CERAMIC ABSTRACTS

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strengths, which are obtained by using more calcareous mixtures and finer grindings. P.L.M.

Study of ring formation in rotary cement kilns. J. SLEGTEN *Zement-Kalk-Gips*, 9 [9] 397–402 (1956).—Suggestions are offered for modifications in design, operation, temperature zones, and fuel to avoid the formation of rings. 19 references. M.HA.

Use of granulated slag cements and of crushed slags in roads and airport runways in Belgium. LEON BLONDIAU. *Rev. matériaux construction et trav. publ.*, 1956, No. 487, pp. 83–94; No. 488, pp. 109–26.—Blast furnace slag cements gave lower compressive strength but higher flexural strength than Portland cements. Slag as an aggregate is critical in regard to its porosity, density, and adhesion. It is recommended that the slag be compounded according to Parker, be cooled quickly from high temperatures to prevent the formation of unstable dicalcium silicate, be dense, be aged at least two weeks, be cooled to 15° to 20°C., and be homogeneous. B. concludes that slag concrete made with proper care is equal to Portland cement concrete containing igneous aggregates. 35 figures, 1 reference. P.L.M.

X-ray study of the ferric phase in Portland cement. NICOLA FRATINI AND RENATO TURRIZIANI. *Ricerca. sci.*, 26 [9] 2747–51 (1956).—The authors describe a chemical method for the separation of the ferric phase of commercial cements, through which its X-ray examination is made possible. The reagent used is an ammonia solution of ammonium citrate (pH = 11.4; ammonium citrate 10% approximately). The results obtained on some commercial cements with different ratios of Al_2O_3 to Fe_2O_3 and on a synthetic product of the brownmillerite formula are reported.

PATENTS

Calcareous matrix body coated with reaction product of an alkali metal borophosphate and a metal silicofluoride. JOHN W. PLAUKA AND ROBERT E. PARRY (Johns-Manville Corp.). U. S. 2,766,140, Oct. 9, 1956.—1. A body comprising staple reinforcing fibers in a calcareous matrix has a surface hardening and sealing coating thereon, the coating comprising the reaction product of an initial surface impregnant comprising approximately 50 to 200 lb. of solids per 1000 sq. ft. of surface treated of an alkali metal borophosphate solution and a coating of approximately 5 to 30 lb. of solids per 1000 sq. ft. of surface treated of a solution of a salt selected from the group consisting of zinc and magnesium silicofluorides. D.J.B.

Cement manufacture. FRED D. DE VANEY (Erie Mining Co.). U. S. 2,769,719, Nov. 6, 1956.—Portland cement clinker in the form of discrete small spheroids is composed of alkaline earth metal silicates and aluminates, the outer surface layers of the spheroids being composed of essentially unfused particles of alkaline earth metal silicates and aluminates and the interiors of the spheroids comprising glassy phase fused alkaline earth metal silicates and aluminates of essentially the same chemical composition as the particles constituting the outer surface layers. D.J.B.

Dental impression material. JAMES CRESSON (L. D. Caulk Co.). U. S. 2,769,717, Nov. 6, 1956.—1. A composition for taking dental impressions consists essentially of an alkali metal alginate, calcium sulfate, and an alkali metal zinc fluoride, the fluoride being adapted to eliminate fixing of the composition while maintaining the shelf life and proper setting time. D.J.B.

Formula for cementitious composition. ALBERT L. TALONE. U. S. 2,769,720, Nov. 6, 1956.—A slow-setting nonshrinking thixotropic water retaining white cement composition capable of use on highly porous surfaces consists, in parts by weight, of 100 Portland cement, 5 to 25 kaolin, 10 to 50 pumice, and 0.62 to 6.2 parts of a salt selected from the group consisting of sodium chloride and potassium bitartrate. A preferred example is 100 white cement, 10 pumice, 10 kaolin (average particle size 0.5 to 5μ), 2.5 salt, and 60 water. Pigments may be added to obtain color variations. D.J.B.

