

**Crystal Data:** Hexagonal. *Point Group:*  $6/m\ 2/m\ 2/m$  (2H);  $3m$  (3R). Massive, fine scaly or feathery aggregates.

**Physical Properties:** *Cleavage:* {0001}. *Tenacity:* Sectile. Hardness = 2.5 VHN = n.d. D(meas.) = 7.4 D(calc.) = 7.732 Soils the fingers.

**Optical Properties:** Opaque. *Color:* Dark lead-gray; in polished section, pure white. *Luster:* Metallic. *Pleochroism:* Very high. *Anisotropism:* Strong; in striking colors including pink and deep blue.

$R_1$ – $R_2$ : (400) 24.4–53.4, (420) 22.6–48.0, (440) 20.8–48.6, (460) 19.9–40.5, (480) 19.3–39.0, (500) 18.8–37.8, (520) 18.5–36.8, (540) 18.2–36.0, (560) 18.0–35.3, (580) 17.8–35.0, (600) 17.8–34.9, (620) 17.9–34.9, (640) 18.0–34.8, (660) 18.1–34.7, (680) 18.0–34.5, (700) 17.9–34.2

**Cell Data:** *Space Group:*  $P6_3/mmc$  (synthetic 2H).  $a = 3.132(4)$   $c = 12.323(5)$   $Z = 2$ , or *Space Group:*  $R\bar{3}m$  (synthetic 3R).  $a = 3.158(1)$   $c = 18.49(1)$   $Z = 3$

**X-ray Powder Pattern:** Synthetic (2H).

6.18 (100), 2.2772 (35), 2.731 (25), 2.667 (25), 1.8335 (18), 1.5783 (16), 3.089 (14)

**X-ray Powder Pattern:** Emma mine, Utah, USA (3R). (ICDD 35-651).

6.13 (100), 1.528 (70), 2.674 (60), 1.571 (50), 2.037 (40), 1.100 (40), 3.04 (35)

**Chemistry:**

	(1)	(2)
W	73.8	74.14
S	25.5	25.86
Total	99.3	100.00

(1) Angokitsk deposit, Russia; by electron microprobe. (2) WS<sub>2</sub>.

**Polymorphism & Series:** Both 2H and 3R polytypes occur naturally.

**Occurrence:** In a deposit replacing limestone (Emma mine, Utah, USA); replacing scheelite (Angokitsk deposit, Russia); in high-temperature fumaroles (Kudryavyy volcano, Russia).

**Association:** Pyrite, sphalerite, galena, cinnabar, tetrahedrite, wolframite, scheelite, quartz.

**Distribution:** In the USA, from the Emma mine, Little Cottonwood Canyon, Alta district, Salt Lake Co., Utah [TL, 2H and 3R]; at the Goldstrike mine, Lynn district, Eureka Co., Nevada. From near Chase, British Columbia, and in the Kidd Creek mine, near Timmins, Ontario, Canada. From Tsumeb, Namibia. At Kipushi, 28 km southwest of Lubumbashi, Katanga Province, Congo (Shaba Province, Zaire). From Crevola d'Ossola, Piedmont, Italy. In Russia, at the Angokitsk tungsten deposit, Buryat; an ore in the Tamvatnei As–Hg–W deposit, Kamchatka; and on Kudryavyy volcano, Iturup, Kuril Islands. From Lyangar, Uzbekistan.

**Name:** For the composition.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 94490.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 331–332. (2) Gait, R.I. and J.A. Mandarino (1970) Polytypes of tungstenite. *Can. Mineral.*, 10, 729–730. (3) Getmanskaya, T.I., E.G. Ryabeva, G.A. Sidorenko, and K.V. Yurkina (1979) Tungstenite — a new discovery in the USSR. *Doklady Acad. Nauk SSSR*, 247, 194–198 (in Russian). (4) Schutte, W.J., J.L. De Boer, and F. Jellinek (1987) Crystal structures of tungsten disulfide and diselenide. *J. Solid State Chem.*, 70, 207–209. (5) (1959) NBS Circ. 539, 8, 65. (6) Ramdohr, P. (1969) *The ore minerals and their intergrowths*, (3rd edition), 866.

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