Avdoninite $K_2Cu_5Cl_8(OH)_4 \cdot H_2O$

Crystal Data: Monoclinic. *Point Group*: 2/*m*, *m* or 2. As crusts; crystals, poorly formed, short-prismatic to thick tabular, to 0.2 mm; with {001}, {100}.

Physical Properties: *Cleavage*: Perfect on {001}. *Fracture*: Stepped. *Tenacity*: Brittle. Hardness = 3 D(meas.) = 3.03(3) D(calc.) = 3.066

Optical Properties: Transparent. *Color*: Bright green. *Streak*: Pale green. *Luster*: Vitreous. *Optical Class*: Biaxial. $\alpha = 1.669(2)$ $\beta = 1.688(2)$ $\gamma = 1.707(5)$ 2V = 90(2)°
Orientation: $Y = c$; $X = b$ (?).

Cell Data: *Space Group*: *P*2/*m*, *Pm*, or *P*2. $a = 24.34(2)$ $b = 5.878(4)$ $c = 11.626(5)$ $\beta = 93.3(1)°$ $Z = 4$

X-ray Powder Pattern: Tolbachik Volcano, Kamchatka Region, Russia.
11.63 (100), 5.80 (27), 5.88 (20), 2.518 (19), 5.73 (17), 2.321 (17), 3.052 (15)

Chemistry:

	(1)
K_2O	11.94
CuO	51.43
Cl	37.07
H_2O	6.9
$-O=Cl_2$	8.37
Total	98.97

(1) Tolbachik Volcano, Kamchatka Region, Russia; average of 4 electron microprobe analyses, H_2O by Penfield method, IR confirms OH and H_2O, corresponding to $K_{1.96}Cu_{5.00}Cl_{8.09}(OH)_{3.87} \cdot 1.03H_2O$.

Occurrence: A product of precipitation from fumarolic gases (Tolbachik Volcano, Russiaa); also reported as an alteration on massive sulfide ore exposed at the Earth's surface.

Association: Euchlorite, paratacamite, belloite, langbeinite, atacamite.

Distribution: Yadovitaya ("Poisonous") fumaroles, Second Cinder Cone, Northern Breach of the Tolbachik Large Fissure Eruption, Tolbachik Volcano, Kamchatka Region, Russia; also reported from the Blyava deposit, Orenburg oblast and dumps at the Degtyarka deposit, Sverdlovsk oblast, Russia.

Name: Honors Ural mineralogist Vladimir Nikolaevich Avdonin (1925–), senior scientist of the Ural Geological Museum, Ural State Mining University, Russia.

Type Material: Mineralogical Museum of the Department of Mineralogy, St. Petersburg State University, St. Petersburg, Russia (catalog no. 19175).

References: (1) Chukanov, N.V., M.N. Murashko, A.E. Zadov, and A.F. Bushmakin (2006) Avdoninite, $K_2Cu_5Cl_8(OH)_4 \cdot H_2O$, a New Mineral Species from Volcanic Exhalations and the Technogenic Zone at Volcanic-Hosted Massive Sulfide Deposits. Zap. Ross. Mineral. Obshch., 135(3), 38–42 (in Russian, English abstract); (2007) Geology of Ore Deposits, 49, 505–508 (in English). (2) (2009) Amer. Mineral., 94, 1076 (abs. ref. 1).