## Fermorite $(Ca,Sr)_5(PO_4,AsO_4)_3(F,OH)$



**Crystal Data:** Monoclinic, pseudohexagonal. *Point Group:* $2/m$. Crudely prismatic, massive, granular.

**Physical Properties:** *Fracture:* Uneven. Hardness = 5 D(meas.) = 3.518 D(calc.) = [3.41]

**Optical Properties:** Translucent. *Color:* Pale pinkish white to white. *Streak:* White. *Luster:* Greasy.
*Optical Class:* Uniaxial (–). $n = \sim 1.66$

**Cell Data:** *Space Group:* $P2_1/m$, pseudo-$P6_3/m$. $a = 9.55$ $c = 6.98$ Z = 2

**X-ray Powder Pattern:** Sitapar, India.
2.86 (10), 2.75 (6), 3.49 (5), 1.971 (4), 1.867 (4), 3.95 (3), 3.12 (3)

**Chemistry:**

| | (1) |
|---|---|
| $P_2O_5$ | 20.11 |
| $As_2O_5$ | 25.23 |
| CaO | 44.34 |
| SrO | 9.93 |
| F | 0.83 |
| $H_2O$ | trace |
| insol. | 0.08 |
| $-O = F_2$ | 0.35 |
| Total | 100.17 |

(1) Sitapar, India; F determination probably low; corresponds to $(Ca_{4.46}Sr_{0.54})_{\Sigma=5.00}[(PO_4)_{1.60}(AsO_4)_{1.24}]_{\Sigma=2.84}(F,OH)$. (2) Do.; by electron microprobe, corresponds to $(Ca_{4.20}Sr_{0.80})_{\Sigma=5.00}[(PO_4)_{1.45}(AsO_4)_{1.48}]_{\Sigma=2.93}[(OH)_{0.66}(F_{0.34}]_{\Sigma=1.00}$.

**Mineral Group:** Apatite group.

**Occurrence:** A rare mineral in veinlets through a manganese deposit.

**Association:** Braunite, hollandite, pyrolusite.

**Distribution:** From Sitapar, Chhindwara district, Madhya Pradesh, India.

**Name:** Honors Dr. Lewis Leigh Fermor (1880–1954), former Director of the Geological Survey of India.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 94809.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 904. (2) Hughes, J.M. and J.W. Drexler (1991) Cation substitution in the apatite tetrahedral site: crystal structures of type hydroxylellestadite and type fermorite. Neues Jahrb. Mineral., Monatsh., 327–336. (3) Traill, R.J. and A.P. Sabina (1960) Catalogue of X-ray diffraction patterns and specimen mounts on file at the Geological Survey of Canada. Geol. Sur. of Canada, Paper 60-4, 36–37.