyshlennosti. 2. AN UkrSSR (for Budnikov).
(Portland cement) (Hydration)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

BUTT, Yu.M.; ROYAK, S.M.; KRYLOV, V.F.; FEDOROV, G.A.

Study of ferroalumina cements obtained in an oxidizing atmosphere. (MIRA 16:5)
TSement 28 no.1:13-16 Ja-F '62.
(Cement clinkers)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M.; SHNEYDER, V.Ye.; BUDNIKOV, P.P., nauchnyy red.; KRYZHANOVSKIY, V.A., red. izd-va; SHMAKOVA, T.M., tekhn. red.

[Industry's requirements as to the quality of mineral raw materials] Trebovaniia promyshlennosti k kachestvu mineral'nogo syr'ia; spravochnik dlia geologov. Moskva, Gosgeoltekhizdat. No.52. [Cement raw materials] TSementnoe syr'e. 1962. 82 p. (MIRA 15:7)

1. Moscow. Vsesoyuznyy nauchno-issledovatel'skiy institut mineral'nogo syr'ya.

(Cement)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S., kandidat tekhnicheskikh nauk; STRELKOV, M., kandidat tekhnicheskikh nauk; DANYUSHEVSKIY, S., kandidat tekhnicheskikh nauk; SYRKIN, Ya., kandidat tekhnicheskikh nauk.

Rapid hardening Portland cement. Stroi. mat., izdel. i konstr. 2 no.2:20-23 F '56. (MLRA 9:6)
(Portland cement)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M., dotsent, kand.tekhn.nauk; MYSHLYAYEVA, V.V., kand.tekhn.nauk; OSOKINA, T.A., kand.tekhn.nauk

Effect of various additives on the properties of magnesia cements. Nauch. soob NIITSementa no.9:38-42 '60. (MIRA 14:5)
(Magnesia cement)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M., kand.tekhn.nauk; DMITRIYEV, A.M., inzh.

Interaction of quartz with lime at high temperatures and pressures. Stroi.mat. 6 no.4:30-34 Ap '60. (MIRA 13:6)

(Quartz) (Lime)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

BUDNIKOV, Petr Petrovich, akademik, zasluzhennyy deyatel' nauki i tekhniki, trizhdy laureat Stalinskoy premii; KUKOLEV, G.V., prof., doktor tekhn.nauk, otv.red.; BEREZHNOY, A.S., red.; AVGUSTINIK, A.I., prof., red.; BUTT, Yu.M., prof., red.; MCHEDLOV-PETROSYAN, O.P., prof., red.; GINSTLING, A.M., prof., red.; SMELYANSKIY, I.S., prof., red.; ZNACHKO-YAVORSKIY, I.L., kand.tekhn.nauk, red.; ZHIKHAREVICH, S.A., kand.tekhn.nauk, red.; KRECH, E.I., kand.tekhn.nauk, red.; MATVEYEV, M.A., kand.tekhn.nauk, red.; ROYAK, S.M., kand. tekhn.nauk, red.; NEMCHENKO, Ye.M., red.izd-va; MARCHUK, G.T., red.izd-va; KADASHEVICH, O.A., tekhn.red.

[Selected works] Izbrannye trudy. Kiev, Izd-vo Akad.nauk USSR, 1960. 571 p. (MIRA 13:7)

1. AN USSR; chlen-korrespondent AN SSSR (for Budnikov). 2. Chlen-korrespondent AN USSR (for Berezhnoy).
(Silicates) (Ceramic materials) (Refractory materials)
(Binding materials)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

BUDNIKOV, P.P.; ROYAK, S.M.; DMITRIYEV, A.N.

Composition of a binder hardening at high temperatures and pressures. Dokl. AN SSSR 137 no. 2:363-365 Mr '61. (MIRA 14:2)

1. Chlen-korrespondent AN SSSR (for Budnikov).
(Cement)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

15-57-5-6572

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 5, p 124 (USSR)

AUTHORS: Royak, S. M., Myshlyayeva, V. V., Tandilova, K. B.

TITLE: An Investigation of Hydraulic Admixtures of Volcanic Origin (Issledovaniya gidravlicheskikh dobavok vulkanicheskogo proiskhozhdeniya)

PERIODICAL: Sb. nauch. rabot po khimii i tekhnol. silikatov. Moscow, Promstroyizdat, 1956, pp 95-111.

ABSTRACT: Hydraulic admixtures investigated were the Ani pemza (pumice), the Yadrino, Abbastapinskiy, and Tedzamskiy tufy (tuffs), and tuff "B." The Abbastapinskiy and Tadrino tuffs and tuff "B," oversaturated with silica (and containing quartz, chalcedony, feldspar, and biotite), have a high activity (140 to 256 mg CaO per g) and at the same time a high loss in weight during roasting. They also have a high content of soluble alumina, up to nine percent. All cements containing a proportion of 50 percent admixture of these materials

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15-57-5-6572

An Investigation of Hydraulic Admixtures of Volcanic Origin (Cont.)

are sulfate-resistant. The formation of calcium sulfo-aluminate in puzzolan portland cements, both from C_3A clinker and from alumina impurities, has a negative influence on the sulfate resistance of puzzolan portland cements in those cases in which the activity ratio of 1 mg of CaO to percentage of "soluble" Al_2O_3 in the mixture is less than 10 to 15. The specified technical conditions for the required content of C_3O (no more than eight percent) in the clinker of sulfate-resistant puzzolan cement that contains admixtures of sedimentary origin should be preserved by using a 30 percent proportion of the above-mentioned admixtures of volcanic material. Admixtures of volcanic origin, suitable for the manufacture of sulfate-resistant puzzolan portland cements, have a ratio of

$$\frac{1 \text{ mg CaO}}{\% \text{ "Soluble" } Al_2O_3}$$

greater than 10 to 15.

