## Liebermannite $KAlSi_3O_8$

**Crystal Data**: Tetragonal. *Point Group*: 4/*m*. As crystals to 10 $\mu$m, in aggregates to 15 $\mu$m.

**Physical Properties**: *Cleavage*: n.d. *Fracture*: n.d. *Tenacity*: n.d. Hardness = n.d. D(meas.) = n.d. D(calc.) = 3.98

**Optical Properties**: Transparent. *Color*: Colorless. *Streak*: n.d. *Luster*: n.d. *Optical Class*: n.d.

**Cell Data**: *Space Group*: *I*4/*m*. *a* = 9.15(14) *c* = 2.74(13) Z = 2

**X-ray Powder Pattern**: Zagami meteorite.
2.890 (100), 2.036 (87), 6.463 (53), 1.442 (27), 1.859 (16), 1.317 (16), 1.266 (15)

**Chemistry**:

| | (1) | (2) |
|---|---|---|
| $SiO_2$ | 65.4 | 64.76 |
| $Al_2O_3$ | 19.0 | 18.32 |
| CaO | 0.37 | |
| $Na_2O$ | 1.62 | |
| $K_2O$ | 13.02 | 16.92 |
| Total | 99.41 | 100.00 |

(1) Zagami meteorite; average electron microprobe analysis supplemented by IR and Raman spectroscopy; corresponds to $(K_{0.76}Na_{0.14}Ca_{0.02})Al_{1.03}Si_{3.00}O_8$. (2) $KAlSi_3O_8$.

**Polymorphism & Series**: High pressure polymorph of $KAlSi_3O_8$.

**Mineral Group**: Feldspar group.

**Occurrence**: Shock-generated, high-pressure mineral formed via solid-state transformation of primary igneous K-feldspar in a Martian-enriched basaltic shergottite meteorite.

**Association**: Lingunite, silica, ilmenite, baddeleyite, augite-pigeonite, maskelynite, titanomagnetite (assemblage 1); silica, chlorapatite, baddeleyite (assemblage 2).

**Distribution**: From the Zagami meteorite [TL] and Northwest Africa (NWA) 480 meteorite.

**Name**: Honors Robert C. *Liebermann*, a high-pressure mineral physicist at Stony Brook University, New York, USA.

**Type Material**: National Museum of Natural History, Washington, D.C., USA (USNM 7619).

**References**: (1) Ma, C., O. Tschauner, J.R. Beckett, G.R. Rossman, C. Prescher, V.B. Prakapenka, H.A. Bechtel, and A. Macdowell (2018) Liebermannite, $KAlSi_3O_8$, a new shock-metamorphic, high-pressure mineral from the Zagami Martian meteorite. Meteoritics and Planetary Science, 53, 50-61. (2) Williams, P.A., F. Hatert, M. Pasero, and S.J. Mills (2014) IMA Commission on new minerals, nomenclature and classification (CNMNC) Newsletter 20. New minerals and nomenclature modifications approved in 2014. Mineral., Mag., 78, 551.