

SHORT COMMUNICATIONS

MINERALOGICAL MAGAZINE, DECEMBER 1970, VOL. 37, NO. 292

Coquimbite from Nevis, West Indies

RARE crystals of coquimbite are intimately associated with tamarugite¹ efflorescences on exposed surfaces of low cliffs composed of extensively opalized and alunitized bandaite or andesitic debris² at the 145-ft. contour in Clark's Ghut, near Jessup Village, Nevis, Leeward Islands, West Indies (approximately 17° 09' 30" S., 62° 37' E.). Very pale amethystine crystals are imperfect, doubly terminated with forms comparable to those reported by Ungemach (1935, p. 169, fig. 20, a crystal from Tierra Amarilla, Chile) but completely dissimilar from those described by Sakurai, Kato, Fujiyama, and Imayoshi (1958, p. 775, figs. 1-5 from Konomai Mine, Hokkaido, Japan). Development of poorly reflective and more or less unmeasurable faces probably results from partial solution caused by water dripping down the cliff face during and after intermittent, but fairly frequent, rains.

The crystals are soluble in cold water and if allowed to stand overnight resultant solutions precipitate $\text{Fe}(\text{OH})_3$. ω 1.543 ± 0.001, ϵ 1.554 ± 0.001, $\epsilon - \omega$ 0.011; D_4^{22} 2.128 g/cm³ ± 0.005.

A completely indexed X-ray diffraction powder pattern and least-squares-refined unit-cell dimensions, the preliminary data being obtained initially from quartz-calibrated Weissenberg films, are listed in table I. Systematic extinctions are: $hh\bar{2}hl$ has l even only, $00l$ has l even. These absences are connected with a c glide plane normal to faces of the $\{hh\bar{2}hl\}$ forms, and hence the space group is either $D_3^2d = P\bar{3}1c$ or $C_{3v}^4 = P31c$. Dana's System (7th edn, 2, 532) lists the possible classes as $3m (= C_{3v})$, $32 (= D_3)$, or $\bar{3}m (= D_{3d})$, doubtless based upon the Laue symmetry found by Hocart (in Ungemach, 1935, pp. 172 *et seq.*), who did not recognize the systematic extinction indicating the c glide plane; this reduces the possible classes to $3m$ and $\bar{3}m$. The only indexed powder diffraction patterns available include one reported by Sakurai *et al.* (1958, pp. 773-4) and card no. 6-0040 in the A.S.T.M. diffraction file. Indexing, limited as it is in both cases, confirms the systematic absences already noted here, and, furthermore, Cesbron's Weissenberg study (1964, pp. 127-8) permitted him to recognize that $hh\bar{2}hl$ reflections are present only when $l = 2n$, thus removing the class 32 from consideration.

Acknowledgement. I wish to acknowledge, with much appreciation, opportunities provided for research in the West Indies by National Science Foundation grants G-14485 and GP-3098.

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¹ It is of interest to note that coquimbite and tamarugite (= lapparentite) also coexist at Tierra Amarilla and Alcaparrosa, Chile (Ungemach, 1935, p. 209; Bandy, 1938, pp. 730, 740). Nevis tamarugite has a 7.354, b 25.182, c 6.101 Å, all ± 0.003 Å; β 94° 42.8' ± 4'.

² Detailed studies of these metasomatized rocks will be reported elsewhere.

TABLE I. X-ray diffraction powder pattern of coquimbite, Clark's Ghut, Nevis, West Indies (spec. no. 8762-45B). Film nos. 1610 and 1612-25. Cu-K α , 1.5418 Å; powder camera radius 114.59 mm; cut-off 19 Å c. Spacings corrected for film shrinkage. a 10.913 Å, c 17.069, both ± 0.005 Å. a:c = 1:1.5641 (cf. Hocart's data in Ungemach, 1935, p. 170, a:c = 1:1.57; or Ungemach's morphological ratio 1:1.5643)