Manufacture of plaster of Paris. WALTER L. BADGER. U. S. 2,767,972, Oct. 23, 1956.—1. The process of calcining gypsum comprises continually moving ground gypsum in the form of a thin layer at a constant rate of speed through a path defined by surfaces including a hot surface and a moving surface while maintaining the hot surface at a predetermined heat by conduction from substantially saturated vapor at approximately atmospheric pressure of a condensable liquid having a boiling point in excess of 300°F. and at the same time regulating the speed of the moving surface to determine the rate of flow of the gypsum over the hot surface. D.J.B.

Method and apparatus for burning cement. EUGEN SZINGER (Amalgamated Limestone Corp., Ltd.). U. S. 2,770,450, Nov. 13, 1956.—1. A method of burning cement in which a granulated mixture of raw cement material and solid fuel is formed into beds on grates in a number of independent containers in which the burning cycles are staggered, the air flows upward through each bed, and the containers are continuously or intermittently fed with additional mixtures of raw material and fuel as the burning proceeds, so that the depth of the bed increases as the burning proceeds from the bottom upward and the combustion zone, during the greater part of the burning, is always covered by a thin layer of fresh raw material and fuel, the burned beds of clinker being successively discharged so that cement is produced substantially continuously. D.J.B.

Method for the manufacture of calcium silicate type insulation. WILLARD R. SEIPT (Kensbey & Mattison Co.). U. S. 2,766,131, Oct. 9, 1956.—1. In the manufacture of calcium silicate insulation having "harsh" reinforcing asbestos fibers incorporated therein, the method of preparing a slurry containing the insulation-forming ingredients and a quantity of water constituting 3 to 8 times the weight of the total solids present in the slurry comprises intermixing lime and siliceous material with less than half of the total water to be incorporated in the slurry, agitating the mixture to form an intimate dispersion of the lime and siliceous material in the water, thereafter adding additional water and the harsh asbestos fibers to the dispersion, the amount of the additional water being sufficient to bring the total water content to 3 to 8 times the weight of the total solids content, and then further agitating the dispersion to effect uniform dilution thereof with the added water and to thoroughly distribute the asbestos fibers therein without appreciably breaking down the length of the fibers. D.J.B.

Self-hardening water-glass compositions and process of preparing. KARL DIETZ (Farbwerke Hoechst A.-G. vorm. Meister Lucius & Brüning). U. S. 2,766,130, Oct. 9, 1956.—Improved acid resistance in the self-curing type of alkali silicate cements is obtained by replacing the fluosilicic acid or other fluorine compounds used as hardeners with an organic hardener from the group consisting of esters, amides, and anhydrides of aliphatic organic acids having equivalent weights of at most about 90. The organic hardener also has less effect on chrome-nickel steels or lead with which the cement might come in contact. The solid constituent comprises an inert filler and 2 to 7% formamide, while the water-glass constituent is selected from the sodium silicates having a ratio of SiO_2 to Na_2O less than 2.75 and of SiO_2 to H_2O higher than 0.35 and potassium silicates having a ratio of SiO_2 to K_2O less than 2.25 and of SiO_2 to H_2O higher than 0.35. The water-glass solutions have a viscosity of less than 600 centipoises at 20°C. and are used in the amount of 25 to 30 cc./100 gm. of the solid constituent. One example has a composition, in parts by weight of the solid composition, of 90 quartz powder (10 to 25% residue on 100 mesh), 4 clay, 2.5 active silicic acid, and 3.5 glycolide. With 100 gm. of this powder is mixed 30 cc. of a potassium silicate solution in which the ratio of SiO_2 to K_2O is about 1.84 and that of SiO_2 to H_2O is 0.46. The viscosity of the silicate solution is 80 centipoises at 20°C. The mixture begins to harden after about 20 min., and setting is completed after 3 days at ordinary temperatures. D.J.B.

Additional abstract

Sect. VII: (*patent*) Zirconia cement.

