

Crystal Data: Orthorhombic. *Point Group:* 2/m 2/m 2/m. As bent fibrous crystals to 0.12 mm, elongated along [001] and flattened on (100), and displaying {001}, {100} and {010}.

Physical Properties: *Cleavage:* Presumed to be {100} and {010}. *Fracture:* Uneven. *Tenacity:* Flexible. Hardness = n.d. D(meas.) = n.d. D(calc.) = 4.713 and 4.172 (for the samples noted below under 'Chemistry')

Optical Properties: Transparent to translucent. *Color:* Cream to pale yellow. *Streak:* Yellowish white. *Luster:* Vitreous.

Optical Class: Biaxial (+). $\alpha = 1.760$ $\beta = 1.775$ $\gamma = 1.795$ $2V(\text{meas.}) = 70(1)^\circ$ $2V(\text{calc.}) = 83^\circ$ *Pleochroism:* Weak, shades of yellowish green. *Orientation:* $X = a$, $Y = b$, $Z = c$.

Cell Data: *Space Group:* Cmc₂m. $a = 14.150(6)$ $b = 10.395(4)$ $c = 7.529(3)$ $Z = 4$

X-ray Powder Pattern: Jaguarapu pegmatite, Minas Gerais, Brazil.

7.081 (100), 4.201 (90), 8.405 (80), 3.053 (80), 2.931 (70), 3.333 (60), 2.803 (60)

Chemistry:	(1)	(2)
UO ₃	54.52	41.83
CaO	2.07	2.10
Ce ₂ O ₃	0.33	0.31
Nd ₂ O ₃	0.49	1.12
Nb ₂ O ₅	14.11	14.64
Ta ₂ O ₅	15.25	16.34
TiO ₂	2.20	0.95
SiO ₂	2.14	3.55
Fe ₂ O ₃	1.08	0.89
Al ₂ O ₃	0.73	0.71
H ₂ O	[11.49]	[14.99]
Total	104.41	97.43

(1) Jaguarapu pegmatite, Minas Gerais, Brazil; average of 7 electron microprobe analyses, H₂O calculated, OH and H₂O confirmed by IR spectroscopy; corresponds to $(\square_{0.68}\text{Ca}_{0.28}\text{Nd}_{0.02}\text{Ce}_{0.02})_{\Sigma=1.00}[\text{U}_{1.44}\square_{0.56}\text{O}_{2.88}(\text{H}_2\text{O})_{1.12}](\text{Nb}_{0.80}\text{Ta}_{0.52}\text{Si}_{0.27}\text{Ti}_{0.21}\text{Al}_{0.11}\text{Fe}_{0.10})_{\Sigma=2.01}\text{O}_{4.72}(\text{OH})_{3.20}(\text{H}_2\text{O})_{2.08}$.

(2) Same as above; corresponding to $(\square_{0.67}\text{Ca}_{0.27}\text{Nd}_{0.05}\text{Ce}_{0.01})_{\Sigma=1.00}[\text{U}_{1.04}\square_{0.96}\text{O}_{2.08}(\text{H}_2\text{O})_{1.92}](\text{Nb}_{0.79}\text{Ta}_{0.53}\text{Si}_{0.42}\text{Ti}_{0.08}\text{Al}_{0.10}\text{Fe}_{0.08})_{\Sigma=2.00}\text{O}_{4.00}(\text{OH})_{3.96}(\text{H}_2\text{O})_{2.04}$.

Polymorphism & Series: Forms a series between end members $(\text{UO}_2)_2\text{Nb}_2\text{O}_6(\text{OH})_2(\text{H}_2\text{O})_2$ and $(\text{H}_2\text{O})_4\text{Nb}_2[\text{O}_2(\text{OH})_4](\text{OH})_2(\text{H}_2\text{O})_2$.

Occurrence: A late-stage cavity filling in albite in a complex pegmatite.

Association: Albite, muscovite, zircon, kaolinite, columbite-(Fe).

Distribution: From the Jaguarapu pegmatite, Minas Gerais, Brazil.

Name: Honors Carlos do Prado Barbosa (1917-2003), a chemical engineer, who as a dealer in mineral specimens, promoted the discovery and scientific study of rare mineral species.

Type Material: Museu de Geociências, Instituto de Geociências, Universidade de São Paulo, São Paulo, Brazil (DR707) and in the Systematic Reference Series, National Mineral Collection, Geological Survey, Ottawa, Ontario, Canada.

References: (1) Atencio, D., A.C. Roberts, M.A. Cooper, L.A.D. Menezes Filho, J.M.V. Coutinho, J.A.R. Stirling, K.E. Venance, N.A. Ball, E. Moffatt, M.L.S.C. Chaves, P.R.G. Brandão, and A.W. Romano (2012) Carlosbarbosaite, ideally $(\text{UO}_2)_2\text{Nb}_2\text{O}_6(\text{OH})_2 \cdot 2\text{H}_2\text{O}$, a new hydrated uranyl niobate mineral with tunnels from Jaguarapu, Minas Gerais, Brazil: description and crystal structure. Mineral. Mag. 76, 75-90. (2) (2012) Amer. Mineral., 97, 1526 (abs. ref. 1).