Gajardoite $KCa_{0.5}As^{3+}{}_4O_6Cl_2 \cdot 5H_2O$

Crystal Data: Hexagonal. *Point Group*: 6/*m* 2/*m* 2/*m*. As hexagonal plates, flattened on {001} and bounded by {100}, to ~100 μm, and as rosette-like subparallel intergrowths.

Physical Properties: *Cleavage*: Perfect on {001}. *Tenacity*: Brittle. *Fracture*: Irregular. Hardness = ~ 1.5 D(meas.) = 2.64(2) D(calc.) = 2.676 Soluble in water and dilute HCl.

Optical Properties: Transparent. *Color*: Colorless. *Streak*: White. *Luster*: Vitreous. *Optical Class*: Uniaxial (-). ω = 1.780(3) ε = 1.570(5) *Pleochorism*: None.

Cell Data: Space Group: *P6/mmm*. *a* = 5.2558(8) *c* = 15.9666(18) Z = 1

X-ray Powder Pattern: Torrecillas mine, northern Atacama Desert, Iquique Province, Chile. 16.00 (100), 2.624 (51), 5.31 (48), 3.013 (44), 2.353 (36), 3.466 (31), 1.8647 (21)

Chemistry:	(1)	(2)
Na_2O	0.26	
K_2O	6.13	7.65
MgO	0.32	
CaO	6.67	4.55
As_2O_3	66.55	64.25
Cl	11.66	11.51
H_2O	[14.58]	14.63
$-O = Cl_2$	2.63	2.60
Total	103.54	100.00

(1) Torrecillas mine, northern Atacama Desert, Iquique Province, Chile; electron microprobe analysis, H_2O calculated for charge balance, high analytical total ascribed to dehydration under vacuum; corresponds to $(K_{0.77}Ca_{0.71}Na_{0.05}Mg_{0.05})_{\Sigma=1.58}As_4O_{11}Cl_{1.96}H_{9.62}$. (2) $KCa_{0.5}As^{3+}{}_4O_6Cl_2 \cdot 5H_2O$.

Occurrence: A secondary mineral from the oxidation of native arsenic and other As-bearing primary phases, followed by later alteration by saline fluids derived from evaporating meteoric water under hyperarid conditions.

Association: Native arsenic, arsenolite, chongite, talmessite, torrecillasite.

Distribution: From the Torrecillas mine, northern Atacama Desert, Iquique Province, Tarapacá Region, Chile. Gajardoite-3R [with a = 15.759(2) and c = 47.780(3)] occurs at a small deposit ~9 km NE of the village of Cuya in the Camarones Valley, Arica Province, Chile.

Name: Honors Dr. Anibal Gajardo Cubillos (b. 1945), a prominent Chilean geologist and academician.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (65585-65587).

References: (1) Kampf, A.R., B.P. Nash, M. Dini, and A.A. Molina Donoso (2016) Gajardoite, $KCa_{0.5}As^{3+}{}_4O_6Cl_2 \cdot 5H_2O$, a new mineral related to lucabindiite and torrecillasite from the Torrecillas mine, Iquique Province, Chile. Mineral. Mag., 80(7), 1265-1272. (2) (2017) Amer. Mineral., 102, 918-919 (abs. ref. 1).