

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. As compact, granular masses; crystals rare, to 400 μm .

Physical Properties: *Fracture:* Uneven to subconchoidal. *Tenacity:* Brittle. Hardness = 3.5 VHN = 108–133; 142 (25 g load). $D(\text{meas.}) = 7.61(1)$ $D(\text{calc.}) = 7.59$

Optical Properties: Opaque. *Color:* Pale bronze; grayish white in reflected light. *Streak:* Gray-black to black. *Luster:* Metallic. *Pleochroism:* Very strong, in gray to creamy white. *Anisotropism:* Strong, gray to yellowish white to grayish blue. *Bireflectance:* Strong. R_1 – R_2 : (400) 36.6–42.8, (420) 37.1–44.2, (440) 37.5–45.8, (460) 37.8–47.8, (480) 38.1–49.6, (500) 38.7–51.0, (520) 39.3–51.9, (540) 39.8–52.6, (560) 40.0–52.8, (580) 40.0–52.8, (600) 40.0–52.9, (620) 39.9–53.1, (640) 39.8–53.5, (660) 39.7–53.8, (680) 39.5–53.9, (700) 39.4–54.0

Cell Data: *Space Group:* $Pmnb$. $a = 8.882(1)$ $b = 20.100(5)$ $c = 4.614(1)$ $Z = 16$

X-ray Powder Pattern: Empress Josephine mine, Colorado, USA. 2.70 (100), 2.23 (80), 3.81 (60), 3.33 (60), 3.18 (50), 2.14 (50), 2.04 (50)

Chemistry:	(1)	(2)	(3)	(4)
Ag	45.17	44.9	45.2	45.81
Fe	0.22			
Te	54.75	55.8	54.9	54.19
insol.	0.39			
Total	100.53	100.7	100.1	100.00

(1) Empress Josephine mine, Colorado, USA; average of two analyses, corresponding to $\text{Ag}_{0.98}\text{Te}_{1.00}$. (2) Do.; by electron microprobe, corresponding to $\text{Ag}_{0.95}\text{Te}_{1.00}$. (3) Do.; by electron microprobe, corresponding to $\text{Ag}_{0.97}\text{Te}_{1.00}$. (4) AgTe.

Occurrence: In low-temperature gold-poor hydrothermal vein deposits.

Association: Tellurium, sylvanite, petzite, hessite, rickardite, altaite, galena (Empress Josephine mine, Colorado, USA); pyrite, rodalquilarite (Tombstone, Arizona, USA); gold, tellurium, hessite, petzite, rickardite (Pitman, Canada).

Distribution: In the USA, in Colorado, from the Empress Josephine mine, Kerber Creek district [TL], and the Klondike mine, Finley Gulch, both in Saguache Co.; the May Day mine, La Plata Co.; and the Red Cloud, Rex, and other mines, Boulder Co.; from Tombstone, Cochise Co., Arizona. In Canada, from the Grotto group of pits, near Pitman, British Columbia, and the Quetico intrusions, northwestern Ontario. At Kalgoorlie, Western Australia. From the Emperor mine, Vatukoula, Viti Levu, Fiji Islands. At the Kawazu mine, Shizuoka Prefecture, Japan. In the Kochbulak gold deposit, Chatkal-Kuramin Mountains, eastern Uzbekistan. At Sulitjelma, Norway. From the Huangshaping Pb–Zn deposit, Guiyang, Hunan Province, China.

Name: For the Empress Josephine mine, Colorado, USA.

Type Material: University of Colorado, Boulder, Colorado, 1649; Harvard University, Cambridge, Massachusetts, 106761; National Museum of Natural History, Washington, D.C., USA, R7243, 117368.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 260. (2) Honea, R.M. (1964) Empressite and stuetzite redefined. *Amer. Mineral.*, 49, 325–383. (3) Stumpfl, E.F. and J. Rucklidge (1968) New data on natural phases in the system Ag–Te. *Amer. Mineral.*, 53, 1513–1522. (4) Bindi, L., P.G. Spry, and C. Cipriani (2004) Empressite, AgTe, from the Empress-Josephine mine, Colorado, U.S.A.: composition, physical properties, and determination of the crystal structure. *Amer. Mineral.*, 89, 1043–1047. (5) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 154.

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