Burnsite $KCdCu_7O_2(SeO_3)_2Cl_9$

Crystal Data: Hexagonal. *Point Group:* $6/m\ 2/m\ 2/m$. As anhedral equidimensional grains, to 0.1 mm.

Physical Properties: *Cleavage:* On {0001}, good. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 1–1.5 VHN = 12 D(meas.) = n.d. D(calc.) = 3.85

Optical Properties: Opaque to translucent. *Color:* Dark red. *Streak:* Red.
Luster: Vitreous.
Optical Class: Uniaxial (–). $\omega = 1.920(5)$ $\epsilon = 1.912(5)$ *Bireflectance:* Weak; 0.01.

Cell Data: *Space Group:* $P6_3/mmc$. $a = 8.7805(8)$ $c = 15.521(2)$ Z = 2

X-ray Powder Pattern: Tolbachik volcano, Russia.
7.779 (100), 4.391 (80), 3.814 (80), 3.066 (70), 2.501 (60), 6.823 (50), 2.582 (50)

Chemistry:

	(1)	(2)
SeO_2	19.91	18.47
CuO	46.74	46.35
CdO	10.45	10.69
K_2O	4.3	3.92
Cl	25.46	26.56
$-O = Cl_2$	5.75	5.99
Total	101.11	100.00

(1) Tolbachik volcano, Russia; by electron microprobe, corresponding to $K_{1.08}Cd_{0.97}Cu_{6.98}O_{2.05}(Se_{1.07}O_{3.21})_2Cl_{8.53}$. (2) $KCdCu_7O_2(SeO_3)_2Cl_9$.

Occurrence: A very rare fumarolic sublimate, formed at an estimated 450 °C–500 °C.

Association: Cotunnite, sofiite, ilinskite, georgbokiite, chloromenite.

Distribution: From the Tolbachik fissure volcano, Kamchatka Peninsula, Russia.

Name: Honors Professor Peter Carman Burns (1966–), Canadian mineralogist and structural crystallographer, University of Notre Dame, Notre Dame, Indiana, USA, for his contributions to structural mineralogy.

Type Material: Mining Museum, Mining Institute, St. Petersburg, Russia.

References: (1) Krivovichev, S.V., L.P. Vergasova, G.L. Starova, S.K. Filatov, S.N. Britvin, A.C. Roberts, and I.M. Steele (2002) Burnsite, $KCdCu_7O_2(SeO_3)_2Cl_9$, a new mineral species from the Tolbachik volcano, Kamchatka Peninsula, Russia. Can. Mineral., 40, 1171–1175.