

NOTES AND NEWS

NOTE ON HYDROPHILITE.

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In running a number of fusions upon anhydrous calcium chloride it was found impossible to check the optical data recorded for this material in Larsen's Tables.¹ Anhydrous calcium chloride occurs in nature as the mineral hydrophilite but no optical determinations have been made upon the mineral itself. The data given by Larsen were obtained upon artificial melts which were cooled, crushed while hot, and immersed immediately in oil. He states that the substance is "uniaxial positive, $\omega=1.605$, $\epsilon=1.615$. It shows a perfect prismatic cleavage and polysynthetic twinning parallel to the c axis. This material inverts while in oil to an isotropic form, in which $n=1.52$, and this material is filled with and bordered by a birefracting material in shreds that has a lower index of refraction."

The first part of these observations were easily verified but no tendency to invert to the isotropic form was observed, even after being immersed in the index liquids for a period of thirty days. Another series of melts were sealed in test tubes, in contact with dry air, for thirty days without inverting. The twinning observed by Larsen was very characteristic and in many basal sections resembled the twinning of microcline. The extinction is symmetrical to the two sets of twinning lamellae and in those cases in which the lamellae were wide, positive biaxial interference figures were obtained with an optic angle of moderate size. The values determined for the indices of refraction were: $\alpha=1.600$, $\beta=1.605$, $\gamma=1.613$, all ± 0.003 . Described on the basis of its pseudo-tetragonal crystallization, the twinning lamellae are parallel to the first order prisms and the optic planes parallel to the second order prisms. The resultant interference figure in all cases except those few which have wide twinning lamellae, is uniaxial positive. Because of the perfect prismatic cleavage interference figures are not commonly observed. The series of index liquids used in these determinations consisted of mixtures of paraffin oil and alpha monobromnaphthalene.

Later while working with a series of index liquids composed of mixtures of turpentine and cinnamon oil, the material began to invert to an isotropic form as Larsen had observed. An examination of the literature of calcium chloride showed that anhydrous calcium chloride forms double compounds with many organic reagents. J. E. Heindl² prepared a series of alcoholates with the general formula $\text{CaCl}_2 \cdot 3\text{ROH}$, where R represents the various members of the methane series. These compounds were described as calcium chloride with "alcohol of crystallization." A. Lieben³ prepared a series of double compounds of calcium chloride with the fatty acids. It is probable that the "inversion" of calcium chloride is due to a reaction of this type with one of the components of the index liquids used. The mean value of the indices of refraction of anhydrous calcium chloride calculated from the specific refractive energies⁴ is 1.599 which agrees closely with the determined values.

¹ Larsen, E. S., The Microscopic determination of the monopaque minerals. *U.S.G.S., Bull.* 679, p. 89, 1921.

² and ³ Mellor, J. W., A comprehensive treatise on inorganic and theoretical chemistry. Vol. 3, p. 712, 1923.

⁴ Larsen, E. S., *op. cit.*, p. 31.

Artificial hydrophilite is probably orthorhombic with a pseudo-tetragonal development, the isotropic material observed by Larsen being a compound of calcium chloride with the index liquids. The birefracting material which later develops along the borders of the isotropic compound probably represents a further reaction with the index liquid.

GREEN SPHALERITE FROM SONORA, MEXICO

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Sphalerite of an unusually fine green color is prominently displayed in specimens of silver-lead ore recently received by the Department of Geology & Mineralogy, University of Arizona, from the Manzanal mine, near Cananea, Sonora, Mexico.

The sphalerite is massive cleavable, transparent, and varies in color between Ridgway's "Veronese" and "Rivage" greens, XVIII, 31', *d* and *b*, respectively. It occurs with galena in irregular segregations ranging up to one inch in greatest dimension; both are associated with small, prismatic quartz crystals in a gangue composed chiefly of massive quartz and included fragments of wall rock. The ore generally, judging by the specimens at hand, consists essentially of massive galena and tetrahedrite, with some brown sphalerite, in a quartz-barite and older, fragmental quartz-wall-rock gangue.

The period of crystallization of the green sphalerite and associated galena evidently was late in the formation of the deposit. Apparently they occur only in vugs or unfilled portions of a vein, and were deposited after the walls of such openings had been more or less lined with slender prismatic quartz crystals. The galena, partly massive cleavable, partly in distorted octahedral crystals, obviously was deposited first, as it commonly rests on and between the quartz crystals, with green sphalerite in turn on the galena. Occasionally, however, the order may be reversed, or sphalerite may be in contact with the quartz crystals, with little or no galena present. Some of the galena has a notably etched appearance. Sericite is abundant in all specimens and is conspicuously associated with the older gangue, while leverrierite is prominent in some as a heavy white coating on crystals of galena and quartz.

REVIEWS

MIKROSKOPISCHE PHYSIOGRAPHIE DER MINERALIEN UND GESTEINE. H. ROSENBUSCH, Vol. I, Second Half, 5th edition, enlarged and revised by Dr. O. Mügge. Octavo, pp. xvi, 814, with 221 figures, 35 plates and 17 double-page tabular summaries. E. Schweizerbart'sche Verlagsbuchhandlung, *Stuttgart*, published in three parts in 1925, 1926 and 1927. (For reviews of the First Half, see *Am. Mineral.*, VII, 1922, p. 211; IX, 1924, p. 172; and X, 1925, p. 155).

This well-known work is a very complete account of the microscopic characters of the rock-forming minerals. Mügge has retained the arrangement of the earlier editions so that minerals are described in the order of decreasing symmetry of the crystal systems to which they belong, while the order within each crystal system follows Groth's chemical classification. He has revised the fourth edition very thoroughly and also added greatly to the value of the work by more complete descriptions of the modes of occurrence of minerals and some discussions of their physico-chemical relations. He has also included many minerals not described in