MINERALOGICAL NOTES

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An occurrence of apophyllite at Shap, Cumbria

SHAP Blue Quarry (NY 564 107) has long been famous for the variety of minerals present in metasomatized Borrowdale Volcanic Group rocks within the aureole of the Shap Granite (Firman, 1957, 1978). Several phases of mineralization have been recognized. Early garnet- and epidote-bearing veins are succeeded by assemblages which include quartz, calcite, pyrite, marcasite, magnetite, hematite, molybdenite, chlorite, nacrite, hydrous mica, goethite, chalcopyrite, galena, sphalerite, malachite, psilomelane and erythrite. A late hydrothermal episode is indicated by the presence of abundant laumontite and pectolite.

Prehnite occurs as a very rare constituent of these veins (Firman, 1978, p. 230), though few examples of the mineral are known to have been found in recent years. During October 1986 blasting in the south-west face of the lowest level of the quarry revealed several large blocks cut by veins containing abundant prehnite. The prehnite-bearing veins were seen only in loose blocks and despite a careful search none was found *in situ*. In these veins early garnet and epidote are overgrown by compact crystalline pale green prehnite which forms masses over 8 cm across. Several specimens were obtained in which slender bright green prisms of epidote up to 2 cm long are embedded in prehnite. In the centre of several of the larger prehnite masses a few small vugs up to 6 mm across were found to be lined with minute colourless crystals of apophyllite, a species not previously reported from the Lake District. The apophyllite forms crusts of colourless crystals up to 0.5 mm across in which pyramid (111) faces are most prominent. X-ray diffraction studies (by R.J.F.) show similarities to fluorapophyllite from St Andreasberg, West Germany (Mineral powder diffraction file card no. 19-82). However as sufficient pure material for a full chemical analysis could not be obtained, the mineral is best described simply as a member of the apophyllite group.

A white crystalline fibrous mineral which locally encrusts the apophyllite, and in places coats fracture surfaces of the prehnite, has been identified by X-ray diffraction as pectolite.

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References

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KEYWORDS: apophyllite, Borrowdale Volcanic Group, prehnite, Shap, Cumbria.

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Mineral nomenclature: khademite

A specimen from Iran was originally described by Bariand *et al.* (1973) as $Al(SO_4)(OH) \cdot 5H_2O$ with 41.7 wt. % H_2O by TGA. No test was made for the presence of F because only a very small amount of material was available. The unit cell is *a* 11.178(4), *b* 13.055(4), *c* 10.887(4) Å in space group *Pcab*. This specimen was named khademite; however, the mineral was rejected by the Commission on New Minerals and Mineral Names (CNMMN) of the International Mineralogical Association in 1973.

Previously a mineral of this composition $Al(SO_4)(OH) \cdot 5H_2O$ was described by Rost (1937) from a chemical analysis and further reported by Palache *et al.* (1951). A slightly smaller unit-cell of *a* 11.169(5), *b* 13.039(5), and *c* 10.871(4) Å was determined by Cech (1979), who renamed this mineral as rostite with CNMMN approval. Khademite was considered a synonymous name for rostite.

Bachet *et al.* (1981), who solved the crystal structure (*a* 11.181, *b* 13.048, *c* 10.885 Å) of the type specimen from Iran, consider that the smaller atomic position requires the presence of F and makes the occupancy by an OH anion impossible. Therefore the chemical formula of khademite was changed to $Al(SO_4)F \cdot 5H_2O$. The chemical formula was also confirmed Williams and Cesbron (1983) by a wet chemical analysis of khademite from Lone Pine mine, Catron County, New Mexico, U.S.A. This