IV—Enamels and Refractory Coatings for Metals

Bright annealing of sheet steel and its use in direct one-coat-white enameling. ARMIN PETZOLD AND HELMUT BETZER. *Glas-Email-Keramo-Tech.*, 7 [8] 284–87 (1956).—Steel annealed at 780°C. for 10 to 15 min. in a protective atmosphere containing H_2 18, CO 10, CO_2 4, CH_4 0.1%, and the remainder N_2, with H_2O 0.15 gm./m.³, was clean and bright and its surface layer was decarbonized. A one-coat TiO_2 enamel applied directly to this sheet at 820° to 840°C. (2.5 min.) showed good gloss and was free from bubbles and pinholes. Although an annealing temperature of 1050°C. would be too expensive for commercial use,

Ceramic industry development and raw material resources of Oregon, Washington, Idaho, and Montana. HAL J. KELLY, KARLE G STRANDBERG, AND JAMES I. MUELLER. *U. S. Bur. Mines Inform Circ.*, No 7752, 77 pp. (1956). Free. Pubs. Distrib. Sect., Pittsburgh 13, Pa.—The survey includes annual production, some operating costs, and annual power consumption for the important plants. 16 figures. M.J.K.

China clay for ceramics—its origin, nature, and uses. RICHARD A. GREEN. *Pottery Gaz.*, 81 [954] 1732–35 (1956).—G. discusses crystalline structure, chemical composition, grain size, function in ceramics, casting, and refractoriness. 6 photos. C.M.C.

Clay minerals from the Röt member of the Triassic near Göttingen, Germany. FRIEDRICH LIPPMANN. *J. Sediment. Petrol.*, 26 [2] 125–39 (1956).—The important clay constituent is a "swelling chlorite" with a regular mixed layer structure for which the name "corrensite" was suggested in an earlier paper. Much of the paper is devoted to the specific properties of corrensite, particularly after treatment with several exchangeable cations. S.A.F.

Dolomite, principal uses and deposits in France. V. CHARRIN. *Génie civil*, 133, 134–36 (1956); abstracted in *J. Iron Steel Inst.* (London), 184 [4] 467 (1956).—C. reviews the composition and uses of dolomite and the separation of chalk and magnesite and gives the location and characteristics of the French deposits. V.R.E.

Fluorspar and cryolite. JOHN E. HOLTZINGER AND LOUISE C. ROBERTS. *U. S. Bur. Mines Minerals Yearbook* (preprint), 1954, Vol. I, 24 pp. (1956). 15¢. Govt. Printing Office, Washington 25, D. C. **Gem stone.** JOHN D. MCLENEGAN, GEORGE SWITZER, AND ELEANOR V. BLANKENBAKER. *Ibid.*, 14 pp. 10¢. **Graphite.** DONALD R. IRVING AND ELEANOR V. BLANKENBAKER. *Ibid.*, 11 pp. 10¢. **Jewel bearings.** HENRY P. CHANDLER AND ELEANOR V. BLANKENBAKER. *Ibid.*, 4 pp. 5¢. 1 figure. **Kyanite and related minerals.** BROOKE L. GUNSALLUS AND FRANCES P. USWALD. *Ibid.*, 6 pp. 5¢. **Perlite.** OLIVER S. NORTH AND ANNIE L. MARKS. *Ibid.*, 7 pp. 10¢. **Pumice and pumicite.** OLIVER S. NORTH AND ANNIE L. MARKS. *Ibid.*, 9 pp. 10¢. 1 figure. **Talc, soapstone, and pyrophyllite.** DONALD R. IRVING AND FRANCES P. USWALD. *Ibid.*, 12 pp. 10¢. 1 figure. **Vermiculite.** OLIVER S. NORTH AND NAN C. JENSEN. *Ibid.*, 10 pp. 10¢. M.J.K.

