

**Keilite****(Fe<sup>2+</sup>, Mg)S**

**Crystal Data:** Cubic. *Point Group:*  $4/m\bar{3}2/m$ . Granular, to 0.5 mm.

**Physical Properties:** Cleavage: Good on (001), (010), and (100). *Tenacity:* Brittle. Hardness = ~4 D(meas.) = n.d. D(calc.) = 3.59-3.958

**Optical Properties:** Opaque. *Color:* Bluish gray in reflected light. *Luster:* Metallic. *Optical Class:* Isotropic.

R: (400) 27.0, (420) 27.1, (440) 27.6, (460) 27.2, (480) 27.1, (500) 26.6, (520) 26.6, (540) 26.6, (560) 26.5, (580) 26.7, (600) 25.9, (620) 26.2, (640) 26.1, (660) 25.9, (680) 26.0, (700) 25.9

**Cell Data:** *Space Group:*  $Fm\bar{3}m$  (by analogy to synthetic MgS).  $a = 5.17$ - $5.18$   $Z = 4$

**X-ray Powder Pattern:** Zakłodzie enstatite achondrite meteorite.

2.5859 (100), 1.8285 (35), 1.4929 (18), 1.2929 (12), 2.9859 (11), 1.1564 (8), 1.0557 (6)

<b>Chemistry:</b>	(1)	(2)	(3)
Fe	40.14	29.52	38.71
Mg	10.05	4.71	16.84
Mn	3.37	23.68	
Ca	1.98	0.84	
Cr	1.91	1.17	
Zn	0.24	0.10	
Ti	0.06		
Ni	0.01		
<u>S</u>	<u>41.39</u>	<u>39.11</u>	<u>44.45</u>
Total	99.15	99.12	100.00

(1) Abee meteorite; by electron microprobe; corresponds to  $(\text{Fe}_{0.56}\text{Mg}_{0.32}\text{Mn}_{0.05}\text{Ca}_{0.04}\text{Cr}_{0.03})_{\Sigma=1.00}\text{S}_{1.00}$ .

(2) Zakłodzie enstatite achondrite; average electron microprobe analysis; corresponds to  $(\text{Fe}_{0.437}\text{Mn}_{0.356}\text{Mg}_{0.160}\text{Cr}_{0.019}\text{Ca}_{0.017}\text{Zn}_{0.001})_{\Sigma=0.990}\text{S}_{1.008}$ . (3) (Fe,Mg)S with Fe:Mg = 1:1.

**Polymorphism & Series:** Forms series with niningerite and alabandite.

**Mineral Group:** Galena group.

**Occurrence:** An accessory mineral in enstatite chondrite and achondrite meteorites.

**Association:** Niningerite, enstatite, kamacite, troilite; troilite (or pyrrhotite), Fe-Ni metal, an (Fe,Zn,Mn)S phase, enstatite (with relict forsterite cores), plagioclase, schreibersite, oldhamite, graphite, sinoite, an SiO<sub>2</sub> polymorph (Zakłodzie).

**Distribution:** From the Abee [TL], Adhi-Kot, Saint-Sauveur, LEW 88180, RKP A80259, LEW 87119, LEW 88714, Y-791790, Y-791811, Y-86760, and Y8404 chondrite meteorites. From the Zakłodzie enstatite achondrite.

**Name:** Honors Dr. Klaus *Keil* (b. 1934), Hawaii Institute of Geophysics and Planetology, University of Hawaii, Honolulu, Hawaii, USA, for his research on chondritic meteorites.

**Type Material:** University of Hawaii, Honolulu, Hawaii, USA (UH 13).

**References:** (1) Shimizu, M., H. Yoshida, and J.A. Mandarino (2002) The new mineral species keilite, (Fe, Mg)S, the iron-dominant analog of niningerite. *Can. Mineral.*, 40, 1687-1692. (2) (2003) *Amer. Mineral.*, 88, 1626 (abs. ref. 1). (3) Karwowski, Ł., R. Kryza, and T.A. Przylibski (2007) New chemical and physical data on keilite from the Zakłodzie enstatite achondrite. *Amer. Mineral.*, 92, 204-249.