Vicanite-(Ce)

$(Ca,REE,Th)_{15}Fe^{3+}(SiO_4)_3(Si_3B_3O_{18})(BO_3)(As^{5+}O_4)(As^{3+}O_3)_x(NaF_3)_{1-x}F_7 \cdot 0.2H_2O$ x = 0.4

Crystal Data: Hexagonal. *Point Group*: 3*m*. As terminated prismatic crystals, to 0.3 mm in aggregates to 0.8 mm. *Twinning*: When present gives a pseudocubic habit.

Physical Properties: *Cleavage*: None. *Fracture*: Conchoidal. Hardness = 5-6
D(meas.) = >4.2 D(calc.) = 4.73

Optical Properties: Transparent. *Color*: Yellowish green. *Streak*: White. *Luster*: Vitreous. *Optical Class*: Uniaxial (-). ω = 1.757(2) ε = 1.722(2) *Pleochroism*: None.

Cell Data: *Space Group*: *R*3*m*. *a* = 10.8112(2) *c* = 27.3296(12) Z = 3

X-ray Powder Pattern: Tre Croci, Vetralla, Viterbo Province, Italy.
2.993 (100), 2.950 (70), 7.70 (50), 4.42 (50), 3.13 (50), 2.698 (50), 1.839 (50)

Chemistry:

	(1)		(1)
SiO_2	13.82	UO_2	1.96
$A1_2O_3$	0.16	La_2O_3	12.01
TiO_2	0.14	Ce_2O_3	14.41
P_2O_5	0.38	Pr_2O_3	2.77
As_2O_3	4.49	Nd_2O_3	1.79
Fe_2O_3	1.66	B_2O_3	[5.27]
CaO	17.07	F	7.50
Na_2O	0.14	- O = F	3.16
ThO_2	18.24	Total	98.65

(1) Tre Croci, Vetralla, Viterbo Province, Italy; electron microprobe analysis supplemented by IR spectroscopy, arsenic partitioned as As^{5+} to fill the cation site and the remainder as As^{3+}, B_2O_3 calculated for 4 B apfu; corresponding to $(Ca_{8.03}Ce_{2.32}La_{1.95}Th_{1.82}Pr_{0.44}Nd_{0.28}U_{0.19})_{\Sigma=15.06}(As^{5+}_{0.86}P_{0.14})_{\Sigma=1.00}(As^{3+}_{0.34}Na_{0.12})_{\Sigma=0.46}(Fe^{3+}_{0.57}Ti_{0.05}Al_{0.08})_{\Sigma=0.67}Si_{6.07}B_4(O_{36.57}F_{10.43})_{\Sigma=47}$.

Mineral Group: Vicanite group.

Occurrence: As crystals in miarolitic cavities in volcanic ejecta of syenitic composition.

Association: Zircon, thorite, thorian uraninite, betafite, thorian hellandite, titanite, antimonian asbecasite, apatite, stillwellite-(Ce).

Distribution: At Tre Croci, Vetralla (north of Rome), Viterbo province, Italy.

Name: For the *Vican* volcanic complex (Italy) where the mineral was found.

Type: Mineralogical Museum, University of Rome, Italy.

References: (1) Maras, A., G.C. Parodi, G. della Ventura, and D. Ohnenstetter (1995) Vicanite-(Ce): A new Ca-Th-REE borosilicate from the Vico volcanic district (Latium, Italy). Eur. J. Mineral., 7, 439-446. (2) Ballirano, P., A. Callegari, F. Caucia, A. Maras, F. Mazzi, and L. Ungarerri (2002) The crystal structure of vicanite-(Ce), a borosilicate showing an unusual $(Si_3B_3O_{18})^{15-}$ polyanion. Amer. Mineral., 87, 1139-1143.