Aluminum Al

Crystal Data: Cubic. *Point Group*: 4/*m* $\bar{3}$ 2/*m*. Typically, granular massive, may be platy or scaly, to 2 mm.

Physical Properties: *Tenacity*: Malleable. Hardness = 2-3 D(meas.) = 2.707 D(calc.) = 2.697

Optical Properties: Opaque. *Color*: Grayish white, silver white. *Luster*: Metallic.
Optical Class: Isotropic.

Cell Data: *Space Group*: *Fm*$\bar{3}$ *m* (synthetic). *a* = 4.0494 Z = 4

X-ray Powder Pattern: Synthetic.
2.338 (100), 2.024 (47), 1.221 (24), 1.431 (22), 0.9289 (8), 0.9055 (8), 0.8266 (8)

Chemistry:

	(1)	(2)	(3)
Al	99.99-100.0	97.81	87.5
Si			7.51
K			1.82
Ca			1.04
Fe			1.55
P			0.17
S			0.17
Cl			0.20
Total			99.99

(1) Tolbachik volcano, Russia; by electron microprobe. (2) Getang, China; by electron microprobe. (3) Rila Mountain, Bulgaria; particle-induced X-ray emission analysis of inhomogeneous sample with a natural oxide coating, total includes 347 ppm Ti.

Occurrence: In a gabbro-dolerite massif (Billeekh intrusion, Russia); in aluminum-rich rocks; in high-temperature hydrothermal Sn-W deposits and their alteration zones; in volcanic ash. In a desilicated zoned gem pegmatite vein intruded between a small serpentinized ultrabasic body and biotite gneiss (Bulgaria).

Association: Cu, Zn, Sn, Pb, Cd, Fe, Sb, moissanite (Billeekh intrusive, Russia); magnetite, ilmenite, hematite, pyrite, iron (Tolbachik volcano, Russia); Cu, S, jarosite (Getang, China); phlogopite, chrysoberyl, emerald, apatite (Bulgaria).

Distribution: In Russia, in Siberia, from the Billeekh [TL], Tsepochechnyi, and Ust-Khann'ya intrusives, Vilyui River Basin; in the Nizhefokinskii intrusion, Norilsk district; from the Ukachilkan tin deposit, northeastern Sakha; and at the Tolbachik fissure volcano, Kamchatka Peninsula. In a mud volcano on Bulla Island, Caspian Sea. At Kyzylcheku, Karamazar, Tajikistan. From Getang, Guizhou Province, and in the Lianhuashan tungsten deposit, Guangdong Province, China.
From Rila Mountain, Bulgaria.

Name: Named aluminum by Humphry Davy, who discovered the element.

Type Material: Geological Museum, Academy of Sciences, Yakutsk, Russia.

References: (1) Oleynikov, B.V, A.V. Okrugin, and N.V. Leskova (1978) Petrological significance of the occurrence of native aluminum in mafic rocks. Doklady Acad. Nauk SSSR, 243, 191-194 (in Russian). (2) (1980) Amer. Mineral., 65, 205 (abs. ref. 1). (3) Jiang Xinshun, Li Wenkang, Zhang Shuxin, and Meng Fanyi (1985) Discovery of native aluminum in the oxidation zone in Getang, Anlong County, Guizhou Province. Bull. Chinese Acad. Geol. Sci., 11, 79-86 (in Chinese with English abs.). (4) Glavatskikh, S.F. (1990) Native metals and intermetallic compounds in the exhalation products of the Great Tolbachik fissure eruption (Kamchatka). Doklady Acad. Nauk SSSR, 313, 433-437 (in Russian). (5) (1953) NBS Circ. 539, 1, 11. (6) Pekov, I.V. (1998) Minerals first discovered on the territory of the former Soviet Union. Ocean Pictures, Moscow, 25.
(7) Dekov, V.M., V. Arnaudov, F. Munnik, T.B. Boycheva, and S. Fiore (2009). Native aluminum: Does it exist? Amer. Mineral., 94, 1283-1286.