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SUSSEXITE FROM STERLING HILL, NEW JERSEY<sup>1</sup>CLIFFORD FRONDEL AND JUN ITO, *Department of Geological Sciences,  
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Sussexite was first described as a species from Franklin, N. J., where it occurred sparingly as fibrous aggregates in carbonate veinlets and as dense, felted veinlets in massive ore. In recent years, sussexite has been found in considerable amounts at the Sterling Hill mine, but no information has been hitherto published. It is known<sup>2</sup> chiefly between the 2150 and 2550 levels, where the orebody throughout contains traces of sussexite with local concentrations as essentially tabular masses up to a few inches thick which pinch out within a foot or so. The sussexite does not occur outside the ore. The orebody is here somewhat brecciated, with the deposition of dolomite both in openings and as a replacement of the calcite gangue. Willemite is in part replaced by antigorite. The deposition of the sussexite, by both replacement and cavity filling, apparently followed this magnesium mineralization. It was followed by the deposition of mooreite, a (Mg, Zn, Mn) sulfate, in small amounts, chiefly as a cavity filling.

The sussexite forms an interlocking aggregate of prismatic grains up to about 1 cm in length. The grains resemble individual crystals, but x-ray study shows that they are in fact parallel aggregates of fibers that are randomly oriented around the direction of elongation. Fracture surfaces have a distinctly silky luster. The grains are coherent and translucent, and differ from the fluffy or separable aggregates that characterize the sussexite from Franklin. Some material is fine-grained and chalcedonic in appearance. The color ranges from bright pink to pale flesh red. Oxidation of the small amount of ferrous iron that is generally present is accompanied by a change in color to light brown and yellowish brown, and the translucency is diminished.

The chemical analysis by J. Ito cited below has Mn:Mg~5:4, and is close to an analysis of vein sussexite from Franklin cited by Poitevin and Ellsworth (1924).

MgO	MnO	ZnO	CaO	Fe <sub>2</sub> O <sub>3</sub>	B <sub>2</sub> O <sub>3</sub>	H <sub>2</sub> O	Insol.	Total
16.84	35.78	3.71	0.15	0.26	33.50	9.57	0.19	100.00

A comparable amount of ZnO has been reported in several analyses of Franklin material. The  $\alpha$  index of refraction, parallel to the fiber elonga-

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<sup>2</sup> Priv. comm. John L. Baum, Geologist, New Jersey Zinc Company.

tion, is 1.636. The specific gravity is 3.12. These values are close to those indicated by the graphs of Schaller (1942). There is a good cleavage parallel to the fibers. Indexed  $x$ -ray powder data for sussexite are given by Takéuchi (1957).

## REFERENCES

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## CRYSTAL PARTICULARITIES IN DOLOMITE SYNTHESIS

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During hydrothermal preparation of rhombohedral carbonates, by Dr. Jangg, Vienna, some particularities were noted on the obtained samples.

It was tried to synthesize dolomite along the same lines as the Walter-Lévy's method for calcite preparation. An equimolar solution of 50 ml 0.08 mol  $\text{KHCO}_3$ , 25 ml 0.04 mol  $\text{MgCl}_2$  and 25 ml 0.04 mol  $\text{CaCl}_2$ , corresponding to 0.01 mol  $\text{CaMg}(\text{CO}_3)_2$ , was heated overnight, at  $150^\circ \text{C.}$ , in an autoclave partially filled with water in order to compensate the inner pressure on the glass tube. The resulting powder did not show dolomite, but heterogeneous crystals, measuring 25-40  $\mu$  (Fig. 1), which gave with  $x$ -ray diffraction the reflections of calcite and magnesite. The large core (calcite) is surrounded with a rim, grown by epitaxis, of same optical orientation but of higher refraction ( $\omega$  1.693, magnesite).

On the other hand dolomite crystals of different habits were obtained according to the method of Medlin (1959) who adopted for dolomite the method of Jantzsch and Zemek (1949) worked out for magnesite. Two syntheses both in the presence of urea were made at  $200 \pm 10^\circ \text{C.}$  One run provided perfect rhombohedral crystals of 35-50  $\mu$ , with  $\omega$  between 1.672 and 1.682, containing plenty of minute inclusions which prevented more precise index determination by immersion method. Another run yielded starshaped crystals of 70-140  $\mu$ ,  $\omega$  1.679, of three dimensional development (Fig. 2). The branching aggregate is due to excessive growth along the rhombohedral edges. Extinction occurs simultaneously for the whole starshaped crystal and the optic axis points along the microscope axis when the crystal orientation clearly displays the starshape. The mineralogical nature of the synthesized dolomites is confirmed by  $x$ -ray dif-