Fused-quartz fibers—a survey of properties, applications, and production methods. NANCY J. TIGHE. *Natl. Bur. Standards* (U. S.) *Circ.*, No. 569, 26 pp. (1956). 25¢. Govt. Printing Office, Washington 25, D. C.—T. presents a summary, including a bibliography, of a literature survey on the properties and the uses of fused-silica fibers. Such fibers, frequently called quartz fibers, have had wide application in precision measuring instruments despite the fact that the factors which affect their behavior are not fully known. Much of the information on their production methods and properties is widely scattered throughout the technical literature. The subjects discussed include applications, methods and apparatus, mechanical properties, and other properties, viz., structure, chemical durability, permeability, sorption, hardness, density, devitrification, thermal expansion, and viscosity. 325 references.

Lead in the Ceramic Industries. Prepared by the CERAMIC TECHNICAL COMMITTEE OF THE LEAD INDUSTRIES ASSOC. Published by Lead Industries Assoc., New York 17, 1956. 40 pp.

"Macrocrystalline" carbon. D. E. PALIN. *Nature*, 178 [4537] 809–10 (1956).—P. describes the interlayer spacings, properties, etc. 1 figure, 3 references. V.R.E.

Mineral resources of the San Carlos Indian Reservation, Ariz. C. S. BROMFIELD AND A. F. SHRIDE. *U. S. Geol. Survey Bull.*, No. 1027-N, pp. 613–91 (1956). $1.25. Govt. Printing Office, Washington 25, D. C.—The San Carlos Indian Reservation covers about 2600 sq. miles in east-central Arizona. Asbestos, the most important mineral resource, is found in the Mescal limestone of pre-Cambrian age near intrusive diabase. Small amounts of building stone, peridot, and guano have been mined commercially. Deposits of gypsum and impure diatomaceous earth of unknown value occur in late Tertiary lake beds. A low but anomalous degree of radioactivity is prevalent in the Dripping Spring quartzite of late pre-Cambrian age. Minor deposits of copper and iron minerals are known. 10 figures. M.J.K.

Nigerian diatomite. E. R. VARLEY, J. W. DU PREEZ, E. A. PARKIN, AND ENID C. SCOTT. *Colonial Geol. and Mineral Resources* (London), 6 [2] 176–81 (1956).—A description is given of the deposits in the Borno Province, Nigeria. 2 references. V.R.E.

Pellet clay stone from the Southern Coalfield, New South Wales (Australia). G. BAKER. *Australian J. Sci.*, 18 [4] 126–27 (1956).—Pellets constitute about 40% of the rock, and up to 130/cm.² of polished surface may appear. Chemical analysis shows a kaolinitic composition with some associated titanium-bearing mineral matter. X-ray powder photography shows that both pellets and matrix consist of kaolinite. The pellets are thought to have been formed by the rolling of small clay balls by running water. Preponderance of kaolinite suggests development under lacustrine conditions in water of low pH. W.O.W.

Purification of bentonite by electrophoresis. NOBUHIKO TAKEUCHI. *Bull. Fac. Eng., Hiroshima Univ.*, 3, 189–94 (1954); *Chem. Abstr.*, 49 [5] 3486c (1955).—Al is the best metal from the industrial standpoint for use as the rotating anode in purifying bentonite by electrophoresis of a negative sol. The energy required is 70 to 90 watt-hr./kg. of bentonite at a current density of about 0.8 amp./dm.²; under these conditions the remaining Fe is about 0.14% compared with the original Fe content of 3.105%.

Randomly interstratified kaolin-montmorillonite in acid clay deposits in Japan. TOSHIO SUDO AND HISATO HAYASHI. *Nature*, 178 [4542] 1115–16 (1956). 2 figures, 1 reference. V.R.E.

