Lepidocrocite γ–$Fe^{3+}O(OH)$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Crystals typically flattened on {010}, isolated, to 2 mm, or aggregated into plumose or rosettelike groups; bladed, micaceous, fibrous, massive.

Physical Properties: *Cleavage:* {010}, perfect; {100}, less perfect; {001}, good. *Fracture:* Brittle. Hardness = 5 VHN = 690–782 D(meas.) = 4.09(4) D(calc.) = 3.96

Optical Properties: Transparent. *Color:* Ruby-red to reddish brown; light reddish to red-orange in transmitted light; gray-white in reflected light. *Streak:* Dull orange. *Luster:* Submetallic.
Optical Class: Biaxial (+). *Pleochroism:* Strong; X = colorless to yellow; Y = orange, yellow, dark red-orange; Z = orange, yellow, darker red-orange. *Orientation:* $X = b$; $Y = c$; $Z = a$. *Dispersion:* Slight. *Absorption:* $Z > Y > X$. $\alpha = 1.94$ $\beta = 2.20$ $\gamma = 2.51$ 2V(meas.) = 83° *Anisotropism:* Strong. *Bireflectance:* Strong.
R_1–R_2: (400) 13.0–21.4, (420) 12.7–20.3, (440) 12.4–19.2, (460) 12.0–18.6, (480) 11.7–18.1, (500) 11.4–17.8, (520) 11.2–17.4, (540) 11.0–17.0, (560) 10.8–16.5, (580) 10.7–16.0, (600) 10.6–15.7, (620) 10.5–15.4, (640) 10.4–15.2, (660) 10.4–15.1, (680) 10.4–15.0, (700) 10.4–14.9

Cell Data: *Space Group:* $Cmc2_1$ (synthetic). $a = 3.08(1)$ $b = 12.50(1)$ $c = 3.87(1)$
Z = 4

X-ray Powder Pattern: Locality unknown. (ICDD 8-98).
6.26 (100), 3.29 (90), 2.47 (80), 1.937 (70), 1.732 (40), 1.524 (40), 1.075 (40)

Chemistry:

	(1)	(2)
Fe_2O_3	89.90	89.86
H_2O	10.77	10.14
Total	100.67	100.00

(1) Eleonore mine, Mt. Dünsberg, Germany. (2) FeO(OH).

Polymorphism & Series: Trimorphous with feroxyhyte and goethite.

Occurrence: A weathering or oxidation product of other iron-bearing minerals, in soils and mineral deposits; a precipitate from ground water. In marine manganese nodules.

Association: Goethite, pyrite.

Distribution: Many minor localities; well-studied material from: in Germany, from Eiserfeld, Siegen, and at Herdorf and Müsen, North Rhine-Westphalia; on Mt. Dünsberg, near Giessen, Hesse; and elsewhere. In France, at Rancié-en-Sem, Ariège, and Chizeuil, Saône-et-Loire. From a cave at Dachstein-Mammuthöhle, Austria. At Příbram, Czech Republic. From Traversella, Piedmont, Italy. At the Great Retallack and Gravel Hill mines, Perranzabuloe, and the Trewethen mine, St. Kew, Cornwall, England. From the Kochbulak gold deposit, Chatkal-Kuramin Mountains, eastern Uzbekistan. In the USA, in Pennsylvania, at Easton, Northampton Co., Chestnut Hill, Lancaster Co., and other localities; from the Iron Mountain mine, Shasta Co., California; at Bisbee, Cochise Co., Arizona. At the Iron Monarch quarry, Iron Knob, South Australia. From Tsumeb, Namibia.

Name: From the Greek for *scale* and *thread*, for the occasionally feathery or scaly habit.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 642–645. (2) Deer, W.A., R.A. Howie, and J. Zussman (1962) Rock-forming minerals, v. 5, non-silicates, 122-124. (3) Christensen, H. and A.N. Christensen (1978) Hydrogen bonds of γ—FeOOH. Acta Chem. Scand., A32(1), 87–88.