

**Crystal Data:** Orthorhombic. *Point Group:*  $2/m\ 2/m\ 2/m$  or  $mm2$ . No crystal forms observed as typically a replacement of rankinite; massive, to 2 mm.

**Physical Properties:** Hardness = n.d.  $D(\text{meas.}) = 2.992(2)$   $D(\text{calc.}) = [3.00]$

**Optical Properties:** Semitransparent. *Color:* Colorless; in thin section, interference colors are typically weak ultra-blue or ultra-brown.

*Optical Class:* Biaxial (-). *Dispersion:*  $r > v$ , distinct to strong.  $\alpha = 1.646\text{--}1.647$   $\beta = 1.648$   $\gamma = 1.650$   $2V(\text{meas.}) = 46^\circ\text{--}60^\circ$

**Cell Data:** *Space Group:*  $Imam$  or  $Ima2$ .  $a = 11.42(5)$   $b = 5.09(5)$   $c = 21.95(5)$   
 $Z = 8$

**X-ray Powder Pattern:** Kilchoan, Scotland.

2.89 (s1), 3.07 (s2), 2.68 (s3), 3.56 (ms), 2.36 (ms), 1.964 (ms), 5.17 (m)

**Chemistry:** (1) Kilchoan, Scotland; an analysis, not given, from which CO<sub>2</sub> was deducted as spurrite, yielded  $(\text{Ca}_{2.93}\text{Fe}_{0.01}^{3+})_{\Sigma=2.94}(\text{Si}_{1.96}\text{Al}_{0.04})_{\Sigma=2.00}[\text{O}_{6.94}(\text{OH})_{0.06}]_{\Sigma=7.00}$ . (2) Fuka, Japan; an analysis, not available, yielded  $(\text{Ca}_{3.13}\text{Fe}_{0.01}^{2+}\text{Na}_{0.01}\text{K}_{0.01})_{\Sigma=3.16}(\text{Si}_{1.91}\text{Al}_{0.02})_{\Sigma=1.93}\text{O}_7$ .

**Polymorphism & Series:** Dimorphous with rankinite.

**Occurrence:** In limestones thermally metamorphosed by invasion of gabbro; thought to have formed during retrograde metamorphism following decarbonation of limestone and thus under low pressure of CO<sub>2</sub> (Kilchoan, Scotland; Carlingford, Ireland).

**Association:** Rankinite, spurrite, tilleyite, melilite, cuspidine, grossular, wollastonite, vesuvianite (Kilchoan, Scotland); rankinite, larnite, spurrite (Golden Gully, New Zealand).

**Distribution:** From near Kilchoan, Ardnamurchan, Argyllshire, Scotland. At Carlingford, Co. Louth, Ireland. In New Zealand, at Golden Gully, Tokatoka district, about 150 km north of Auckland. In Japan, from Fuka, near Bicchu, Okayama Prefecture. In the Ozerskii massif, near Lake Baikal, eastern Siberia, Russia.

**Name:** For Kilchoan, Scotland, where it was first found.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 119424, 119425.

**References:** (1) Agrell, S.O. and P. Gay (1961) Kilchoanite, a polymorph of rankinite. *Nature*, 189, 743. (2) (1961) *Amer. Mineral.*, 46, 1203 (abs. ref. 1). (3) (1962) *Amer. Mineral.*, 47, 420 (corr. ref. 1). (4) Taylor, H.F. (1971) The crystal structure of kilchoanite, Ca<sub>6</sub>(SiO<sub>4</sub>)(Si<sub>3</sub>O<sub>10</sub>), with some comments on related phases. *Mineral. Mag.*, 38, 26–31. (5) Deer, W.A., R.A. Howie, and J. Zussman (1986) *Rock-forming minerals*, (2nd edition), v. 1B, disilicates and ring silicates, 272–277 [rankinite].