Reconnaissance of the ceramic and refractory clays of Western Australia. R. W. COX, A. C. FROSTICK, W. G. GARRETT, AND W. O. WILLIAMSON. *Commonwealth* (Australia) *Sci. Ind. Research Org., Div. Ind. Chem., Tech. Paper*, No. 2, 92 pp. (1956).—Sixty-one samples from 43 localities were examined mineralogically and by physical tests. Testing methods and the ceramic assessment of results are discussed. Many clay deposits remained in place on rocks from which they had been derived by intensive weathering. Some of these contained excessive amounts of grit, iron and titanium compounds, or soluble salts. Lacustrine clays were also represented. Clays were classified as kaolins and semiball, ball, and bentonitic clays. Some are of possible use in earthenware, china and related bodies, in firebrick, and as bond or coating clays. 31 references. W.O.W.

Smaltite—mineral specimens No. 37. ANON. *Mine & Quarry Eng.*, 22 [10] 412–13 (1956).—The synonyms, nomenclature, varieties, composition, crystallography, physical properties, tests and diagnosis, occurrence, and uses of smaltite ($CoAs_2$) are presented in orthodox textbook style. Cobalt compounds are used in ceramics, especially for making blue glass, enamel, pottery, etc. 3 figures. V.R.E.

Some Australian silica deposits as potential sources of silica brick. R. R. HUGHAN. *Clay Products J. Australia*, 23 [8] 3–9 (1956).—Chemical and physical data are given for samples of silica, mostly from the States of Victoria, New South Wales, and South Australia. The rocks included sedimentary quartzites, silicified limestone, material silicified beneath basalt flows, and silcretes. The silcretes resemble those of South Africa and were found in the Oodnadatta region of South Australia. Satisfactory experimental brick were made from several quartzites. W.O.W.

Surface adhesion and elastic properties of mica. GEORGE L. GAINES, JR., AND DAVID TABOR. *Nature*, 178 [4545] 1304–1305 (1956). 1 figure, 4 references. V.R.E.

Titanium nitride—its preparation and "hard-metal" properties. I. C. KRAITZER AND I. E. NEWNHAM. *Australian J. Appl. Sci.*, 7 [3] 215–23 (1956).—TiN was made by passing NH_3 and $TiCl_4$ through a stainless steel tube at 600°C. Iron contamination of the nitride during preparation and subsequent ball milling assisted the sintering of compacts. Attempts to sinter pure nitride prepared by another method failed below 2000°C. Addition of Fe permitted sintering below 2000°C. Strength and hardness decreased but subsequently rose to a maximum at 11% Fe. Addition of Mo to nitride containing Fe caused little change in sintering temperature or strength but greatly increased hardness to a maximum at 10% Mo. Compacts with 2% Mn had physical properties similar to those of compacts with 10% Mo. Metallographic descriptions are given. Methods for analyzing titanium nitride with metallic additions are discussed. 2 figures, 13 references. W.O.W.

Veinlets and similar formations in bauxites. S. I. BENESLAVSKII. *Doklady Akad. Nauk S.S.S.R.*, 97, 729–32 (1954); *Chem. Abstr.*, 49 [3] 1497g (1955).—In gibbsite and boehmite-diaspore

using a through-flame technique for their preparation. The distributions obtained confirmed the earlier work with the exception that cyclic phosphates were found in solutions of glasses having or approaching the metaphosphate composition despite prolonged heating of the glasses in the molten condition. The earlier observation was that prolonged heating eliminated the cyclic phosphates. As before, no orthophosphate was found, as predicted by Van Wazer, and neither the Poisson nor the "random reorganization" distributions fitted the data for both high and low average chain lengths. Although some sort of rearrangement is occurring in the melt, it may not be a completely random process; a rapid change of chemical properties with chain length of the short polymers may have to be taken into account. This was confirmed by similar studies of potassium and lithium phosphate glasses, whose distributions were found to be different enough to demonstrate a cation effect. Consequently, more than stoichiometry is involved. 6 figures, 19 references.

Diamond glass wheel working machinery. M. H. Hawkins. *Glass*, 34 [5] 215–17 (1957). 5 figures. V.R.E.

