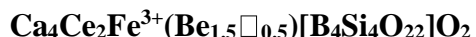


Ferri-mottanaite-(Ce)**Crystal Data:** Monoclinic. *Point Group:* 2/m. As tabular crystals to 1 mm.**Physical Properties:** *Cleavage:* None. *Tenacity:* Brittle. *Fracture:* [Conchoidal.]
Hardness = n.d. D(meas.) = n.d. D(calc.) = 3.952**Optical Properties:** Transparent. *Color:* Light yellowish brown. *Streak:* Very pale-yellow.
Luster: Vitreous.
Optical Class: Biaxial (-). $\alpha = 1.748(5)$ $\beta = 1.762(5)$ $\gamma = 1.773(5)$ $2V(\text{meas.}) = 85.9(5)^\circ$
 $2V(\text{calc.}) = 82.5^\circ$ *Pleochroism:* $X = Y = \text{tan}$, $Z = \text{yellowish brown}$. *Absorption:* $X \sim Y < Z$.
Dispersion: Strong, $r > v$. *Orientation:* $X \parallel b$, $Y \wedge a = 10.1^\circ$ (β acute), $Z \wedge c = 21.0^\circ$ (β obtuse).**Cell Data:** *Space Group:* P2/a. $a = 19.0548(9)$ $b = 4.7468(2)$ $c = 10.2560(5)$ $\beta = 110.906(2)^\circ$
 $Z = 2$ **X-ray Powder Pattern:** Calculated pattern.

2.648 (100), 2.857 (50), 1.904 (48), 2.919 (44), 3.086 (44), 3.246 (43), 3.453 (36)

Chemistry:	(1)	(2)	(1)	(2)	(1)	(2)
SiO ₂	23.75	22.90	La ₂ O ₃	3.29	Er ₂ O ₃	0.06
B ₂ O ₃	[12.77]	13.27	Ce ₂ O ₃	6.43	Gd ₂ O ₃	0.09
BeO	[2.59]	3.57	Pr ₂ O ₃	0.61	Yb ₂ O ₃	0.05
TiO ₂	1.29		Nd ₂ O ₃	1.58	ThO ₂	11.88
Al ₂ O ₃	0.86		Sm ₂ O ₃	0.18	UO ₂	2.10
Fe ₂ O ₃	4.28	7.61	Eu ₂ O ₃	0.13	H ₂ O	[0.21]
Mn ₂ O ₃	1.55		Gd ₂ O ₃	0.09	F	1.25
CaO	24.73	21.37	Dy ₂ O ₃	0.02	- O = F	0.53
					Total	99.18 100.00

(1) Tre Croci, near Vetralla (Viterbo), Latium, Italy; electron microprobe and LA-ICP-MS analyses; B₂O₃, BeO, H₂O calculated; corresponds to $X(\text{Ca})_4 Y(\text{Ca}_{0.40}\text{REE}_{0.93}(\text{Th,U})^{4+}_{0.54}\square_{0.13})_{\Sigma=2.00} Z(\text{Fe}^{3+}_{0.50}\text{Al}_{0.23}\text{Mn}^{3+}_{0.17}\text{Ti}^{4+}_{0.17})_{\Sigma=1.07} T(\text{Be}_{1.04}\text{Li}_{0.04}\square_{0.92})_{\Sigma=2.00} [\text{Si}_{4.03}\text{B}_{3.89}\text{O}_{22}](\text{O}_{1.09}(\text{OH})_{0.38}\text{F}_{0.53})_{\Sigma=2.00}$.
 (2) Ca₄Ce₂Fe³⁺(Be_{1.5}□_{0.5})[B₄Si₄O₂₂]O₂.

Mineral Group: Hellandite group.**Occurrence:** In miarolitic cavities in feldspathoid-bearing alkali-syenitic pyroclastic ejecta.**Association:** Fluorite, sanidine, cancrinite, danburite, vonsenite, thorite/ekanite, magnetite, zircon, zirconolite, titanite.**Distribution:** From Tre Croci, near Vetralla, Vico volcanic province, Italy.**Name:** Honors Annibale *Mottana*, Professor of Mineralogy, University of Roma Tre, Italy, for his leadership and support of investigations and cataloguing of the Latium minerals, during which the first sample was found; a suffix indicates the dominant REE, a prefix, *ferri*, for dominant Fe³⁺.**Type Material:** Mineralogy Museum, University of Pavia, Lombardy, Italy (2018-02).**References:** (1) Oberti, R., A. Langone, M. Boiocchi, E. Bernabè, and F.C. Hawthorne (2019) News from the hellandite group: the redefinition of mottanaite and ciprianiite and the new mineral description of ferri-mottanaite-(Ce), the first Fe³⁺-dominant hellandite. *Eur. J. Mineral.*, 31, 799-806.