crystallization of the coarse-grained sillimanite-kornerupine-biotite-sapphirine assemblage.

Acknowledgements. I thank R. I. Gait at the Royal Ontario Museum, Toronto, R. K. Herd and S. Lonker for samples, R. I. Gait for loan of the thin section E2724 (= 16/171) studied by Walker and Collins (1907), and D. M. Carmichael for unpublished information on the Gananoque grandidierite. This research was supported by US National Science Foundation Grant DPP80-19527 to UCLA.

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[*Manuscript received 10 November 1982; revised 31 December 1982*]

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MINERALOGICAL MAGAZINE, SEPTEMBER 1983, VOL. 47, PP. 403-4

Prehnite from the Ilimaussaq alkaline intrusion

THE Ilimaussaq alkaline intrusion situated approximately 30 km NE of Julianehåb, South Greenland is renowned for its unique assemblage of rare ultramafic rocks and nepheline syenites containing abundant rare earth, beryllium, and radioactive minerals. During field work in the summer of 1968 at Laksetværelv, Kangerdluarssuk, on the eastern border of the intrusion, the author collected some large spherulitic specimens of a yellow-green mineral. Recently this mineral has been analysed by infra-red spectrophotometry and X-ray powder diffraction and identified as prehnite.

Occurrence. At Laksetværelv the prehnite occurs as large spherulitic incrustations on altered lava xenoliths, associated with aegirine, albite, microcline, yellow-green natrolite (with which it was at first confused), and sparce blue fluorite. Prehnite has been found at various other localities in Greenland. Bøggild (1953) summarizes seven localities; an eighth is Mikis Fjord, East Greenland (O. V. Petersen, pers. comm.). At most of these localities prehnite occurs as spherulitic aggregates in association with zeolites in volcanic rocks. Flink (1898) mentions prehnite from Nunarssuatsiag but this proved later to be apatite (Bøggild, 1953). The occurrence of prehnite in the peralcaline rocks of the Ilimaussaq intrusion is remarkable and a description of the mineral is given below.

Physical and optical properties. The spherulitic fan-shaped hand specimens measuring up to 15 cm in size consist of exceedingly fine confocal fibrils producing gem-quality, translucent, pale green or yellow-green, sometimes white aggregates with a pearly lustre on fracture surfaces.

In thin section the prehnite appears colourless with a moderate birefringence. Euhedral to anhedral grains of aegirine, albite, and microcline are embedded in and partly altered by the later prehnite. Spherulites sectioned parallel to the fibril axis display subparallel oriented fibrils, arranged in radiating bundles. The bundles are fan-shaped and may be continuous; in the latter case bundles have nucleated in succession, forming composite spherulites with a flamboyant texture.

Close to the extinction position the bundles exhibit a peculiar herring-bone pattern oblique to the fibrils. In thicker parts of the section the pattern is very pronounced but tends to disappear in the thinner parts. Since anomalous blue interference colours are also encountered in the thicker parts of a section, the herring-bone pattern may be ascribed to the superposition of fibrils.

Spherulites sectioned end-on show the fibril bundles with rectangular outlines and arranged in oblong groups. Within the groups the bundles are parallel oriented but adjacent groups are sub-parallel.

The individual fibrils could not be resolved in the microscope; their presence was indicated by their spherulitic extinction pattern. The fibrillar growth axis is *c* (001). The crust surfaces of the spherulites are covered with the blunt ends of protruding fibril bundles. The gravity measured in suspension in $CHBr_3/CCl_4/CH_2S_2$ is 2.917 (1) g/cm^3 (X-ray density 2.919 g/cm^3). Infra-red spectra were obtained with a Perkin-Elmer model 530 double-beam spectrophotometer using 1 mg samples in 350 mg KBr tablets. Spectra of white, pale green, and pale yellow-green prehnite were obtained in the range 200–4000 cm^{-1}. The spectra exhibited no significant differences and are identical to the spectrum of prehnite given by Moenke (1962). Owing to the fibrillar nature of the prehnite no attempt was made to determine the refractive indices by immersion methods. However, Tröger (1959) has determined the optical properties of prehnite as a function of the Fe^{3+} mol. %; since a partial chemical analysis of the greenish-yellow prehnite gave $Ca^{2+} = 19.4$ wt. %, $Na^+ = K^+ = Li^+ = 0.01$ wt. % and $Fe^{3+} = 2.0$ wt. %, the optical properties could be calculated on the basis of the Fe content. The results are α 1.627, β 1.638, γ 1.663, SV_γ 67°, and Δ 0.036.

X-ray data. A preliminary unit cell was derived from single-crystal photographs. The refinement was done by least squares using the program PARAM (Steward *et al.*, 1976). The powder data are in agreement with the data for prehnite, PDF no. 7-333. The unit cell data are *a* 4.628(1), *b* 5.485(1), *c* 18.478(4) Å, and cell volume 469.056 Å^3.

Acknowledgements. The author would like to thank I. G. Krogh Andersen, K. E. Simonsen, S. Juhl Hansen, and C. Nielsen all from the Institute of Chemistry, Odense University for the X-ray work and density measurements, chemical analysis and IR spectra, respectively; the Institute of Chemistry for providing working facilities and the Danish Ministry of Energy which made this investigation possible. Finally, B. E. Petersen and K. Tang-Jensen are thanked for typing the manuscript.

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[*Manuscript received 27 August 1982; revised 29 November 1982*]

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MINERALOGICAL MAGAZINE, SEPTEMBER 1983, VOL. 47, PP. 404–6

A note on the occurrence of melilite in kimberlites and olivine melilitites

OLIVINE melilitites occur together with kimberlites in Siberia (Ukhanov, 1963) and Namaqualand, South Africa (Moore, 1976). Such field associations, coupled with the alkaline ultrabasic characteristics of the two rock types, suggest a close although as yet poorly understood genetic relationship. This is supported by striking similarities in the phase assemblages of kimberlites and olivine melilitites (Moore and Erlank, 1979). There are, however, a number of marked differences in the mineral assemblages in the two rock types, including the rarity of melilite in kimberlites. It is suggested that the presence or absence of this mineral in undersaturated ultrabasic rocks can in part be understood in terms of melilite phase relations.

Representative analyses of melilites from the Namaqualand–Bushmanland olivine melilitites are given in Table I. Melilitites from these pipes are