Electron microscope investigations on opal glass break surfaces. Frank Kerkhof, Robert Seeliger, and Walter Westphal. *Glastech. Ber.*, 28 [7] 262–64 (1955).—Electron micrographs were made of tungstic oxide shadowed collodion replicas from opposite surfaces of a break in opaque glass. The tiny crystals embedded in the amorphous glass were usually irregular lumps; only seldom were cubic crystals indicated. They were thought to be chiefly NaF in view of the composition of the glass, which is not, however, given. The pattern of the crystals in the glass permitted matching pictures of the opposite break surfaces exactly. There was no evidence of plastic flow of glass under the stresses involved in the breaking process. There were tall spikes on most of the crystals projecting from the glass surface, evidently due to sticking and flow of the collodian membrane during the stripping operation. Behind each projecting crystal a tiny flag 0.5 to 1.0μ long appeared in the glass surface. The directions of these flags indicated the direction in which the crack traveled when the glass broke with an average error of 5° to 7°. They were due to the break traveling at different levels around the fluoride crystals, thus forming tiny terraces or steps. The number of crystals per square millimeter of surface passed through a minimum of 14×10^4 at a distance of 2 mm. from the fire-polished surface of the glass. From this point the number increased toward both surfaces, reaching 19×10^4/mm.^{2} at a distance of 0.5 mm. from the fire-polished surface and 24×10^4/mm.^{2} at a distance of 1.5 mm. from the opposite, mat, surface. The crystals were finer and more numerous in the vicinity of the mat surface, where the glass was cooled most rapidly during the pressing process, than in the vicinity of the fire-polished surface. Glass thickness was 8.5 mm., and the crystals ranged from 0.1 to 1.0μ in diameter. 4 figures, 6 references. C.H.G.

Glass as fertilizer. Karl T. Nestle. *Glastech. Ber.*, 28 [5] 194–97 (1955).—Developments in the U. S. and Germany are reviewed. The base glass, which must not be too soluble (<7%), is obtained by replacing a substantial part of the silica of ordinary glass batches with phosphoric oxide, e.g., SiO_2 38.8, P_2O_5 20.9, Fe_2O_3 5, MnO_2 4, CaO 8.2, MgO 8.2, K_2O 9.2, and Na_2O 9.2%. Trace elements may be added in various proportions according to soil and crop requirements. 20 references. C.H.G.

Glass in the hands of our ancestors. W. E. S. Turner. *Glastech. Ber.*, 28 [7] 255–59 (1955).—Historical. 5 references. C.H.G.

Glass polishing: I, Optical polish. Ernst Brüche and Helmut Poppa. *Glastech. Ber.*, 28 [6] 232–42 (1955).—Electron micrographs were made of metal-shadowed replicas from 12 samples of optical glass disks taken at various stages of polishing with Uni-Oxide, a 70% ZrO_2 powder with a maximum in the particle size distribution at about 0.25μ. The presence of uneven smeared areas in the highest lying zones of the initial sample showed that the polishing process had begun during the last stages of fine grinding. In the first minute of polishing this process of smoothing the high spots was greatly extended. It appeared to be due to plastic flow of the glass under pressures of about 50,000 kg./cm.^{2}. Such flow without cracking under sharp pointed silicon carbide grains with a moderate load was shown by an electron micrograph which also showed the cracking and tearing that occurred when the load was increased and the polishing action went over to grinding. The erasure of one trace by plastic flow when another trace crossed it was also demonstrated. This polishing process appeared to occur only on the high spots, and no filling in of craters left by grinding was observed as a result of either the plastic flow of the glass or the adherence of displaced material in the low spots. As the polishing progressed, the smooth spots enlarged and finally joined, leaving rough areas where the surface was originally depressed. No polishing action takes place at the bottom of such low spots since the polishing grains must be supported directly by the pitch of the polishing cup to exert the pressure necessary for plastic flow of the glass. The ratio between the measured pressure during polishing of 150 gm./cm.^{2} and the pressure necessary for plastic flow, 5×10^7 gm./cm.^{2}, indicates that the active surface of polishing medium actually in contact with the glass amounts to only 3×10^{-4} cm.^{2}/cm.^{2} of lap surface. From the average size of the polishing grains, the number of grains in a 1-grain layer is calculated to be 16×10^4/mm.^{2}. The ratio of surface of the grains in actual contact with the glass to projected area of the grains indicates that the pressure traces or scratches made by the polishing grains in the glass surface are about 1 mμ deep. With the normal rate of polishing, successive grains pass over the glass at intervals of 10^{-4} sec., which may be a short enough time so that the surface of the glass remains in a plastic state continuously. "Table" cracks are found marking off elevated or depressed areas a few microns in diameter. These are ascribed to the action of abrasive particles under high pressure which produce cylindrical cracks running perpendicularly into the glass. The initial stages of polishing progress rapidly, but the final elimination of low rough regions requires a relatively long time because glass must be wiped from the smooth high surface until the level is reduced to that of the valley bottoms. 22 figures, 13 references. *Cf. Ceram. Abstr.*, 1956, Sept., p. 186*f*. C.H.G.