Card 2/2

V. P. Ye.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M., dotsent, kand.tekhn.nauk; LEYBOVICH, Kh.M., kand.tekhn.nauk; CHERKASOVA, A.F., kand.tekhn.nauk

Rapid method of determining the grade of cement by using contact heating. Nauch. soob. NIITSementa no.12:35-38 '61. (MIRA 15:7)
(Cement--Testing)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M., prof.; CHERKASOVA, A.F., kand. tekhn. nauk; OGNYANOVA, Ye.Z., inzh.

Is everybody ready?Standartizatsiia 29 no. 11:31-32 N '65 (MIRA 19:1)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

44560
S/020/63/148/001/018/032
B101/B186

AUTHORS: Budnikov, P. P., Academician AS UkrSSR, Royak, S. M., Malinin, Yu. S., Mayants, M. M.

TITLE: Study of the kinetics of hydration of Portland cement clinker minerals in hydrothermal processing

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 148, no. 1, 1963, 91-94

TEXT: The degree of hydration of $2CaO \cdot SiO_2$, $3CaO \cdot SiO_2$, $3CaO \cdot Al_2O_3$, and $4CaO \cdot Al_2O_3 \cdot Fe_2O_3$ was calculated from the content of non-hydrated phase determined by x-ray diffraction analysis: $L = 100 - A/100 + mA$, where L is the degree of hydration, A the content of non-hydrated phase, and m the stoichiometric coefficient for the water content of the fully hydrated material. The empirical equation $L = K \log\tau - B$ was found, where τ is the time, K a factor depending on temperature and other experimental conditions, and B a constant proportional to the induction period of hydration. The equation describes the hydration of the principal amount (20-80%) of the individual compounds investigated, and

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their mixtures and the alite phase of Portland cement. Its use simplifies the study of cement hydration. Further investigations are being carried out for combined setting, i.e., short-termed hydrothermal processing and subsequent setting at room temperature. There are 4 figures and 3 tables. The most important English-language reference is: S.Brunauer, L. Copeland, R.H. Bragg, J.Phys.Chem.,60,no.1,112 (1956).

ASSOCIATION: Vsesoyuznyy gosudarstvennyy nauchno-issledovatel'skiy institut tsementnoy promyshlennosti (All-Union State Scientific Research Institute of the Cement Industry)

SUBMITTED: September 11, 1962

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

15(6) SOV/101-59-2-6/13

AUTHORS: Royak, S.M., Nagerova, E.I. and Korniyenko, G.G.

TITLE: Investigation of the Phase Formation of Aluminous Cement by Chemical Methods

PERIODICAL: Tsement, 1959, Nr 2, pp 22-24 (USSR)

ABSTRACT: The authors state that the best properties of aluminous cement are its strength at the initial periods of hardening, and radiation of heat. These features depend upon the mineralogical composition of the high-consistency aluminous slag. Such cement is obtainable by means of smelting or - caking. The mineralogical composition of cement is usually determined by means of microscopical analysis. But, with cement produced by the caking method, such examination meets with some difficulties, caused by the fine-crystalline structure of the calcinated material. Consequently, a chemical method must be used for the determination of basic components of aluminous cement. The bicalcium silicate can be determined, in accordance

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

SOV/101-59-2-6/13

Investigation of the Phase Formation of Aluminous Cement by Chemical Methods

with a method proposed by E.I. Nagerova, by using a 5% aqueous solution of boric acid. The practical result was that calcium aluminates dissolve in the 2 - 5% solution of sodium carbonate in about 1 hour time at a temperature of 70 - 90°. The authors quote experiments made at the Pashiyskiy tsementnyy zavod (Pashiya Cement Plant) with 20 samples of aluminous cement of various mineralogic composition. Summarizing, the authors state that chemical methods of determination of the content of bicalcium silicate, helenite and even calcium aluminates are more conclusive than the microscopic methods. However, a joint use of the chemical and microscopic methods will insure an exact characteristic of the phase formation of aluminous cement. This formation may be determined by the usual methods of silicate analysis, with the application of suitable reagents. There are 2 tables.

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M., dotsent, kand.tekhn.nauk; LEYBOVICH, Kh.M., kand.tekhn.nauk

Cement for speeded-up production of prestressed concrete construction elements. Trudy NIITSement no.13:51-67 '60. (MIRA 13:11)
(Cement) (Precast concrete)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S.M., kand.tekhn.nauk; PIROTSKIY, V.Z., inzh.

Resistance to the pulverization of clinkers and the grinding conditions. Trudy NIITSement no.14:3-41 '60. (MIRA 13:11)
(Cement clinkers--Testing)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7"

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ROYAK, S.M.; DANYUSHEVSKAYA, Z.I; GERASIMOVA, G.P.

Salt resistance of plugging cements with mineral additives.
Neft.khoz. 38 no.8:52-56 Ag '60. (MIRA 13:8)
(Oil well cementing)

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ROYAK, S. M.

KRYLOV, V. F. - inzh. i, ROYAK, S. M. - Kand. tekhn. nauk.

Vsesoyusnyy nauchno-issledovatel'skiy institut tsementnoy promyshlennosti (NIITSement)

GIDRAVLICHESKAYA AKTIVNOST' DOMENNYKH SHLAKOV S POVYSHENNYM SODERZHANIYEM MARGANTSA
Page 106

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ROYAK, S. M.

