Balliranoite $(Na,K)_6Ca_2(Si_6Al_6O_{24})Cl_2(CO_3)$

Crystal Data: Hexagonal. *Point Group*: 6. Crystals, prismatic on {10$\bar{1}$ 0} and striated along [0001], to 2 mm; as grains to 1 cm.

Physical Properties: *Cleavage*: Perfect on {10$\bar{1}$ 0}. *Fracture*: n.d.
Tenacity: Brittle. Hardness = 5 D(meas.) = 2.48(1) D(calc.) = 2.486(12)

Optical Properties: Transparent. *Color*: Colorless. *Streak*: n.d.
Luster: Vitreous.
Optical Class: Uniaxial (+). $\omega = 1.523(2)$ $\varepsilon = 1.525(2)$

Cell Data: *Space Group*: $P6_3$. $a = 12.695(2)$ $c = 5.325(1)$ $Z = 1$

X-ray Powder Pattern: Monte Somma–Vesuvio volcanic complex, Campania, Italy.
4.797 (100), 3.281 (73), 2.662 (58), 3.669 (57), 2.446 (31), 2.120 (18), 2.754 (16)

Chemistry:

	(1)
SiO_2	32.38
Al_2O_3	27.28
CaO	12.70
Na_2O	13.05
K_2O	3.08
Cl	7.43
SO_3	1.96
CO_2	3.24
H_2O	0.19
$-O=Cl_2$	1.68
Total	99.63

(1) Monte Somma–Vesuvio volcanic complex, Campania, Italy; average of 5 analyses, CO_2 by selective sorption, H_2O by Penfield method and confirmed by IR, corresponding to $Na_{4.70}Ca_{2.53}K_{0.73}(Si_{6.02}Al_{5.98}O_{23.995})Cl_{2.34}(CO_3)_{0.82}(SO_4)_{0.27}\cdot 0.12\ H_2O$.

Mineral Group: Cancrinite group.

Occurrence: A product of metasomatic reaction between alkaline magma and limestone.

Association: Orthoclase, phlogopite, clinohumite, calcite, diopside, pargasite, haüyne, apatite.

Distribution: Monte Somma–Vesuvio volcanic complex, Campania, Italy.

Name: Honors the Italian crystallographer Paolo Ballirano (b. 1964), Department of Earth Sciences, University of Rome, for contributions to the crystal chemistry of cancrinite group minerals.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (catalog no. 3756/1).

References: (1) Chukanov, N.V., N.V. Zubkova, I.V. Pekov, L.V. Olysych, E. Bonaccorsi, and D.Y. Pushcharovski (2010) Balliranoite, $(Na,K)_6Ca_2(Si_6Al_6O_{24})Cl_2(CO_3)$, a new cancrinite-group mineral from Monte Somma–Vesuvio volcanic complex, Italy. Eur. J. Mineral., 22, 113–119. (2) (2010) Amer. Mineral., 95, 1595-1596 (abs. ref. 1).