*Discussion.* The HF bath treatment apparently has a cleansing action on the weathered surface and prepares it for the K-feldspar stain. Occasionally the plagioclase is rendered a very pale yellow probably indicating a small amount of K-feldspar in solid solution or, perhaps, an alteration to sericite.

The chief limitation of this method is the destructive effect on the dark minerals (particularly biotite), which may be eliminated entirely if the HF bath time is too great. However, good results have been obtained using the procedure suggested here.

Granites stained over two years ago still have a vivid stain. More permanent preservation can be obtained by spraying the surface with clear lacquer.

The writer uses a dot pattern of 45 points per $cm^2$, a zoom-lens microscope, and a multi-tally counter for modal analysis. The counting precision for the major minerals compares favourably with the precision for stained thin sections as determined by Chayes and Fairbairn (1951).

*Conclusions.* The staining procedure described here is suitable for granitic and other rocks containing K-feldspar. It works well with weathered rocks, the procedure is simple and requires no special preparation for plagioclase, and it is extremely economical.

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[*Manuscript received 25 August 1970.*]



MINERALOGICAL MAGAZINE, DECEMBER 1971, VOL. 38, PP. 519–21

# Ferrocarpholite associated with lawsonite–albite facies rocks near Sangineto, Calabria, Italy

FERROCARPHOLITE, the ferrous iron analogue of carpholite proper, was described in 1951 as a new mineral from the island of Celebes or Sulawesi, Indonesia (W. P. de Roever, 1951). It was found as a constituent of sericite-quartzites in a glaucophane-, lawsonite-, and jadeite-bearing area.

In 1967 another group of occurrences of ferrocarpholite was discovered, in the north-western part of Calabria, Southern Italy (W. P. de Roever, E. W. F. de Roever, Beunk, and Lahaye, 1967). During subsequent field-work by one of the authors it was shown that ferrocarpholite, occurring together with quartz and calcite[1] in veins in phyllites, marbles, and quartzites, is rather widespread in an area of about 100 $km^2$ between Scalèa, Mormanno, and S. Nicola Arcella (Beunk, 1971). In this area ferrocarpholite-bearing rocks are closely associated with massive lawsonite-glaucophane rocks. These latter rocks show as further constituents sodic pyroxenes with a jadeite-content of up to 80 % associated with quartz, and aragonite, thus showing the most typical paragenesis of the glaucophane-(lawsonite) schist facies. As a result of detailed petrological and tectonical investigations of the complicated metamorphic history of this region, Beunk (1971) concluded that the formation of the ferrocarpholite was contemporaneous with the metamorphism in the glaucophane-(lawsonite) schist facies, and most probably took place under the conditions of this facies (cf. de Roever *et al.*, 1967).

Twenty-five km south of the area near Scalèa another occurrence of vein-filling ferrocarpholite in phyllites was found (E. W. F. de R.), 1½ km north-west of Sangineto. In the wider surroundings of Sangineto ferrocarpholite is probably widespread too, as it was found as one of the more important constituents of beach sand and gravel west of Sangineto. In the occurrence near Sangineto the phyllites with ferrocarpholite veins are associated with (overlying) metabasites and marbles; the metabasites can be correlated with the corresponding rocks, which near Scalèa are metamorphosed in the glaucophane-schist facies (Quitzow, 1935). The metabasites 1½ km north-west of Sangineto show a metamorphism characterized by the plentiful production of lawsonite, pumpellyite, chlorite, and albite, a metamorphism which can best be described in terms of the lawsonite-albite facies (Winkler, 1965).

Southward the metabasites can be followed in the coastal mountain-chain up to Mt. Reventino and Nicastro, some 100 km south of Sangineto (Dubois, 1969). The metabasites of the extensive exposure near Fuscaldo (25 km south of Sangineto) show a metamorphism in the lawsonite-albite facies as well. Phyllites associated with the (overlying) metabasites again show many veins resembling those of Scalèa and Sangineto, but without ferrocarpholite. Probably due to slight differences in metamorphic conditions—somewhat higher temperatures and lower pressures according to Dubois, 1969—no ferrocarpholite was formed near Fuscaldo.

Ferrocarpholite has a composition very similar to that of chloritoid, as illustrated by the equation:

| ferrocarpholite | = chloritoid | +quartz+water |
|---|---|---|
| $H_4(Fe, Mg)(Al, Fe)_2Si_2O_{10}$ | $= H_2(Fe, Mg)(Al, Fe)_2SiO_7$ | $+SiO_2+H_2O$ |

Substitution of Mg for Fe in both minerals ranges up to about 40 %. In Western Calabria chloritoid is found, e.g. near Mt. Reventino, where it is an important constituent of garnet-bearing schists closely associated with metabasites, here repre-

[1] Aragonite was not found in these veins; if aragonite was ever present, later deformation and recrystallization may account for its absence.

sented by epidote–actinolite schists (Piccarreta and Zirpoli, 1969). No ferrocarpholite was found in this region, and evidently chloritoid is formed under metamorphic conditions of slightly higher grade (cf. de Roever, 1956).

Whereas the ferrocarpholite of Scalèa and surroundings appears to have been formed under glaucophane-schist facies conditions, the occurrence near Sangineto is considered to indicate that ferrocarpholite can be formed under conditions of the lawsonite-albite facies as well. A slightly higher grade of metamorphism, however, favours the production of chloritoid.

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[*Manuscript received 30 November 1970.*]



MINERALOGICAL MAGAZINE, DECEMBER 1971, VOL. 38, PP. 521–5

# The occurrence of vaterite in gastropod egg-shells

VATERITE is very much less common in nature than the other two forms of calcium carbonate, calcite and aragonite. It has been recorded from calcareous sediments (Bentor *et al.*, 1963), metamorphic rocks (McConnell, 1960), and meteorites (Du Fresne and Anders, 1962), but most known occurrences are in abnormally calcified tissues, including regenerated damaged mollusc shells (Wilbur, 1964), otoliths of some fishes (Carlström, 1963), and pathological concretions in man (Lagergren, 1962); additional references are given by Hall and Kennedy (1967). This note records a new type of occurrence of vaterite in the egg-shells of the gastropod mollusc *Ampullaria*.

We have examined the shells of the eggs of a number of species of gastropods by X-ray diffraction, and all were made of calcite or aragonite except for those belonging to the genus *Ampullaria*, which were found to consist of vaterite. Specimens have been examined of four species of *Ampullaria*: *A. australis* from Uruguay, *A. baxea*