Brezinaite Cr_3S_4

Crystal Data: Monoclinic. *Point Group:* $2/m$ Anhedral grains, to 3 mm.

Physical Properties: Hardness = n.d. VHN = n.d. D(meas.) = n.d. D(calc.) = 4.12

Optical Properties: Opaque. *Color:* Brownish gray in polished section; synthetic brezinaite is dull gray.
R_1–R_2: n.d.

Cell Data: *Space Group:* $I2/m$ (synthetic). $a = 5.96(1)$ $b = 3.425(5)$ $c = 11.270(15)$ $\beta = 91.54(3)°$ Z = 2

X-ray Powder Pattern: Tucson iron meteorite.
2.644 (100), 5.67 (70), 2.056 (70), 1.716 (70), 2.978 (65), 2.606 (60), 5.23 (40)

Chemistry:

	(1)	(2)
Cr	48.3	54.88
Fe	3.9	
V	1.61	
Ti	0.96	
Mn	0.86	
Ni	0.08	
S	45.0	45.12
Total	100.71	100.00

(1) Tucson iron meteorite; by electron microprobe, average of 26 grains, corresponding to $(Cr_{2.65}Fe_{0.20}V_{0.09}Ti_{0.06}Mn_{0.04})_{\Sigma=3.04}S_{4.00}$. (2) Cr_3S_4.

Occurrence: In the metal matrix and contiguous to silicate inclusions (Tucson iron meteorite).

Association: Forsterite, enstatite, aluminous diopside, anorthite, feldspathic glass, kamacite, taenite, schreibersite (Tucson iron meteorite); troilite, carlsbergite, daubréelite (New Baltimore iron meteorite).

Distribution: In the Tucson [TL], New Baltimore, and Gibeon iron meteorites.

Name: In honor of Aristides Brezina (1848–1909), past Director of the Mineralogy-Petrology Section of the Natural History Museum, Vienna, Austria.

Type Material: Meteorite Collection, National Museum of Natural History, Washington, D.C., USA.

References: (1) Bunch, T.E. and L.H. Fuchs (1969) A new mineral: brezinaite, Cr_3S_4, and the Tucson meteorite. Amer. Mineral., 54, 1509–1518. (2) Jellinek, F. (1957) The structure of the chromium sulfides. Acta Cryst., 10, 620. (3) Buchwald, V.F. (1977) The mineralogy of iron meteorites. Phil. Trans. Royal Soc. London, A. 286, 453–491.