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Effect of rapid cooling of high-magnesia clinker on the properties of the cement. S. M. Royak and V. V. Myshlyaeva. *Tsement* 23, No. 6, 1-4(1957).—Rapid cooling of a portland cement clinker arrests the crystn. of the mineral components in the liquid phase and leaves a relatively large portion in the glassy condition. Moreover, crystal size is smaller than after normal cooling. This effect is especially noticeable in cements with high MgO content, which is manifest in reduced periclase content and small crystal size and, consequently, lower autoclave and final setting expansion. Exptl. work involved quenching the clinker from 1350° with water, followed by optical and chem. analysis in parallel with a sample cooled normally. On a typical pair of samples 5 and 5_r (after normal and rapid cooling, resp.) the percentage contents of C_3S were 41 and 50; C_2S 23 and 21; size of crystals (μ) 20-40 and 3-25; MgO content 10.2 and 10.2; periclase content 9.0 and 8.0; dimensions of periclase crystals 5-15 and 2-8; sp. surface (sq. cm./g.) 3410 and 3570; compressive strength (kg./sq. cm. after 28 days) 407 and 434; tensile strength (as above) 23.8 and 26.7. On the basis of the data obtained rapid quenching is considered beneficial, especially with respect to the improvement in tensile strength. H. L. Olin

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15-57-5-6320

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 5, p 92 (USSR)

AUTHORS: Skramtayev, B. G., Royak, S. M., Gershman, M. I.

TITLE: Disintegration of Cements Under Constant and Variable Attacks (Korroziya tsementov v postoyannykh i peremennykh usloviyakh agressii)

PERIODICAL: V sb: Korroziya betona i mery bor'by s ney, Moscow, Izd-vo AN SSSR, 1954, pp 128-149.

ABSTRACT: Bibliographic entry

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ROYAK, S.M., kand.tekhn.nauk

Plugging cements. Zhur. VKhO 6 no.6:680-684 '61. (MIRA 14:12)
(Cement) (Oil wells)

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BUDNIKOV, Petr Petrovich, akademik; OVCHARENKO, F.D., akademik, otv. red.; BEREZHNOY, A.S., red.; BUTT, Yu.M., prof., red.; MCHEDLOV-PETROSYAN, O.P., red.; AVGUSTINIK, A.I., prof.; BARZAKOVSKIY, V.P., doktor khim. nauk, red.; KUKOLEV, G.V., prof., red.; MATVEYEV, M.A., prof., red.; MCHEDLOV-PETROSYAN, O.P., prof., red.; ROYAK, S.M., prof., red.; POKROVSKAYA, Z.S., red.

[Chemistry and technology of silicates] Khimiia i tekhnologiia silikatov. Kiev, Naukova dumka, 1964. 608 p. (MIRA 17:12)

1. Akademiya nauk Ukr.SSR (for Ovcharenko). 2. Chlen-korrespondent Ukr.SSR (for Berezhnoy). 3. Chlen-korrespondent AN SSSR i deystvitel'nyy chlen Pol'skoy Akademii nauk , AN Ukr.SSR (for Budnikov).

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15-1957-10-14115

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 10, p 120 (USSR)

AUTHORS: Royak, S. M., Krylov, V. F.

TITLE: The Influence of Manganese Oxide on the Activity of Granulated Blast-Furnace Slag (O vliyanii zakisi margantsa na aktivnost' domennykh granulirovannykh shlakov)

PERIODICAL: V sb: Domennyye shlaki v str-ve. Kiyev, Gosstroyizdat UkSSR, 1956, pp 133-147

ABSTRACT: Bibliographical entry

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ROYAK, S. M.

DANYUSHEVSKAYA, Z. L. - inzh. i, SHESTOPEROV, S. V. - Kand. tekhn. nauk, ROYAK, S. M. - Kand. tekhn. nauk.

Vsesoyuznyy nauchno-issledovatel'skiy institut tsementnoy promyshlennosti (NIITSement)
EFFEKTIVNOST' MOKROGO POMOLA TSEMENTNOGO KLINKERA Page 106

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001445520003-7

ROYAK, S. M.

"Metod polucheniya trikal'tsiya germanata."

report submitted for 35th Intl Cong, Industrial Chemistry, Warsaw, 15-19 Sep 64.

Vsesoyuznyy zaochnyy inzhenerno-stroitel'nyy institut, Moscow.

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KROYCHUK, L.A.; NESTEROVA, V.N.; ROYAK, S.M.; STESHENKO, Ye.M.

Firing of two-component charges. TSement 29 no.6:16-17 N-D '63. (MIRA 17:3)

1. Vsesoyuznyy gosudarstvennyy nauchno-issledovatel'skiy institut tsementnoy promyshlennosti, i Volkhovskiy tsementnyy zavod.

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ROYAK, S. M.

SUBACH, YE. I. - inzh. i, MYSHLYAYEVA, V. V. - Kand. tekhn. nauk., ROYAK, S. M. - Kand. tekhn. nauk.

Vsesoyuznyy nauchno-issledovatel'skiy institut tsementnoy promyshlennosti (NIITSement)

ULUCHSHENIYE KACHESTVA MAGNEZIAL'NOGO SILIKATTSEMENTA Page 107

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ROYAK, S.M.

