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CERAMIC ABSTRACTS

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and alkaline constituents appear to have been leached out by percolating water charged with solvent acids. Fire-clay seams occur both above and below the coal seams, as bands in them, and also separately in the sandstone sequence. The deposits, reserves, and refractory properties of fire clays are described. B.L.M.

Fluorite flotation: I, Development of new flotation technique. J. H. HAMILTON, J. W. JOHNS, JR., AND H. BRADFORD. *Univ. Utah Eng. Expt. Sta. Bull.*, No. 47, pp. 1-21 (1950).—Two techniques for high recovery of fluorite concentrate are given: (a) The ore is ground wet and then boiled subsequent to the addition of required reagents but prior to the final flotation step. (b) The ore is ground dry with required reagents and then heated to a temperature below the decomposition temperature of the collector. Laboratory and pilot-plant data on ores of various gangue constituents are given. 3 figures, 17 references. **II, Theory of oleic acid collector action.** M. A. COOK AND A. W. LAST. *Ibid.*, pp. 22-39.—Benefits of the new techniques are explained on the basis of the time and temperature dependent chemisorption process. The strength of attachment to the solid is greater in chemisorption than in physical adsorption. Evidence is presented which indicates that the collector acts as a neutral molecule. 5 figures, 20 references. **III, Improvement of selectivity of oleic acid by the use of vitamin D-type addition agents.** J. C. NIXON AND M. A. COOK. *Ibid.*, pp. 40-50.—Results similar to those recorded in parts I and II are obtainable by condensing the physically adsorbed oleic acid film. In this case neither heating nor dry grinding appear to be necessary to recover 95% of 98% fluorite for most ores. Ergosterol, cholesterol, and other sterol-type reagents, added in an amount of 1 lb./ton, serve to condense the oleic acid and improve selectivity. 1 figure, 14 references. E.P.H.

Fundamental studies of talc: I, Constitution of talcs. JOSEPH A. PASK AND MAURICE F. WARNER. *J. Am. Ceram. Soc.*, 37 [3] 118-28 (1954).—Talc varies considerably in texture and in chemical analysis. These variations are explored on the basis of phase, field, and atomic structure considerations with the aid of chemical, X-ray, and differential thermal analyses. This complexity may be accounted for primarily on the basis of the existence of solid solutions of the layer or group type. 8 figures, 24 references.

Hydraulic methods for underground mining of silica sand. A. D. BRYANT. *Mining Eng.*, 5 [3] 282-83 (1953).—Silica sand bonded by 1 to 2% clay is mined from the St. Peter sandstone near Ottawa, Ill., in open pits by hydraulic methods. Similar hydraulic methods have been extended to one underground mine. The sandstone is blasted and then disintegrated and washed to a sump by hydraulic nozzles. The slurry is picked up from the sump by a sand ejector or hydraulic elevator and transferred to rubber-lined pumps for transportation to a washing plant. 3 illustrations. M.D.T.

Industrial minerals. IAN CAMPBELL. *Mining Eng.*, 5 [2] 162-69 (1953).—This review of activities and developments for 1952 includes discussions of asbestos, cement, clay, diatomite, feldspar, lime, perlite, talc, and zircon. 9 illustrations. M.D.T.

Inorganic pigments: IV, Cobalt arsenate, 1, Compositions and some properties of cobaltous arsenates obtained by the wet process. TOKUO ANDO AND SOICHIRO MINAMI. *Bull. Osaka Ind. Research Inst.*, 3 [2] 44-49 (1952).—The chemical composition of the precipitates formed by adding a solution of sodium arsenate to a cobalt nitrate solution is $\text{Co}_m(\text{AsO}_4)_n \cdot x\text{H}_2\text{O}$. When a 5% solution of Co and arsenate is used, m is about 2.5(I), while in very dilute solutions m is about 3(III). When calcined I is dipped in water, its composition changes to II, $\text{Co}_2(\text{AsO}_4)_3 \cdot 8\text{H}_2\text{O}$. X-ray powder photographs of I, II, and III are identical. The colors of these samples are determined by a G.E. recording spectrophotometer. For part III see *Ceram. Abstr.*, 1952, Aug., p. 151j. K.Y.

Method for concentration of North Carolina spodumene ores. M. K. BANKS, W. T. MCDANIEL, AND P. N. SALES. *Mining Eng.*, 5 [2] 181-86 (1953).—A flotation process has been developed for the production of spodumene concentrates that contain 6.0% Li_2O and 0.45% Fe_2O_3 . The ore is floated twice, first to float the mica, feldspar, and quartz and then the iron-bearing minerals. The tailings remain as a high-spodumene concentrate. 11 references, 2 figures. M.D.T.

Mica weathering in three soils in central New York. B. N. ROLFE AND C. D. JEFFRIES. *Clay Minerals Bull.*, 2 [10] 85-93 (1953).—The authors show how the mineralogical characteristics of soil profiles may be used to determine their genesis. The

X-ray spectrometer patterns of three brown podzolic soil profiles in the selected area of about 2 sq. miles show the individuality of each profile and also indicate the steps in the weathering sequence from unweathered, through intermediate, to hydrated mica (vermiculite). Differences in drainage and topographic positions yield distinct profiles on weathering. 2 figures. A.B.S.

