Barbosalite $Fe^{2+}Fe_2^{3+}(PO_4)_2(OH)_2$

Crystal Data: Monoclinic, pseudotetragonal. *Point Group:* $2/m$. As stout prismatic to pseudocubic crystals, may have a mosaic texture, to 0.25 mm; generally as microcrystalline to powdery coatings. *Twinning:* Contact twins with (001) as composition surface.

Physical Properties: Hardness = 6 D(meas.) = 3.60–3.62 D(calc.) = 3.71

Optical Properties: Translucent to nearly opaque. *Color:* Dark blue, blue-green. *Streak:* Dark blue. *Luster:* Vitreous to earthy. *Optical Class:* Biaxial (+). *Pleochroism:* $X = Y$ = dark blue-green; Z = dark olive-green. *Dispersion:* $r > v$, strong. *Absorption:* Strong; $X = Y > Z$. $\alpha = 1.76$–1.78 $\beta = 1.77$–1.81 $\gamma = 1.835$–1.84 2V(meas.) = 64°.

Cell Data: *Space Group:* $P2_1/c$. $a = 7.25$ $b = 7.46$ $c = 7.49$ $\beta = 120°15'$ Z = 2

X-ray Powder Pattern: Sapucaia mine, Brazil.
3.361 (10), 3.313 (8), 4.84 (6), 3.239 (6), 3.160 (6), 2.327 (4), 1.309 (4)

Chemistry:

	(1)	(2)
Fe_2O_3	40.92	40.79
FeO	18.38	18.35
MnO	0.30	
P_2O_5	36.07	36.26
H_2O	[4.33]	4.60
Total	[100.00]	100.00

(1) Criminoso mine, Brazil; by electron microprobe, Fe^{2+}:Fe^{3+} from stoichiometry, H_2O by difference. (2) $Fe^{2+}Fe_2^{3+}(PO_4)_2(OH)_2$.

Mineral Group: Lazulite group.

Mineral Group: Dimorphous with lipscombite.

Occurrence: In complex granitic pegmatites, formed by oxidation and hydration of primary phosphates.

Association: Tavorite, huréaulite, heterosite, triphylite, vivianite, roscherite, rockbridgeite.

Distribution: In Brazil, in Minas Gerais, at the Sapucaia pegmatite mine, about 50 km east-southeast of Governador Valadares, and in good crystals from the Criminoso pegmatite mine, about 35 km north of São Jose da Safira, Agua Boa. In the USA, at the Palermo #1 mine, near North Groton, Grafton Co., New Hampshire; from the Bull Moose and Tip Top mines, near Custer, Custer Co., South Dakota; at the Williams pegmatite, Coosa Co., Alabama. In Australia, from Wilson's quarry, Thackaringa district, 40 km southwest of Broken Hill, New South Wales, and in the Wiperaminga Hill West quarry, Boolcoomata, South Australia. From the Buranga pegmatite, near Gatumba, Rwanda. At the Angarf-Sud pegmatite, Tazenakht Plain, Morocco. In the Mangualde pegmatite, near Mesquitela, Portugal.

Name: Honors Aluizio Licinio de Miranda Barbosa (1916–), Professor of Geology, School of Mines, Ouro Preto, Brazil.

Type Material: National Museum, Rio de Janeiro, Brazil; The Natural History Museum, London, England, 1965,209; National Museum of Natural History, Washington, D.C., USA, 106842.

References: (1) Lindberg, M.L. and W.T. Pecora (1955) Tavorite and barbosalite, two new phosphate minerals from Minas Gerais, Brazil. Amer. Mineral., 40, 952–966. (2) Lindberg. M.L. and C.L. Christ (1959) Crystal structures of the isostructural minerals lazurite, scorzalite and barbosalite. Acta Cryst., 12, 695–697. (3) Smith, M.L.L. (1969) Twinning in barbosalite from the Sapucaia pegmatite mine, Minas Gerais, Brazil. U.S. Geol. Surv. Prof. Paper 650-D, 75–79. (4) Dunn, P.J., P.B. Leavens, B.D. Sturman, R.V. Gaines, and C. do Prado Barbosa (1979) Hureaulite and barbosalite from Lavra do Criminoso, Minas Gerais, Brazil. Mineral. Record, 10, 147–151.