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Proceedings of the symposium on the chemistry of cement (Trudy Soveshchaniya Khim. Tsementa). Sci.-Technol. Soc. of Industry of Bldg. Materials, 1956, Moscow. P. P. Budnikov, Yu. M. Butt, S. M. Royak, and M. O. Yushkevich, editors, 484 pp. Progress of Soviet science in the field of cement chemistry, and future problems. P. P. Budnikov. Pages 5-13. Physicochemical processes of cement-clinker formation. V. N. Yung. 14-19.—A survey. Composition and crystallization conditions of celite in portland cement clinker. N. A. Toropov and A. I. Boikova. 20-6.—The refractive indexes n_γ and n_α for the modifications α and α' of $5CaO.3Al_2O_3$ and of $4CaO.Al_2O_3.Fe_2O_3$ are plotted in straight lines as functions of the compn. of their solid solns. The exptl. data of synthetic solid solns. of this series correspond much better to the presence of the α' modification than to α-$5CaO.3Al_2O_3$ in the structure of $4CaO.Al_2O_3.Fe_2O_3$. The limit compn. of the solid solns. highest in the hypothetical $2CaO.Al_2O_3$ contain 17.5% Fe_2O_3, with $n_\gamma = 1.914$, $n_\alpha = 1.854$, and are much less intensely pleochroic than is $4CaO.Al_2O_3.Fe_2O_3$. The compn. of this limit phase is $8CaO.3Al_2O_3.Fe_2O_3$. Celites from the heavy-grain fractions of portland cements isolated by centrifugation in CH_2I_2 always showed refractive indexes lower than that of $4CaO.Al_2O_3.Fe_2O_3$. An optical detn. of the true celite compn. in the aluminate-ferrite phase is indispensable for accurate calcns. Importance of the inner structure of alite crystals in portland cements for rapid winter building construction. Ezhi Gzhimek. 27-41.—For high-strength cement clinkers the size and crystallographic development of alite is important; the more elongated the crystals, the higher the strength. In expts. to develop high-early-strength cements a Polish marl, high in

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P.P. Budnikov; Yu. M. Fiff, S. M. Royak, ...

Al_2O_3, was burned with limestone to form $CaO.Al_2O_3$, and $\beta \rightarrow \gamma$-$2CaO.SiO_2$. The finely powd. disintegration product was extd. to remove Al_2O_3 hydrate; the residual Ca_2SiO_4 was an excellent raw material for the desired alite cements. About 90% of the chem. energy of the alite can be made useful in the new type of early-high-strength portland cements. Because of their heat of hydration the concrete may attain temps. up to 65° as is desirable for winter concrete construction. Chemical methods for the examination of the phase composition of cement clinkers. S. M. Royak, E. I. Nagerova, and G. G. Kornienko. 42-52.—The glass-contg. matrix of portland-cement clinkers is selectively sol. in *N* AcOH; at room temp. in 75 min. under shaking $3CaO.Al_2O_3$ is completely dissolved, only about 10% of the $4CaO.Al_2O_3.Fe_2O_3$ and $5CaO.3Al_2O_3$ are dissolved, and $2CaO.SiO_2$ and $3CaO.SiO_2$ are decompd. completely. The sol. Ca silicates can be detd. separately by extn. with H_3BO_3 soln. In com. portland cements with alumina moduli between 0.86 and 2.71 the soly. of celite in AcOH is increased. The higher the $5CaO.3Al_2O_3$ content in the solid solns. of the series $2CaO.Fe_2O_3$-$5CaO.3Al_2O_3$, the higher the soly. The soly. of quenched samples is generally higher than that of slowly cooled samples. H_3BO_3 does not leach CaO from the silicates dissolved in the quenched glasses. The mol. ratio $CaO:(Al_2O_3 + Fe_2O_3)$ in the portion insol. in AcOH is practically const. (= 2) independently of the cooling rates. The resistance of clinkers to sulfate-contg. water depends on the amts. of noncrystd. aluminate-ferrite and $3CaO.Al_2O_3$, detd. by the AcOH test. In Al_2O_3-enriched blast-furnace-slag cements the observed gehlenite and $5CaO.3Al_2O_3$ contents are as a rule higher than those calcd. from the normal compn., and the $CaO.Al_2O_3$

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and $2CaO.SiO_2$ contents lower. Slags with a high mech. strength show a ratio Al_2O_3:CaO above 1.7 (with gehlenite above 30, and even 40%). The process of clinkering in the rotary kiln. O. M. Astreeva. 53-62.—The progress of chem. reactions in the granules of portland-cement mixes in the different thermal zones of the rotary kiln is affected by the furnace shape and construction. CaO formed by dissocn. of the limestone is first bound as $2CaO.SiO_2$, by a typical solid-state reaction. Particularly characteristic are the $2CaO.SiO_2$ crystals surrounding residual quartz grains, and around pores in the clinker structure. Alite in small amounts also is a product of such reactions at relatively low temps.; its recrystn. is chiefly detd. by the presence of liquid phases. Compn. of the aluminate-ferrites in the clinker depends on the burning conditions and on the cooling rates. A slowly cooled clinker is lower in $3CaO.Al_2O_3$, because more aluminate is dissolved in the aluminate-ferrite solid solns. The cooling conditions are also important for the structure and compn. of the alite and belite. Especially in CaF_2-contg. mixes, the alite crystals in slowly cooled clinkers show distinct disintegration to free CaO and $2CaO.SiO_2$. Crystal chemistry of hydraulic materials. O. P. Mchedlov-Petrosyan. 63-77; cf. *C.A.* 49, 12809*k*, 15207*d*.—The chemical process of hydration of serpentinitic cement is not a simple rehydration of the anhyd. serpentine; the differential-thermal curves of the hydration products are totally different from those of normal serpentine. Hydration in a magnetic field of 25,000 oersteds gave a strong orientation effect on the OH^- groups indicated by a lower mech. strength of the product than that of the normally hydrated serpentinitic cement samples. The refractive index of the colloidal hydration products surrounding the

