

Ruifrancoite

Crystal Data: Monoclinic. *Point Group:* 2/m. As needles or laths to 2 μm thick and to 100 μm long in fan-shaped botryoidal aggregates.

Physical Properties: *Cleavage:* Perfect on {100}, good on {010} (by analogy to other roscherite-group minerals). *Tenacity:* Brittle. *Fracture:* n.d. *Hardness* = ~4.5 (by analogy to other roscherite-group minerals) *D(meas.)* = 2.88(1) *D(calc.)* = 2.859 Non-fluorescent.

Optical Properties: Transparent. *Color:* Reddish brown. *Streak:* Orange-brown. *Luster:* Vitreous. *Optical Class:* Biaxial (+). $\alpha = 1.665(3)$ $\beta = 1.665(3)$ $\gamma = 1.682(3)$ $2V(\text{meas.}) = 10^\circ$ $2V(\text{calc.}) = 0^\circ$ *Orientation:* $X = b, Y \wedge c \approx 16^\circ$. *Dispersion:* $r > v$, very strong. *Absorption:* $Z > Y = X$. *Pleochroism:* $Z =$ brownish red, $X = Y =$ light brownish red.

Cell Data: *Space Group:* C2/c. $a = 15.911(7)$ $b = 11.894(7)$ $c = 6.625(7)$ $\beta = 94.5(1)^\circ$ $Z = 2$

X-Ray Diffraction Pattern: Sapucaia mine, Sapucaia do Norte, Minas Gerais, Brazil. 5.943 (100), 4.821 (65), 9.485 (44), 3.176 (44), 2.643 (42), 2.784 (41), 3.146 (25)

Chemistry:	(1)
CaO	9.81
MgO	3.23
MnO	8.10
FeO	3.93
Fe ₂ O ₃	12.51
Al ₂ O ₃	0.86
BeO	8.41
P ₂ O ₅	39.46
<u>H₂O</u>	<u>12.56</u>
Total	98.87

(1) Sapucaia mine, Sapucaia do Norte, Minas Gerais, Brazil; average electron microprobe analysis; Fe²⁺/Fe³⁺ by Mössbauer spectroscopy, H₂O by Penfield method, BeO by ICP-AES; corresponding to Ca_{1.89}(□_{1.45}Mn²⁺_{0.55}) $\Sigma=2.00$ (Fe³⁺_{1.69}Mg_{0.86}Mn²⁺_{0.68}Fe²⁺_{0.59}Al_{0.18}) $\Sigma=4.00$ Be_{4.00}(PO₄)₆[(OH)_{4.75}(H₂O)_{1.25}] $\cdot 3.90\text{H}_2\text{O}$.

Mineral Group: Roscherite group.

Occurrence: A late, vug-filling phase in a zoned LCT-type granitic pegmatite.

Association: Albite, muscovite, cyrilovite, meurigite.

Distribution: From the Sapucaia (Proberil) mine, Sapucaia do Norte, Galiléia County (first described as “roscherite”), and at Pomarolli farm, Linópolis, Divino das Laranjeiras, (first described as “Fe³⁺ species”), Minas Gerais, Brazil.

Name: Honors Professor *Rui Ribeiro Franco* (b. 1916), for his contributions to Brazilian mineralogy and geology, in particular the three-volume *Minerals do Brazil* (1972).

Type Material: Geosciences Museum, University of São Paulo, Brazil (DR587).

References: (1) Atencio, D., N.V. Chukanov, J.M.V. Coutinho, L.A.D. Menezes, V.T. Dubinchuk, and S. Möckel (2007) Ruifrancoite, a new Fe³⁺-dominant monoclinic member of the roscherite group from Galiléia, Minas Gerais, Brazil. *Can. Mineral.*, 45, 1263-1273.