Mineral production of India during 1951. DIRECTOR, GEOLOGICAL SURVEY OF INDIA. *Indian Minerals*, 6 [4] 189-208 (1952).—The output of asbestos, bauxite, feldspar, kyanite, and steatite increased, but the production of chromite, fuller's earth, and gypsum declined. The ceramic industry used 9.4% of the total coal output. The Lapsa Buru kyanite deposit of Kharaswan is estimated at 200,000 tons within a depth of a few feet. The output of vermiculite rose from 52 tons in 1950 to 232 tons during 1951. Cf. *Ceram. Abstr.*, 1953, April, p. 71j. B.L.M.

Mining and concentration of ilmenite and associated minerals at Trail Ridge, Florida. J. H. CARPENTER, J. C. DETWEILER, J. L. GILLSON, E. C. WEICHEL, JR., AND J. P. WOOD. *Mining Eng.*, 5 [8] 789-95 (1953).—Beach and dune sands containing ilmenite, rutile, zircon, and other heavy minerals occur as extensive deposits near Jacksonville. Sand containing 4% heavy minerals is dredged, screened, and passed through banks of Humphreys spiral concentrators. A major product is 98% zircon, which is marketed for foundry, ceramic, sandblasting, and high-temperature use. 2 references, 10 figures. M.D.T.

Occurrence of "china clay rock" on Eyre Peninsula, South Australia, and its industrial significance. H. ELLERTON. *Clay Products J. Australia*, 21 [2] 3-5 (1953).—Laboratory tests showed that a very pure kaolin was obtainable by washing this material. Analyses of raw and purified material are given. Unfortunately, there is a lack of clean water near the deposit. W.O.W.

Process development and practice of the Potash Division of the Duval Sulphur and Potash Co. G. E. ATWOOD AND D. J. BOURNE. *Mining Eng.*, 5 [11] 1099-1104 (1953).—Recovery of sylvinite by flotation from a sylvinite-halite-clay ore was complicated by the presence of up to 1.5% of dispersed montmorillonite, which adsorbed large quantities of the flotation collector and amine. The following methods of preventing adsorption by the montmorillonite were considered: (1) heating to cause irreversible dehydration, (2) fixing the base-exchange ion with a very active radical, and (3) blinding the structural interstices of the montmorillonite prior to the addition of the cationic collector. The use of a blinding agent was chosen, and polysaccharide mannogalactan was used. The commercial source was Guar (General Mills, Inc.). 14 references, 9 illustrations. M.D.T.

Production and uses of beryllium. A. G. THOMSON. *Mining J. (London)*, 241, 661-62 (1953).—The world output of beryllium in 1952 is estimated at 7000 tons. Although Brazil is still the principal source of supply, Africa is becoming of greater importance. L.B.

Progress of geological work in Madras. M. S. KRISHNAN. *Indian Minerals*, 6 [2] 59-64 (1952).—Madras State has good resources of raw materials for the ceramic, glass, and refractory industries, none of which is well established within its borders. Cf. *Ceram. Abstr.*, 1952, Sept., p. 1686c. B.L.M.

Properties of Wanibuchi chlorite. YOICHI SHIRAKI. *J. Ceram. Assoc. Japan*, 61 [688] 485-89 (1953).—By differential thermal analysis, chlorite of Wanibuchi, Shimane prefecture, was found to be penninite. Its particle is flakelike. Its swelling property, the viscosity of the suspension, and its base-exchange capacity are high, but its plasticity is low. The amount of soluble MgO is least for the sample fired at 800° to 900° and maximum for that fired at 1100°C . It can be used as raw material for cordierite ceramics, steatite, magnesia brick, etc. K.Y.

Recent studies of kaolins and clays—practical effects in the field of refractory materials. ANTONIO REBUFFAT. *Ceramica*, 8 [10] 36-39 (1953).—The latest theories on the crystalline structure of kaolin and clay and the molecular network formed are reviewed and presented in diagrams. M.H.A.

Some new limestone and dolomite occurrences in northern India. J. B. AUDEN. *Indian Minerals*, 2 [2] 77-91 (1948).—Cement limestones are available at Larji, lower Giri Valley in Sirmur State, and the Kalsi area. These resources are important for the production of cement in East Punjab and the western part of the United Provinces. High-silica and low-magnesia limestones occur in the Lakshmanjhula area and up the Ganges Valley. 13 references, 1 map. B.L.M.