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P.P. Budnikov, Yu. M. Butt, S.M. Mikhaylov

serpentine residues is 1.495 ± 0.005. From these facts is derived a generalized theory of hydraulic binding reactions in materials that by different thermal treatments have undergone a change in the original coördination conditions of active cations. On these distorted (active) centers are adsorbed the OH^- ions from the solns., bringing about a breakdown of the cement particles to colloidal dimensions. The role of mineralizers in the formation of cement clinker. N. A. Toropov, S. L. Golynko-Vol'fson, and M. M. Sychev. 78–82.—BaF_2 is more active in the formation of $2CaO.SiO_2$ (in the temp. range 1000° to 1100°), and of $3CaO.SiO_2$, than are CaF_2, MgF_2, AlF_3, NaF. The mineralizing action of the fluorides is attributed to interaction between HF in the kiln atm. with SiO_2 of the raw mix to form a highly loosened structure that more readily undergoes solid-state reactions with CaO. Fluosilicates also are mineralizing agents; the addn. of 1.5 to 1.7% of $CaSiF_6$ and $MgSiF_6$ is optimum. By-products of the superphosphate industry are very suitable in place of the pure salts. The formation of a rather fluid liquid phase is observed as low as 500° to 600° in the systems NaF–$CaCO_3$ and NaF–CaO. Study of $3CaO.SiO_2$ and $3CaO.Al_2O_3$ in the field of high temperature. B. V. Volkonskii. 83–92.—A high-temp. x-ray diffraction camera was constructed with a Pt-Rh furnace (used up to 1500°), for the study of polymorphism in clinker constituents. The disintegration of pure $3CaO.SiO_2$ at 1175° was distinctly observed after 50 hrs. If 5% gypsum was added, the same disintegration occurred after 24 hrs. At 1375°, pure $3CaO.SiO_2$ undergoes a polymorphic inversion forming α-$3CaO.SiO_2$ with the characteristic interplanar distances 2.94, 2.78, 2.32, 2.00, and 1.47 A. Mixes of $3CaO.Al_2O_3$ + 5% KF or NaF show a strong disintegration to $5CaO.3Al_2O_3$

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P. P. Budnikov, Yu. M. Kiil, S. M. Lovok....

and free CaO at 800°, but above 1300° (for KF) and 1400° (for NaF) no more reaction of this kind is observed, and the $3CaO.Al_2O_3$ diagram reappears, evidently after a complete volatilization of the fluorides. CaF_2 reacts in the same way, decomposing $3CaO.Al_2O_3$ at 1000°, but at 1400°, $3CaO.Al_2O_3$ reappears. No polymorphic phenomena are observed in $3CaO.Al_2O_3$, only the common thermal expansion effects. Investigation on reaction accelerators in solid mixes. P. P. Budnikov and A. M. Ginstling. 93-105.—Mineralizers are defined as substances that accelerate characteristic reactions in the solid state. The distinction of accelerators from catalysts is based on the theories of heterogeneous catalysis (cf. Roginskii, *C.A.* 42, 2501i). The question of how much may be the critical amount of accelerator or "flux" additions sufficient for a distinct effect cannot be answered in general from hypotheses on the mechanism of their action. The sensitivity of heating curves is usually not sufficient to detect thermal effects of this kind. Application of a rapid ionization x-ray analysis for the investigation of cements. P. F. Konovalov and A. I. Efremov. 106-13.—A self-recording Geiger counter app. for x-ray powder diffraction diagrams is described, characterized by a photographic registration on sensitive paper from a galvanometer with amplifier. This instrument is combined with a high-temp. furnace. The decompn. of limestone and kaolin, the inversions of quartz and Al_2O_3 ($\gamma \rightarrow \alpha$ at 1050° to 1100°), and the new formation of mullite, corundum, etc., were studied. Theoretical aspects of hydraulic minerals based on the periodic system of Mendeleev and the knowledge of metastable states. N. A. Moshchanskii. 114-24.—Zhuravlev's theory (1952) of the nature of hydraulic compds. is modified by demonstration of primary groupings, chiefly with O, and secondary, or higher complex formation (e.g. silicates, aluminates) of highly variable stabilities. Hydraulic properties are shown only by those compds. which Fersman

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P.P. Budnikov, Yu.M. Bul, S.M. Kogut, ...

called "mutable" (metastable), with distorted (defect) cryst. structures. Often pure compds. do not show hydraulic properties, but contaminations (foreign cations) activate the structure. In the same manner, dehydration, decarbonation, and quenching to glass (e.g. in slags) bring about hydraulic characters. By mixing with H_2O (or a soln. of defined pH) a colloidal suspension is formed from which coagulates segregate and harden to the "cement paste." This theory describes the hydraulic character of all the hydraulic silicate and aluminate cements, of the phosphate (dental) pastes, Mchedlov-Petrosyan's "serpentinitic cements," etc. Physical chemical ideas on the mechanism of setting and hardening of hydraulic mineral materials. P. A. Rebinder. 125-37.—The initial surface of dry $3CaO.Al_2O_3$ is increased after 30 to 40 min. of H_2O action and then slowly decreased by a recrystn. of hydrates. The kinetics of the hydration of $3CaO.Al_2O_3$, $3CaO.SiO_2$, and $2CaO.SiO_2$, studied by the tracer method, shows the rapid hydration of $3CaO.Al_2O_3$, and the particularly slow hydration of $2CaO.SiO_2$. Also the heat evolution as a function of time gives characteristic kinetic curves for commercial cements with 9% and 5% $3CaO.Al_2O_3$ in their clinker compn. for the systems with pure H_2O, and for H_2O + 0.25% and 0.5% additions of a plasticizer from sulfite waste liquor. The high surface development in montmorillonite-like layer structures of the hydrophilic hydrates of Ca aluminates and aluminate-sulfate is most important in the setting with its first mech. strength effects. The corresponding reactions with the less active silicates det. the hardening process. The application of these aspects in practice is to find the optimum ratio between the rapid setting, and the slow hardening reactions for which the addition of org. substances

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P.P. Budnikov, Yu.M. Butt, Silikat...