hkl	d. calc.	d. obs.	I	hkl	d. calc.	d. obs.	I	hkl	d. calc.	d. obs.	I
1010	9.450 Å	9.43 Å	4	3140	2.621 Å	—	—	2137	2.014	2.012	< 1D and B
0002	8.534	8.55	1	2242	2.599	—	—	4152	2.005	—	—
1011	8.267	8.26	10VB	3141	2.591	—	—	1128	1.987	—	—
1012	6.334	6.330	2	3034	2.534	2.531 Å	3	2246	1.969	1.968	2½D and B
1120	5.456	5.441	5	1126	2.522	—	—	2028	1.945	—	2½D and B
1013	4.875	4.875	< 1	3142	2.506	—	—	4045	1.943	1.943	2½D and B
2020	4.725	4.73	2½	2135	2.468	—	—	3037	1.928	—	—
1122	4.597	4.599	6	2026	2.437	—	—	1019	1.859	—	—
2021	4.554	—	—	3143	2.381	2.379	2	4154	1.857	1.856	3
0004	4.267	4.270	1	4040	2.363	—	—	5052	1.845	—	—
1014	3.889	3.900	< 1	1017	2.361	—	—	2138	1.832	—	—
2023	3.635	3.633	5	4041	2.340	—	—	3033	1.819	1.821	2
2130	3.572	3.575	< 1	3035	2.315	2.312	1½	1347	1.785	—	—
2131	3.496	3.492	3	2244	2.298	2.297	3	3362	1.779	1.778	1
1124	3.361	3.360	7	4042	2.277	—	—	4261	1.776	—	—
1232	3.295	3.289	< 1	3144	2.234	2.226	ID & B	3038	1.767	1.766	2
1015	3.210	3.208	< 1	2136	2.225	—	—	1455	1.765	—	—
2024	3.167	3.163	< 1D	3250	2.168	—	—	2029	1.760	—	—
3030	3.150	—	—	3251	2.151	—	—	4262	1.748	—	—
3031	3.098	3.098	2½	0008	2.134	—	—	5054	1.728	—	—
2133	3.025	3.020	3	3036	2.111	—	—	3256	1.724	1.727	1½
3032	2.955	2.958	< 1	3252	2.101	—	—	0.0.0.10	1.707	—	—
0006	2.845	—	—	3145	2.079	2.079	1	4263	1.704	—	—
2025	2.767	—	—	4044	2.067	2.064	< 1	5160	1.697	1.699	< 1
3033	2.756	2.753	7VB	4150	2.062	—	—	4047	1.697	—	—
2134	2.739	—	—	4151	2.047	2.051 Å	1	—	—	—	—
2240	2.728	—	—	3253	2.026	—	—	—	—	—	—

Twenty-two additional lines are present on powder films. VB = very broad line; D = diffuse line; Bd = band; D & B = diffuse and broad line.

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 [Manuscript received 17 November 1969]

MINERALOGICAL MAGAZINE, DECEMBER 1970, VOL. 37, NO. 292

Jarosite from the Eocene of the Hampshire Basin

FOUR concentrates of jarosite, $\text{KFe}_3^{3+}(\text{OH})_6(\text{SO}_4)_2$, have been prepared as a by-product of a micropalaeontological investigation. Two are from the Barton clay at Alum Bay and the other two are from Whitecliff Bay, Isle of Wight, one in the Barton clay and one in the upper Bracklesham beds.

The jarosite was identified by X-ray diffraction, the *d*-spacings agreeing very closely with those observed by Warshaw (1956). Partial chemical analyses by wet methods confirmed the identification and an X-ray spectrometer scan identified small amounts of Pb, Sr, Ni, Ti, and Ca, which may be substituting in the jarosite. Silver was not detected.

The mineral occurs as a yellow, finely crystalline coating on quartz grains and is closely associated with limonite. In the Bracklesham specimen the jarosite forms a gradation from the limonitic staining of a sandstone band within the clays. Also frequently present are glauconite and gypsum, this association according with the record of Briggs (1951). Sass *et al.* (1965) and Pough (1941) reported jarosite associated with gypsum and pyrite. These authors suggest that jarosite results from a series of reactions initiated by the oxidation of pyrite, as either a weathering or early diagenetic feature. In the Eocene samples, jarosite appears to be a product of the alteration of limonite, which may result from the initial weathering of pyrite.

Acknowledgements. The authors would like to thank Dr. B. E. Leake and Mr. R. Bradshaw for their help and advice.

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[Manuscript received 5 December 1969]

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