Carlosruizite

$K_6(Na,K)_{10}Mg_{10}(Se^{6+}O_4, SO_4, CrO_4)_{12}(IO_3)_{12}\cdot 12H_2O$

Crystal Data: Hexagonal. *Point Group:* $\overline{3}\ 2/m$. As thin pseudorhombohedral platy {0001} crystals with hexagonal outline, modified by $\{10\overline{1}2\}$, to < 200 μm.

Physical Properties: *Cleavage:* On $\{11\overline{2}0\}$, likely, visible on SEM images. *Tenacity:* Brittle. Hardness = 2–3 D(meas.) = n.d. D(calc.) = 3.400 Slowly soluble in H_2O.

Optical Properties: Transparent. *Color:* Colorless to pale yellow. *Luster:* Vitreous. *Optical Class:* Uniaxial (–). $\omega = 1.655(3)$ $\epsilon = 1.642(1)$

Cell Data: *Space Group:* $P\overline{3}c1$. $a = 9.5901(8)$ $c = 27.56(2)$ Z = 1

X-ray Powder Pattern: Zapiga, Chile.
3.561 (100), 3.058 (39), 2.717 (39), 3.082 (32), 13.75 (30), 7.10 (20), 3.974 (16)

Chemistry:

	(1)
SO_3	7.9
SeO_3	19.0
CrO_3	2.5
I_2O_5	45.6
MgO	9.2
Na_2O	4.7
K_2O	6.7
H_2O	n.d.
Total	95.6

(1) Zapiga, Chile; by electron microprobe, average of ten analyses, amounts thought low due to decay in electron beam, H_2O confirmed by crystal-structure analysis; corresponds to $K_{6.2}Na_{6.7}Mg_{10.0}[(Se^{6+}O_4)_{6.6}(SO_4)_{4.3}(CrO_4)_{1.1}]_{\Sigma=12.0}(IO_3)_{12.0}\cdot 12H_2O$.

Polymorphism & Series: Forms a series with fuenzalidaite.

Occurrence: A rare constituent of nitrate ores.

Association: Iquiqueite, nitratine, halite, darapskite, and residues containing dietzeite, brüggenite, tarapacaite, lopezite, ulexite, probertite, and gypsum after leaching in water.

Distribution: Probably from near Zapiga, Tarapacá, Chile.

Name: Honors Carlos Ruiz F. (1916–), first Director of the Chilean Geological Survey.

Type Material: n.d.

References: (1) Konnert, J.A., H.T. Evans, Jr., J.J. McGee, and G.E. Ericksen (1994) Mineralogical studies of the nitrate deposits of Chile: VII. Two new saline minerals with the composition $K_6(Na,K)_4Na_6Mg_{10}(XO_4)_{12}(IO_3)_{12}\cdot 12H_2O$: fuenzalidaite (X = S) and carlosruizite (X = Se). Amer. Mineral., 79, 1003–1008.