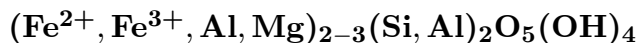


Berthierine

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Crystal Data: Monoclinic; in part hexagonal or orthorhombic. *Point Group:* *m*. Commonly as microcrystalline oolitic aggregates.

Physical Properties: Hardness = Soft. $D(\text{meas.}) = \text{n.d.}$ $D(\text{calc.}) = [3.06]$

Optical Properties: Transparent. *Color:* Dark olive-green, yellowish green.

Optical Class: [Biaxial.] $n = 1.62\text{--}1.65$ $2V(\text{meas.}) = \text{n.d.}$

Cell Data: *Space Group:* *Cm*. $a = 5.25\text{--}5.41$ $b = 9.10\text{--}9.33$ $c = 7.06\text{--}7.27$ $\beta = 104.5^\circ$
 $Z = [2]$

X-ray Powder Pattern: Stanion Lane pit, Corby, England; 1H.

7.105 (100), 3.546 (100), 2.520 (100), 2.147 (70), 1.560 (70), 1.775 (60), 1.478 (60)

X-ray Powder Pattern: Ayrshire, Scotland; mixed 1M and 1H.

7.04 (100), 3.513 (100), 2.514 (90), 1.552 (70), 2.137 (60), 2.673 (40), 2.399 (40)

Chemistry:

	(1)	(2)
SiO ₂	20.84	26.01
TiO ₂	0.51	
Al ₂ O ₃	28.02	12.33
Fe ₂ O ₃	5.38	5.32
FeO	32.29	37.07
MnO		0.04
MgO	2.02	6.13
CaO		0.48
H ₂ O	10.70	10.33
Total	99.76	97.71

(1) Belgorod district, Kursk, Russia; corresponds to $(\text{Fe}_{1.48}^{2+}\text{Al}_{0.96}\text{Fe}_{0.22}^{3+}\text{Mg}_{0.16})_{\Sigma=2.82}(\text{Si}_{1.15}\text{Al}_{0.85})_{\Sigma=2.00}\text{O}_{5.04}(\text{OH})_{3.93}$. (2) Kaňk, Czech Republic; corresponds to $(\text{Fe}_{1.81}^{2+}\text{Mg}_{0.53}\text{Al}_{0.36}\text{Fe}_{0.23}^{3+})_{\Sigma=2.93}(\text{Si}_{1.52}\text{Al}_{0.48})_{\Sigma=2.00}\text{O}_{5.00}(\text{OH})_{4.00}$.

Polymorphism & Series: 1M and 1H polytypes.

Mineral Group: Kaolinite-serpentine group.

Occurrence: Common in unmetamorphosed marine sediments; in lateritic and polar soils.

Association: Glauconite, chlorite-vermiculite interstratified with mica-smectite, siderite, calcite.

Distribution: Widespread; a few localities for studied material are: at Hayange, Meurthe-et-Moselle, France. In several mines in the Weardale fluorite district, Durham; in the Stanion Lane pit, Corby, Northamptonshire; on the Worth Farm and in the Philpots quarry, West Sussex, England. From the Belgorod district and the Voronezh anticline, Kursk, Russia. In the Chichibu mine, Saitama Prefecture, Japan. On Ellef Ringnes Island, Northwest Territories; from near Picton, Ontario; and at Mont Saint-Hilaire, Quebec, Canada.

Name: Honors the French geologist, Pierre Berthier (1782–1861).

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 658.

(2) Brindley, G.W. (1951) The crystal structure of some chamosite minerals. *Mineral. Mag.*, 29, 502–530. (3) Brindley, G.W. and R.F. Youell (1953) Ferrous chamosite and ferric chamosite. *Mineral. Mag.*, 37, 57–70. (4) Brindley, G.W. (1982) Chemical composition of berthierines – a review. *Clays and Clay Minerals*, 30, 153–155.

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