Mummeite $Ag_2PbCuBi_6S_{13}$

Crystal Data: Monoclinic. *Point Group:* $2/m$. As intergrowths of short columnar crystals, to 1 mm, exsolved to alternating lamellae of mummeite and plumbocuprian mummeite. *Twinning:* Along a straight composition plane parallel to elongation.

Physical Properties: Hardness = n.d. VHN = 186–220, average 203 D(meas.) = n.d. D(calc.) = 6.79–6.80

Optical Properties: Opaque. *Color:* Gray. *Luster:* Metallic.
Optical Class: Biaxial. *Anisotropism:* Pronounced, in shades of gray to brownish yellow to dark indigo. *Bireflectance:* Perceptible.
R_1–R_2: 43.3–47.5 (470), 42.8–47.0 (546), 42.5–46.4 (589), 42.2–45.7 (650)

Cell Data: *Space Group:* $C2/m$ (mummeite), with $a = 13.47(1)$ $b = 4.06(1)$ $c = 21.63(1)$ $\beta = 92.9(1)°$ Z = 2, or *Space Group:* $C2/m$ (plumbocuprian mummeite), with $a = 13.48(1)$ $b = 4.06(1)$ $c = 21.72(1)$ $\beta = 93.9(1)°$ Z = 2

X-ray Powder Pattern: Alaska mine, Colorado, USA.
2.863 (10), 2.023 (10), 3.53 (5), 3.43 (5), 1.652 (4), 1.285 (4), 5.55 (3)

Chemistry:

	(1)	(2)	(3)
Ag	11.69	10.81	10.00
Pb	12.10	14.40	9.60
Cu	2.22	4.32	2.95
Bi	56.04	52.34	58.13
S	17.30	16.99	19.32
Total	99.35	99.84	100.00

(1) Alaska mine, Colorado, USA; by electron microprobe, mummeite; corresponds to $Ag_{2.61}Pb_{1.41}Cu_{0.84}Bi_{6.46}S_{13.00}$. (2) Do.; by electron microprobe, plumbocuprian mummeite; corresponds to $Ag_{2.46}Pb_{1.71}Cu_{1.67}Bi_{6.14}S_{13.00}$. (3) $Ag_2PbCuBi_6S_{13}$.

Mineral Group: Benjaminite group.

Occurrence: In hydrothermal base-metal sulfide vein deposits.

Association: Chalcopyrite, sphalerite, pyrite, ourayite, schapbachite, heyrovskyite, quartz (Alaska mine, Colorado, USA).

Distribution: In the USA, from the Alaska mine, Poughkeepsie Gulch, near Ouray [TL] and at the Mike mine, Silverton district, San Juan Co., Colorado.

Name: To honor Dr. William Gustav Mumme (1936–), Australian mineralogist, C.S.I.R.O., Melbourne, Australia, who first studied the mineral, for his work with sulfosalts.

Type Material: University of Copenhagen, Copenhagen, Denmark; Museum of Natural History, Denver, Colorado, USA.

References: (1) Karup-Møller, S. and E. Makovicky (1992) Mummeite – a new member of the pavonite homologousseries from the Alaska mine, Colorado. Neues Jahrb. Mineral., Monatsh., 555–576. (2) (1993) Amer. Mineral., 78, 847 (abs. ref. 1). (3) Mumme, ?? (1990) ??title?? Neues Jahrb. Mineral., Monatsh., 193–204.