

**Crystal Data:** Orthorhombic. *Point Group:*  $2/m\ 2/m\ 2/m$ . As tabular crystals, which may be slightly bent, up to 2 mm; as oriented intergrowths with benjaminite.

**Physical Properties:** *Cleavage:* Rare, parallel to the tabular faces; even more rarely perpendicular to the tabular faces. *Hardness* = n.d. *VHN* = 175–218 (100 g load). *D*(meas.) = n.d. *D*(calc.) = 7.01

**Optical Properties:** *Opaque.* *Color:* In polished section, white to grayish white. *Pleochroism:* White to gray. *Anisotropism:* Weak in air, distinct in oil, bluish black to grayish white. *R*<sub>1</sub>–*R*<sub>2</sub>: n.d.

**Cell Data:** *Space Group:*  $Bbmm$  or  $Bb2_1m$ .  $a = 13.510(8)$   $b = 20.169(15)$   $c = 4.092(8)$   
*Z* = 4

**X-ray Powder Pattern:** Ivigtut, Greenland.  
3.363 (100), 2.996 (100), 2.895 (100), 3.640 (80), 3.401 (80), 3.376 (80), 3.977 (50)

Chemistry:	(1)	(2)	(3)	(4)
Pb	22.82	18.9	19.9	18.26
Ag	7.39	8.9	9.4	9.51
Bi	51.15	52.0	53.2	55.27
Sb		3.3		
S	17.13	17.7	17.4	16.96
Total	98.49	100.8	99.9	100.00

(1) Ivigtut, Greenland; by electron microprobe, corresponding to  $Pb_{1.24}Ag_{0.77}Bi_{2.75}S_{6.00}$ .

(2) Bernic Lake, Canada; by electron microprobe, corresponding to  $Pb_{0.99}Ag_{0.90}$

$(Bi_{2.70}Sb_{0.30})_{\Sigma=3.00}S_{6.00}$ . (3) Camsell River, Canada; by electron microprobe, corresponding to  $Pb_{1.06}Ag_{0.96}Bi_{2.82}S_{6.00}$ . (4)  $PbAgBi_3S_6$ .

**Polymorphism & Series:** Forms a series with lillianite.

**Occurrence:** A rare mineral of hydrothermal origin; also in pegmatites.

**Association:** Aikinite, bismuthinite, cosalite, pavonite, benjaminite, bismuth, chalcopyrite, tetrahedrite, pyrrhotite, stannite, arsenopyrite.

**Distribution:** From the Ivigtut cryolite deposit, southwestern Greenland [TL]. In Canada, at the deposit of the Terra Mining and Exploration Co., Camsell River, Northwest Territories, and from the Tanco pegmatite, Bernic Lake, Manitoba. In the USA, from the Silver Bell mine, Red Mountain district, Ouray Co., and at the Old Lout mine, Poughkeepsie Gulch, near Ouray, San Juan Co., Colorado; from South Mountain, Owyhee Co., Idaho; at Darwin, Inyo Co., and Randsburg, San Bernardino Co., California; in the Outlaw mine, about 17 km north of Manhattan, Round Mountain district, Nye Co., Nevada. From the Julcani mine, Peru. In the Montaneme Sn–W deposit, Galicia??[no, cf eskimoite?], Spain. At the Salsigne mine, 15 km north of Carcassone, Aude, and in the La Roche-Balue quarry, west of Nantes, Loire Atlantique, France. At Rotgülden, Salzburg, Austria. In the Ardino deposit, Bulgaria. From the Kti-Teberda deposit, northern Caucasus Mountains, and several other poorly specified localities in the Far Eastern Region, Russia. Additional localities for lillianite–gustavite series minerals are known.

**Name:** To honor Gustav Adolf Hageman (1842–1916), chemical engineer for the Cryolite Firm, Ivigtut, Greenland.

**Type Material:** University of Copenhagen, Copenhagen, Denmark, 1973.188; National Museum of Natural History, Washington, D.C., USA, 136172.

**References:** (1) Karup-Møller, S. (1970) Gustavite, a new sulfosalt mineral from Greenland. *Can. Mineral.*, 10, 173–190. (2) (1971) *Amer. Mineral.*, 56, 633–634 (abs. ref. 1). (3) Harris, D.C. and T.T. Chen (1975) Gustavite: two Canadian occurrences. *Can. Mineral.*, 13, 411–414.

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