Hemleyite $FeSiO_3$

Crystal Data: Hexagonal. *Point Group*: $\bar{3}$. As a subhedral crystal ~7 x 6 x 5 μm.

Physical Properties: *Cleavage*: n.d. *Tenacity*: n.d. *Fracture*: n.d. Hardness = n.d.
D(meas.) = n.d. D(calc.) = 4.383

Optical Properties: n.d. *Color*: n.d. *Streak*: n.d. *Luster*: n.d.
Optical Class: n.d.

Cell Data: *Space Group*: $R\bar{3}$. a = 4.7483(5) c = 13.665(1) Z = 6

X-ray Powder Pattern: Suizhou chondrite meteorite.
2.625 (100), 2.376 (50), 2.105 (50), 1.645 (50), 3.520 (35), 1.762 (25), 1.372 (20)

Chemistry:

	(1)
SiO_2	51.08
Al_2O_3	1.26
Cr_2O_3	0.61
FeO	29.33
MgO	12.71
CaO	1.88
MnO	1.76
Na_2O	1.02
Total	99.65

(1) Suizhou chondrite meteorite; average electron microprobe analysis supplemented by Raman spectroscopy; corresponds to $(Fe^{2+}_{0.48}Mg_{0.37}Ca_{0.04}Na_{0.04}Mn^{2+}_{0.03}Al_{0.03}Cr^{3+}_{0.01})_{\Sigma=1.00}Si_{1.00}O_3$.

Polymorphism & Series: Fe-analogue of akimotoite (ilmenite-structured $MgSiO_3$), and a predicted high-pressure polymorph of clinoferrosilite, ferrosilite, and pyroxferroite.

Occurrence: In an unmelted portion of the heavily shocked (<20 GPa; <2000 °C) L6 Suizhou chondrite meteorite. Perhaps relevant to the mineralogy of Earth's deep interior, it could have a role at the bottom of the Earth's mantle transition zone and within the uppermost lower mantle.

Association: Forsterite, clinoferrosilite, Fe-bearing pyroxene with a composition nearly identical to hemleyite.

Distribution: In the Suizhou chondrite meteorite (fallen on April 15, 1986), at Dayanpo, ~12.5 km southeast of Suizhou, Hubei, China.

Name: Honors Russell J. *Hemley* (b. 1954), former Director of the Geophysical Laboratory, Carnegie Institution, Washington D.C., USA., for his research exploring the behavior of materials under extreme conditions of pressure and temperature.

Type Material: Natural History Museum Florence, Italy (3238/I.).

References: (1) Bindi, L., M. Chen, and X. Xie (2017) Discovery of the Fe-analogue of akimotoite in the shocked Suizhou L6 chondrite. Scientific Reports, 7, 42674. (2) (2020) Amer. Mineral., 105, 1920-1921 (abs. ref. 1).