is most important. Investigation of the process of structure development in cement suspensions and the action of hydrophilic plasticizer from sulfite waste liquor on these processes. E. B. Segalova and E. S. Solov'eva. 133-53; cf. *C.A.* 49, 2011a. In the first two to three hrs. of the reactions in a portland cement-H_2O paste chiefly the hydration of $3CaO.Al_2O_3$ dets. the initial mechanism to develop strengths in the stirred mix. Three stages in the colloid-phys. reactions which become particularly evident if plasticizing agents (e.g. from a sulfite waste liquor) are added, are (I) coagulation of the newly formed hydration products with included cement particles; this is a very short-time process; (II) development of a crystal structure in the hydration products; the system becomes thixotropic, i.e. sensitive to mech. stirring; (III) development of a rigid coagulation structure of hydrated aluminates after destroying the thixotropic paste of stage II, in which subsequently cement particles are suspended. Sulfite waste liquor stabilizes the products of type I; a considerable reduction of the requirement of H_2O in the paste is an immediate practically important consequence. The structure of the paste becomes relatively denser. In II the plasticizer facilitates the adsorption and dispersion of the hydrated compds. For this reason, the structure in III shows a strong increase again in H_2O requirement. For an optimum application of plasticizer with cements of variable contents in $3CaO.Al_2O_3$ the development of I of the paste is fundamental. For cements high in $3CaO.Al_2O_3$ the decrease in the ratio H_2O:cement is a max. In order to prolong I in the slurry, more hydrophilic plasticizer is needed. In gypsum-contg. cements the mechanism in I is similar to that in cements without gypsum, but sulfate aluminate is pptd. in place of the aluminate hydrates.

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ROYAK, S. M.

Proceedings of the Symposium on the Chemistry of Cement (Trudy Soveshchaniya Khim. Tsementa), Sci.-Technol. Soc. of Industry of Bldg. Materials, 1956, Moscow. P. P. Budnikov, Yu. M. Butt, S. M. Royak, and M. O. Yishkevich, editors, 484 pp.

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Change of structure and properties of hardened cement and concrete if hardened under pressure. A. V. Satalkin.—154-72.—The possibility is theoretically discussed, and experimentally confirmed in numerous technological tests that the strength of concrete can be increased by an early application of pressure on the setting and hardening cement-aggregate mix. The "colloidization" mechanism in hardening of hydraulic materials, according to A. A. Balkov. S. D. Okorokov. 173-83.—Balkov's ideas on colloidization are extended on the basis of Rebinder's ideas of colloidization by dispersion (or peptization) in H_2O-contg. systems. An inner spontaneous grouping in smallest structural units is thus assumed. The adsorption effect of H_2O on the primary particles of the hydraulic material is even reinforced by surface-active agents (plasticizers). The coagulation of the colloid particles brings about the setting phenomenon, followed by the slow process of crystn. in the hardening slurry. The colloidization is to a certain degree analogous to dispersion and vol. change reactions in homogeneous polymorphism (inversions) which are illustrated by the regrouping of the atoms in the crystal structure of the inversion products. In setting, the newly formed phases include H_2O from the soln. phase in the slurry ("heterogeneous polymorphism"). Change in the real composition of the liquid phase formed during the hardening of hydraulic materials, and the mechanism of their hardening. M. I. Strelkov. 183-200.—An app. is described for the filtration under a pressure of 1500 kg./sq. cm. of the soln. phase in portland cement slurries with the water/cement factor (W/C) = 0.5 and 1.0. The W/C ratio is very important for the compn. of the soln. phases. The dissolved CaO decreases after about 6 hrs. to amounts below 0.4 g./l.; Na_2O is slightly increased to more than 4 g./l. (for W/C = 0.5). SO_4^{--} entirely disappears from the soln. after 3 days.

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Al_2O_3 gradually increases. The behavior of SiO_2 in the solns. demonstrates a soly. of the Ca silicate hydrates in the liquid phase of cement slurries. The relation of the compn. of the solns. to pressure and time indicates that the liquid phase in immediate contact with the hydrating grains is more highly supersatd. than the bulk of the liquid. Gypsum does not appear in the early stages of hydration. Alkali salts crystallize in very characteristic acicular forms. No Ca silicate hydrates were observed. $Ca(OH)_2$ in hexagonal tables up to 1 μ in diam. are a rule, also corroded aggregates, but the spherical forms described from electron microscopic studies were not observed. Hardening is possible only if a high degree of dispersion (colloidization) of the newly formed crystal phases occurs. For the complete filling of the interstices to form a monolithic massive hardened product, a material transport over a soln. phase is required, i.e. even the Ca silicate hydrates in cement paste must have a certain, although small, soly. Experimental grounds for the development of a uniform theory of hardening of hydraulic materials on a colloid-chemical basis. G. N. Sivertsev. 201-20.—The kinetics of the reactions of CaO and H_2O with pozzolan additions, of portland cement with H_2O alone, and with H_2O and pozzolans, of blast-furnace slags with H_2O, etc., were studied as adsorption phenomena described by the Freundlich isotherm equation. This formula describes the quant. adsorption of Ca^{++} on tripoli, kaolin, calcined clay, trass, alumina and silica hydrates, etc., by a typical chemisorption. Desorption is not complete from Ca metakaolin sorbates, although Ca tripoli and Ca trass release Ca^{++} ions nearly quantitatively. The Ca adsorption is coupled with a binding of H_2O in the sorbates to form typical micellae. The higher the Ca and H_2O fixation the higher the "pozzolanic activity." Simi-