Identification of inorganic fibers. W. Boeth and U. Müller. *Faserforsch. u. Textiltech.*, 7, 497–504 (1956); abstracted in *J. Appl. Chem.* (London), 7 [5] i–417 (1957).—A rapid microchemical method for identifying slag fiber (I), mineral fiber (II), ceramic fiber (III), glass fiber (IV), quartz fiber (V), and asbestos fiber (VI) comprises treating the fiber sample successively with the following reagents which give the results indicated: (1) 2% H_2SO_4, I dissolves with the formation of $CaSO_4$ crystals; (2) 37% H_2SO_4, II dissolves with formation of $CaSO_4$ crystals; (3) a 1:1 mixture of 37% H_2SO_4 and 10% HF, both III and IV dissolve, III without residue and IV with formation of crystals or a corny residue; (4) a 4:1 mixture of 20% HF and 5% aqueous K ferrocyanide, both V and VI are undissolved but VI turns blue or green according to the asbestos type and V is uncolored. Tests for distinguishing between the members of the individual fiber classes are as follows: (*a*) with a 1:3.5 mixture of 15% HCl and 5% aqueous K ferrocyanide, slag and mineral wool give different color changes; (*b*) with 17% H_2SO_4 and 10% HF, Silan dissolves with crystal formation and basalt without residue; (*c*) with a 1:1 mixture of 37% H_2SO_4 and 10% HF, various types of glasses give different crystal types in different amounts; and (*d*) with 40% HF (and other reagents), various types of asbestos give characteristic color changes or crystal forms. 12 references. V.R.E.

Instruments for the determination of the physical properties of glasses. H. Schulz. *Glas-Email-Keramo-Tech.*, 8 [5] 157–60 (1957).—A brief review is given of the simpler forms of apparatus for determining refractive index and dispersion for production quality control. Approximate values are obtained by measuring the shift of the image viewed through a slab of the glass, and more accurate measurements are made with a refractometer or by goniometric observations on a beam passing through a prism. Apart from the general refractive index of the sample, it is essential to be able to detect small variations from point to point which may be caused by inhomogeneities such as cords. A relatively simple observation of the strain pattern in polarized light can detect a variation of one part in a million. 1 figure. J.A.S.

Kinetics of slow fractures in glass. W. C. Levengood and W. H. Johnston. *J. Chem. Phys.*, 26 [5] 1184–85 (1957).—Fractures in plate glass originating at a cutter mark and progressing slowly parallel to the surface were observed under controlled conditions. The rates of spread of such fractures, immediately after the glass is cut and for several hours afterward, were determined by viewing microscopically the movement of interference fringes produced in monochromatic light. Effects of external atmosphere and of various gases introduced during melting are described. A theory of the kinetics of slow fracture rates is offered, which relates the fracture spreading rate to the