Talc deposits at Degeta, near Dausa, Rajasthan. B. C. ROY. *Indian Minerals*, 6 [3] 141-46 (1952).—A fair percentage of the

illus. \$15.—This book comprises a very complete summary of the field, from the elementary considerations of the theories involved through practical applications. In most cases it will not be necessary to consult another reference to actually start from the beginning and make determinations. Except for the fundamental equations of diffraction theory, the mathematics necessary to clarify the various formulas is presented. The first chapters present elementary crystallography, sources and properties of X rays, and the principles of X-ray diffraction. The procedures, equipment, and interpretation of results by photographic and spectrometric powder techniques are covered completely. Over 100 pages are devoted to the Geiger-counter spectrometer, the first summation of such information in book form. The applications covered include qualitative and quantitative analysis of crystalline powders with reference to the use of the ASTM

data file, determination of lattice constants, crystallite size determinations, polycrystalline diffraction as used in stress measurement of metals and other applications, studies of non-crystalline materials, and particle size work employing small-angle X-ray scattering. The authors have made actual use of most of the procedures described. There are nine appendices giving data necessary for calculations as well as information on processing X-ray film and laying out a diffraction laboratory. There are 561 specific footnote references and 103 references to general literature covering the different sections. Complete subject and author indexes. 325 figures. D.J.B.

Additional abstract

Sect. XIV: Statistical significance of the strength of brittle materials.

XIV—General and Historical

Electrical hazards in the ceramic and glass industries. W. SCHWEISHAMER. *Ceramics*, 6 [64] 179-80 (1954).—Brief suggestions and precautions for avoiding electric shock are given with a warning that low voltages can be as harmful as high ones, although in a different manner. The risks of shock are greater in hot weather and in hot workshops where the operators perspire freely. Electric burns, if neglected, can be very serious.

A.B.S.

Give them a reason to buy. DAVE CHAPMAN. *Am. Ceram. Soc. Bull.*, 33 [7] 213-14 (1954).

International Commission on Glass meets in Sweden. HOWARD R. LILLIE. *Am. Ceram. Soc. Bull.*, 33 [8] 252-53 (1954). 3 photos.

International Congress on Nuclear Engineering. JAMES A. NORTON. *Am. Ceram. Soc. Bull.*, 33 [8] 251 (1954).

The pencil—also a ceramic product. C. STURMER. *Euro-päische Tonind.*, 3 [6] 161-62 (1954).—A brief historical sketch is given of the development of the pencil as used by artists since early times. While the Eastern world preferred soft pencils (and brushes), the West used hard pencils. Graphite is used exclusively for pencils. The preparation of graphite, its manufacture, and hardness scales are described, and the possibilities of using color pencils for ceramic decoration are discussed. M.H.A.

Statistical significance of the strength of brittle materials. O. K. SALMASSY, A. D. SCHWOPE, AND W. H. DUCKWORTH. *Am. Ceram. Soc. Bull.*, 33 [8] 240-43 (1954).—The definition of the "strength" of brittle materials is discussed. It is proposed that structures made of brittle materials be designed, not on the basis of the mean strength obtained from test data, but upon a stress corresponding to a given probability of fracture, as derived from a statistical analysis of the test data. The choice of a probability of fracture and its corresponding design stress is left to the discretion of the designer, but the stress corresponding to zero probability of fracture, the "zero strength," is indicated to be of particular significance. 26 references, 5 figures. Cf. *Ceram. Abstr.*, 1953, Oct., p. 183j.

Stress analysis in design: IV, How to approach the problem. J. B. HARTMAN AND R. E. BENNER. *Machine Design*, 26 [7] 139-46 (1954).—A description is given of common procedures

used to develop a design for proper strength together with considerations which influence the choice of an economical procedure. Factors that lead to the selection of a stress analysis method are the major topic. 7 figures. For part III see *Ceram. Abstr.*, 1954, Sept., p. 172k. D.J.B.

BOOKS

Sixteenth Semiannual Report of the Atomic Energy Commission. U. S. Govt. Printing Office, Washington 25, D. C., 1954. ix + 137 pp.

Work and Health Protection in the Glass and Ceramic Industry (Arbeits- und Gesundheitsschutz in der Glas- und Keramischen Industrie). 2d enlarged ed. WALTER GUTMANN AND ERNST HOLSTEIN. Fachbuchverlag G.m.b.H., Leipzig, 1952. 144 pp. Price DM 6.80.—The inherent dangers to the health of workers in glass and ceramic plants are described, and the protective measures planned in the past are outlined. The work of Bernardino Ramazzini (1633-1714), who wrote a book entitled, "On the Diseases of Glass and Mirror Makers," is particularly noteworthy; in his opinion, "the glassmakers are the most intelligent among all handicrafters." This work is given at the end of the book in English. The book deals with the production and processing of glass and ceramics, the provision of protection in laying out a plant, ventilation, the removal of mechanical impurities (dust, soot), the prevention of accidents, the nature of possible diseases (silicosis), and rational measures for guarding the health of workers, in particular women and youths. The satisfying of the great thirst produced under heat and radiation is discussed; 2 to 3 quarts of liquid per man per shift is considered to be normal. The liquid should be neither ice cold nor hot, and beer should not be used. Tea, especially tea made of blackberry or strawberry leaves, is a good thirst quencher, even when tepid. The regulations of the German Democratic Republic (East Germany) for the protection of the worker are appended in full. 103 figures. M.H.A.

Additional abstract

Sect. V: Chemical hazards in glass and ceramic industries.