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larly to pozzolanic addns., the Al_2O_3-SiO_2 hydrates behave as "anionic sorption centers" in the residues of hydrolysis of portland cement clinker minerals, which adsorb Ca^{++} from the supersatd. solns. in the paste, bind H_2O strongly, and swell. Extensive quant. exptl. data illustrate the kinetic time-concn. conditions of Ca^{++} adsorption on portland cements with pozzolanic additions and on blast furnace slags. The ratio Al_2O_3:SiO_2:CaO varies between 1:2:1 and 1:1:2, or even 1:1:3; the ratio H_2O:CaO is about 2:1. Addns. of hydrophilic materials stabilize the suspensions and act as retarders for rapid setting reactions. Air-hardening limes show a combined sorption of CO_2 and H_2O, through a strong dipole action of H-binding and hydroxonium endings on the active surface. **Hydration of the aluminates and calcium aluminoferrites.** L. Ya. Lopatnikova. 221–34.—Rate of hydration decreases in the order $3CaO.Al_2O_3$, $5CaO.3Al_2O_3$, $CaO.Al_2O_3$. The hydration products are hexagonal crystals for the basic aluminates. Those of the less basic aluminates are mixts. of crystals and colloidal alumina hydrogels. The final mech. strengths are highest for the products from $CaO.Al_2O_3$, lowest for those from $3CaO.Al_2O_3$. For hardening, the colloidal alumina hydrogels are the most important. Temps. of 35–7° bring about a very rapid crystn. of hexagonal aluminate hydrates, which then are changed to cubic $3CaO.Al_2O_3.6H_2O$. The less basic aluminates hydrate to mixts. of cryst. and gel products, but the mech. strengths of the hardened slurries are lower than in the analogous slurries produced at room temp. Aluminate cement (with 35–40% $CaO.Al_2O_3$, 30–35% gehlenite, and the rest $5CaO.3Al_2O_3$, etc.) hydrates less rapidly than the pure synthetic aluminates, but develops much more alumina

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hydrogels besides scaly crystals. Among the aluminate-ferrites, $6CaO.2Al_2O_3.Fe_2O_3$ is most rapidly hydrated, $4CaO.Al_2O_3.Fe_2O_3$ somewhat more slowly; and $2CaO.Fe_2O_3$ not at all over a long time. The hydration products also in this case are hexagonal aluminate hydrates, easily changed above 35° to an Fe_2O_3-contg. $3CaO.Al_2O_3.6H_2O$. If gypsum is added, or sulfate solns. act on the hydrating aluminates and aluminate-ferrites, immediately the characteristic acicular crystals of ettringite are formed, without any intermediate reactions. If insufficient SO_4^{--} is present, the hexagonal $3CaO.Al_2O_3.CaSO_4.12H_2O$ also appears. The ettringite gradually changes it to gypsum, $Ca(OH)_2$, and a fine-grain isotropic material, even in supersatd. soln. of $Ca(OH)_2$ and in sea water, in the latter case forming rather coarse spheroidal gypsum. Physics of dispersed materials and their application in hydraulic substances. B. V. Il'in. 235-42.—Portland cement, pozzolan, and other kinds of hydraulic binders are characterized in their dispersity properties, detd. by the sp. surface and the heat of wetting. Plasticity, adhesion properties (e.g. for bituminous binders) and mech. strengths are chiefly functions of these quant. characteristics. A new pendulum viscometer was developed, suitable for materials of the consistency of cement-mix muds, etc. The adsorption processes under the action of dipole liquids on the surface of crystals were studied. An approx. relation to calc. the energy of adsorption, U, was exptly. confirmed: $U = \mu e_1/r_0^3 S_a$ (μ = dipole moment of the adsorbed mol.; e_1 = electrostatic charge of the touched ion of the adsorbent crystal; r_0 = distance between ion and dipole; S_a = surface required for the adsorbed mol.). The equation was exmd. for systems with H_2O, phenol, chlorobenzene, nitrobenzene, and the homologous series of alcohols on $BaSO_4$, $SrSO_4$, and $PbSO_4$.

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Contemporary calorimetry for the investigation of dispersed materials. V. F. Kiselev. 243-63.—New improvements of calorimetry consist in the introduction of sensitive temp. indicators and electronic self-controlling systems, and the use of adiabatic twin-calorimeter principles. The exact methods and instruments developed in the Inst. Phys. Chem., Acad. Sci. U.S.S.R., are given. The calorimetric results are accurate to 1-2 × 10^{-3} cal./g.; the microcalorimetric measurements to 4 × 10^{-4} cal./g. For practical purposes a less-sensitive twin-calorimeter of simple construction is described. Relations between the phase composition and the petrographic structure of the clinker, and the properties of hardened cement. L. D. Ershov. 264-78.—Clinker structures are classified petrographically, and the matrix of the clinker structure is classified on the basis of compn. and of content of liquid phase. For the high-strength rapid-hardening cements it is desirable that the ratio $3CaO.Al_2O_3:4CaO.Al_2O_3.Fe_2O_3$ be about 2.5 to 3.0, with 25 to 30% of a liquid phase in the matrix. For the hardening process and the increase in strength with time in the pastes the development of cryst. $Ca(OH)_2$ is coupled with the evolution of gels of Ca silicate hydrogels in which $Ca(OH)_2$ forms an indispensable reinforcing skeleton. Gel evolution and hardening depend on the ratio $3CaO.SiO_2:2CaO.SiO_2$, called the "modulus of hardening intensity." This modulus in commercial rapid-hardening cements is above 3.0; in slowly hardening belite cements it is 0.5 or less. The presence of 0.5 to 1.0% TiO_2, or of 0.2 to 0.3% P_2O_5 increases the one-day strength of portland cement by 200 to 300%. Volume increase of the solid phase during the hydration of mineral hydraulic materials. O. V. Kuntsevich. 279-93.—In the pores of a concrete often gypsum or calcium aluminate-sulfate crystallizes; this

