

**Kampfite****Ba<sub>12</sub>(Si<sub>11</sub>Al<sub>5</sub>)O<sub>31</sub>(CO<sub>3</sub>)<sub>8</sub>Cl<sub>5</sub>**

**Crystal Data:** Monoclinic. *Point Group:* *m*. As irregular masses, to 1 cm.

**Physical Properties:** *Cleavage:* Perfect, {001}. *Fracture:* Uneven. *Tenacity:* Brittle.  
Hardness = 3 D(meas.) = n.d. D(calc.) = 3.809

**Optical Properties:** Translucent. *Color:* Light blue-gray. *Streak:* White.  
*Luster:* Vitreous.

*Optical Class:* Biaxial (-) [Probable].  $\alpha = 1.641(1)$   $\beta = 1.642(1)$   $\gamma$  (calc) = 1.642  
 $2V = 20(5)^\circ$  *Dispersion:*  $r < v$ , slight.

**Cell Data:** *Space Group:* *Cc*.  $a = 31.2329(7)$   $b = 5.2398(1)$   $c = 9.0966(3)$   
 $\beta = 106.933(2)^\circ$   $Z = 1$

**X-ray Powder Pattern:** Rush Creek, California, USA.

14.67 (100), 3.883 (100), 2.616 (70), 2.988 (60), 3.357 (50), 2.887 (50), 1.969 (50)

<b>Chemistry:</b>	(1)	(2)
Na <sub>2</sub> O	0.08	0.06
CaO	0.06	-
SrO	-	0.10
BaO	57.72	56.74
SiO <sub>2</sub>	20.14	19.75
Al <sub>2</sub> O <sub>3</sub>	7.76	8.06
CO <sub>2</sub>	[5.69]	10.74
H <sub>2</sub> O	[1.16]	-
Cl	5.60	5.33
<u>-O = Cl<sub>2</sub></u>	<u>1.26</u>	<u>1.20</u>
Total	96.95	99.69

(1) Rush Creek, California, USA; average of 3 electron microprobe analyses, H<sub>2</sub>O and CO<sub>3</sub> confirmed by IR spectroscopy and calculated, corresponding to (Ba<sub>5.83</sub>Na<sub>0.04</sub>Ca<sub>0.02</sub>) $\Sigma=5.89$  (Si<sub>5.18</sub>Al<sub>2.36</sub>) $\Sigma=7.54$ O<sub>15.08</sub>(CO<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub>[(H<sub>2</sub>O)Cl<sub>0.45</sub>] $\Sigma=1.45$ . (2) Rush Creek, California, USA; average of 10 electron microprobe analyses of crystal used for structure determination, micro-IR spectroscopy did not detect H<sub>2</sub>O; corresponding to (Ba<sub>12.12</sub>Na<sub>0.06</sub>Sr<sub>0.03</sub>) $\Sigma=12.21$ (Si<sub>10.77</sub>Al<sub>5.18</sub>Ti<sub>0.05</sub>) $\Sigma=16.00$ C<sub>8.00</sub>O<sub>55.14</sub>Cl<sub>4.93</sub>.

**Occurrence:** In quartz-sanbornite bodies in contact metamorphic gneiss near a granodiorite pluton.

**Association:** Celsian, fresnoite, macdonaldite, titantaramellite, traskite, witherite, pyrrhotite.

**Distribution:** Esquire no. 1 claim, Rush Creek, eastern Fresno County, California, USA.

**Name:** Honors mineralogist Anthony Robert Kampf (b. 1948), Curator and Section Head of Minerals, Los Angeles County Museum of Natural History, California, USA.

**Type Material:** M.Y. Williams Museum, University of British Columbia, Vancouver, and Mineral Collection, Geological Survey of Canada, Ottawa, Canada.

**References:** (1) Basciano, L.C., L.A. Groat, A.C. Roberts, J.D. Grice, G.E. Dunning, E.E. Foord, I.M. Kjarsgaard, and R.E. Walstrom (2001) Kampfite, a new barium silicate carbonate mineral species from Fresno County, California. *Can. Mineral.* 39, 1053–1058. (2) Basciano, L.C., and L.A. Groat (2007) The crystal structure of kampfite. *Can. Mineral.*, 45, 935–943. (3) (2002) *Amer. Mineral.*, 87, 766 (abs. ref. 1). (4) (2008) *Amer. Mineral.*, 93, 705-706 (abs. ref. 2).