

**Crystal Data:** Triclinic. *Point Group:*  $\bar{1}$ . Crystals, platy on {001}, to 8 x 15 x 2 mm; as star shaped aggregates.

**Physical Properties:** *Cleavage:* Perfect on {001}. *Fracture:* Splintery.  
*Tenacity:* Brittle. Hardness = < 5 D(meas.) = 3.871(1), impure sample. D(calc.) = 4.018

**Optical Properties:** Translucent. *Color:* Orange-red to brownish-red. *Streak:* Pale yellow.  
*Luster:* Vitreous.

*Optical Class:* Biaxial (+). *Pleochroism:* Strong; X = light brown; Y = reddish brown; Z = yellow-brown. *Absorption:* Z < X < Y.  $\gamma(\text{calc}) = 1.866$  2V(meas.) = 93(1)°  
*Orientation:* X ^ a = 90.4°; Y ^ b = 86.9°; Z ^ c = 103.9°.

**Cell Data:** *Space Group:*  $C\bar{1}$ . a = 10.6965(7) b = 13.7861(9) c = 21.478(2)  
 $\alpha = 99.345(1)^\circ$   $\beta = 92.315(2)^\circ$   $\gamma = 89.993(2)^\circ$  Z = 4

**X-ray Powder Pattern:** Verkhnee Espe Deposit, Akjailyautas Mountains, eastern Kazakhstan. 2.63 (100), 2.79 (90), 1.721 (70), 3.39 (50), 3.18 (50), 2.101 (50), 2.87 (40)

Chemistry:	(1)		(1)
SiO <sub>2</sub>	25.25	CaO	0.56
TiO <sub>2</sub>	15.69	BaO	21.11
ZrO <sub>2</sub>	0.33	FeO <sub>total</sub>	16.54
Al <sub>2</sub> O <sub>3</sub>	0.13	Na <sub>2</sub> O	1.41
Fe <sub>2</sub> O <sub>3</sub>	2.77	K <sub>2</sub> O	0.84
Nb <sub>2</sub> O <sub>5</sub>	1.57	F	3.11
MnO	9.46	H <sub>2</sub> O <sub>calc</sub>	1.84
ZnO	0.12	-O = F <sub>2</sub>	1.31
MgO	0.21	Total	99.63

(1) Verkhnee Espe Deposit, Akjailyautas Mountains, eastern Kazakhstan, average of 13 electron microprobe analyses, Fe<sup>3+</sup>/Fe<sup>2+</sup> by Mössbauer spectroscopy, H<sub>2</sub>O from structure analysis; corresponding to (Ba<sub>2.61</sub>K<sub>0.34</sub>) $\Sigma=2.95$ (Na<sub>0.86</sub>Ca<sub>0.14</sub>) $\Sigma=1$ (Ti<sub>3.72</sub>Nb<sub>0.22</sub>Al<sub>0.05</sub>) $\Sigma=3.99$ (Fe<sup>2+</sup><sub>4.36</sub>Fe<sup>3+</sup><sub>0.66</sub>Mn<sub>2.53</sub>Mg<sub>0.10</sub>Zr<sub>0.05</sub>Zn<sub>0.03</sub>Ca<sub>0.05</sub>) $\Sigma=7.78$ Si<sub>7.97</sub>O<sub>35.89</sub>H<sub>3.88</sub>F<sub>3.11</sub>.

**Occurrence:** A hydrothermal mineral in the extensively recrystallized contact zone of a fenitized granite.

**Association:** Bafertsite, jinshajiangite, zircon, pyrochlore-group minerals, thorite, monazite, xenotime, fluoroleakeite (as inclusions).

**Distribution:** Verkhnee Espe Deposit, Akjailyautas Mountains, eastern Kazakhstan.

**Name:** Honors Fernando Cámara (b. 1967) of Melilla, Spain, in recognition of his contributions to the mineralogy and crystallography of Ti-silicates, amphiboles, and arrojadite-group and cancrinite-group minerals.

**Type Material:** Fersman Mineralogical Museum, Moscow, Russia (catalog no. 3828/1 and 3828/2).

**References:** (1) Sokolova, E., Y. Abdu, F.C. Hawthorne, A.V. Stepanov, G.K. Bekenova, and P.E. Kotel'nikov (2009) Cámaraite, Ba<sub>3</sub>NaTi<sub>4</sub>(Fe<sup>2+</sup>, Mn)<sub>8</sub>(Si<sub>2</sub>O<sub>7</sub>)<sub>4</sub>O<sub>4</sub>(OH, F)<sub>7</sub>. I. A new Ti-silicate mineral from the Verkhnee Espe Deposit, Akjailyautas Mountains, Kazakhstan. *Mineral. Mag.*, 73, 847–854. (2) Cámara, F., E. Sokolova, and F. Nieto (2009) Cámaraite, Ba<sub>3</sub>NaTi<sub>4</sub>(Fe<sup>2+</sup>, Mn)<sub>8</sub>(Si<sub>2</sub>O<sub>7</sub>)<sub>4</sub>O<sub>4</sub>(OH, F)<sub>7</sub>. II. The crystal structure and crystal chemistry of a new group-II Ti-disilicate mineral. *Mineral. Mag.*, 73, 855–870. (3) (2010) *Amer. Mineral.*, 95, 1357–1358 (abs. refs. 1 and 2).