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brings about expansion stresses above the tensile strength of concrete of av. quality. The chief expansion effects occur during the hydration period, which coincides for many hydraulic materials with the period of increasing mech. strength in the solid mixes. Calcd. vol. increases are given for the most important hydraulic compds. in portland cement, CaO, MgO, and plaster of Paris. The reaction between kaolin and $Ca(OH)_2$ under hydrothermal treatment. P. P. Budnikov. 294-303; cf. *C.A.* 47, 1908g; 48, 11987i.—Metakaolin and clays calcined at 800° react with $Ca(OH)_2$ under H_2O vapor pressure in both their silica and their alumina portions. Bentonites and kaolin react slowly; tripoli reacts rapidly. The hydrothermal reactions with $Ca(OH)_2$ considerably increase the heats of wetting and the soly. of the products in 10% NaOH soln., and greatly increase the refractoriness of the products. By electron micrographs and differential thermal analysis well-developed crystals of $4CaO.Al_2O_3.12H_2O$ and of ettringite are shown. The Ca silicate hydrates formed by the hydrothermal reactions are evidently the same as those that are important for the hardening of portland cements. Influence of temperature and of additions on the acceleration of concrete hardening. S. A. Mironov. 304-19.—Diagrams show the considerable increase in the mech. strength of concretes produced by steaming or by elec. heating at 50° to 90°. The rather rapid decrease of strength for $3CaO.Al_2O_3$ cured with H_2O alone is in contrast with the rapid increases for $3CaO.SiO_2$ with 10% $CaCl_2$ + 5% NaCl. For concrete construction in winter preference is given to alite portland cements contg. less than 10% $3CaO.Al_2O_3$. Specifications are given for the most adequate addns. of gypsum, and for the suitable ratios of $3CaO.SiO_2$:$3CaO.Al_2O_3$:$4CaO.Al_2O_3.Fe_2O_3$ in the compn. of the cements, or for the use of additions of pozzolanas, tripoli, quartz sand, etc. Control of the hardening processes of hydraulic ma-

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terials under hydrothermal treatment. Yu. M. Butt. 320-40; cf. *C.A.* 50, 13399c.—For autoclave hardening of concrete articles, a portland cement should be low in 3CaO·Al_2O_3, and high in 4CaO·Al_2O_3·Fe_2O_3. For special articles, the addition of slaked or unslaked lime to the mix is considered. Influence of hydrothermal treatment on the hardening of cements of variable mineralogical composition. P. I. Bozhenov and G. R. Suyotova. 141-50; cf. *C.A.* 50, 5262d.—The action of steam on portland cement mortars at 8-200 atm. pressure was studied. In general, the action of autoclaving goes deeper than normal hardening with H_2O at room temp., and the hydrated products are more thoroughly crystallized. For most of the portland cements investigated the optimum autoclaving pressure was 15-25 atms. An increase in pressure above 25 atms. decreases the strength of the products, probably by a change in the compn. and the phys. character of the hydrates formed. In the thermal analysis curves alite cements show strong peaks for the dehydration effect of $Ca(OH)_2$ at 560° to 580°; the belite cements show with increasing pressure of autoclaving decreasing $Ca(OH)_2$ effects, but increasing peak intensities at 820° to 860°. Chemical processes in dispersed materials. K. G. Krasil'nikov. 351-80.—The detn. of the specific surface and the porosity of dispersed silica by the wt. of H_2O, CH_3OH, or benzene vapors adsorbed is discussed. For more coarsely dispersed systems detn. of the vol. of N_2 adsorbed is suitable. For the system CaO-SiO_2-H_2O, the chemisorption of CaO from the aq. solns. on tripoli or diatomaceous earths, or on silica gels (prepd. from $SiCl_4$ or $Si(OCH_3)_4$ by hydrolysis) is measured by detn. of the amt. of CaO adsorbed as a function of the CaO concn. Such chemisorption reactions are important for the definition of the "activities" of pozzolanic materials, since they account for the effects of dispersity and porosity. In the

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system SiO_2 gel–$Ca(OH)_2$, the isotherm curves indicate probable compds. with the ratios $CaO:SiO_2$ = 0.9, 3:2, and 2:1, all in highly dispersed states. The solv. of SiO_2 in the solns. reaches 6 to 7 meq./l. for the ratio 0.5:1, but then rapidly decreases, practically to 0. The ratio $CaO:SiO_2$ becomes 1:1. From $Ca(OH)_2$ solns. in chemisorption equil. with a silica gel prepd. by the hydrolysis of $Si(OCH_3)_4$, the cryst. phase $CaO.SiO_2.aq.$ was isolated, and cured for 10 years. It shows in the electron microscope flat tabular crystals, in the polarization microscope optically anisotropic particles, and spherulitic needle aggregates, intermingled with isotropic material. In small amounts also a more anisotropic crystal phase with n_γ = 1.541 and n_α = 1.531 was observed. The x-ray diagrams show some similarity to crestmoreite. More-basic silicate hydrates than $CaO.SiO_2.aq.$ are always incongruently sol. Heat evolution of cement during the steaming of concrete. R. Malinowskii (Polytechn. Inst., Warsaw). 381–93.—For winter construction rapid concrete hardening is possible by raising its temp. to such an extent that the one-day mech. strength reaches 50 to 70% of the normal 28-day strength. A "coefficient of activity" in steaming for a given cement is defined as the ratio of the mech. strength after one day for the steamed concrete to that of the normally cured concrete after one day. It is above 3 for slowly hardening cements, and is 1 to 2 for supercements. The max. temp. reached in a simple heat evolution test is highest for cements that have the lowest activity coeffs., and lowest for those with the

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