

Cerchiarait-(Al)

Crystal Data: Tetragonal. *Point Group:* 4/m 2/m 2/m. As thin prisms and in aggregates of matted fibers to 1 mm.

Physical Properties: *Cleavage:* None. *Fracture:* Irregular. *Tenacity:* Brittle. Hardness = ~ 4.5
D(meas.) = 3.69(3) D(calc.) = 3.643

Optical Properties: Transparent. *Color:* Blue, greenish blue to bluish green.
Streak: Pale green-blue. *Luster:* Vitreous.
Optical Class: Uniaxial (-). $\omega = 1.695(2)$ $\varepsilon = 1.677(2)$ *Pleochroism:* Strong, *O* = colorless, *E* = blue.

Cell Data: *Space Group:* I4/mmm. $a = 14.317(4)$ $c = 6.0037(18)$ $Z = 2$

X-ray Powder Pattern: Esquire No. 1, Rush Creek, Fresno County, California, USA.
3.009 (100), 2.580 (93), 3.316 (77), 1.880 (68), 1.4031 (54), 2.029 (43), 10.15 (39)

Chemistry:	(1)
BaO	44.82
MgO	0.43
Mn ₂ O	0.22
Fe ₂ O ₃	[6.55]
FeO	[0.65]
Al ₂ O ₃	8.94
SiO ₂	25.38
Cl	7.53
-O = Cl ₂	1.70
<u>H₂O</u>	<u>[5.76]</u>
Total	98.66

(1) Esquire No. 1, Rush Creek, Fresno County, California, USA; average of 11 electron microprobe analyses, H₂O from stoichiometry, Fe³⁺/Fe²⁺ from bond-valence analysis; corresponding to (Ba_{3.82}Na_{0.02}Ca_{0.04}) $\Sigma=3.88$ (Fe³⁺_{3.42}Ti⁴⁺_{0.27}Al³⁺_{0.25}Mn³⁺_{0.04}Mg_{0.02}) $\Sigma=4.00$ Si_{5.62}O_{15.47}(OH)_{9.31}Cl_{2.22}.

Occurrence: Formed on the margins of quartz-sanbornite veins as a result of fluid interactions.

Association: Bazirite, diopside, goethite, opal, quartz, sanbornite, titantaramellite, traskite, witherite (Esquire No. 1 claim); cerchiarait-(Fe), pyrrhotite, muirite, traskite, diopside, witherite (Esquire No. 7 claim).

Distribution: From the Esquire No. 1, Rush Creek, and Esquire No. 7 and No. 8 claims, Big Creek, Fresno County, California, USA.

Name: For the analog of *cerchiarait* with dominant aluminum in the octahedral structural site.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (63517-63519).

References: (1) Kampf, A.R., A.C. Roberts, K.E. Venance, C. Carbone, D. Belmonte, G.E. Dunning, and R.E. Walstrom (2013) Cerchiarait-(Fe) and cerchiarait-(Al), two new barium cyclosilicate chlorides from Italy and California, USA. *Mineral. Mag.*, 77(1), 69-80. (2) (2016) *Amer. Mineral.*, 101, 235-236 (abs. ref. 1).