Stilpnomelane $K(Fe^{2+}, Mg, Fe^{3+})_8(Si, Al)_{12}(O, OH)_{27}$

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Crystal Data: Triclinic. *Point Group:* $\bar{1}$. As plates or scales and fibers with comb structures; as plumose or radiating groups, to 1 cm; as a velvety coating.

Physical Properties: *Cleavage:* Perfect on {001}, imperfect on {010}. Hardness = 3–4 D(meas.) = 2.59–2.96 D(calc.) = 2.667

Optical Properties: Semitransparent. *Color:* Black, greenish black, yellowish bronze, greenish bronze; in thin section, golden brown, dark brown, green. *Luster:* Pearly to vitreous on cleavage surface, may be submetallic.
Optical Class: Biaxial (–). *Pleochroism:* X = bright golden yellow to pale yellow; Y = Z = deep reddish brown to deep green to nearly black. *Orientation:* $Y = b$; $X \simeq \perp$ (001). $\alpha = 1.543$–1.634 $\beta = 1.576$–1.745 $\gamma = 1.576$–1.745 2V(meas.) = $\sim 0°$

Cell Data: *Space Group:* $P\bar{1}$. $a = 21.86$–22.05 $b = 21.86$–22.05 $c = 17.62$–17.74 $\alpha = 124.14°$–$125.65°$ $\beta = 95.86°$–$95.93°$ $\gamma = 120.00°$ Z = 6

X-ray Powder Pattern: Crystal Falls, Iron Co., Michigan, USA.
12.3 (100), 4.16 (100), 2.55 (100), 2.69 (70), 3.12 (60), 1.568 (60), 6.26 (50)

Chemistry:

	(1)	(2)		(1)	(2)
SiO_2	44.45	48.03	MgO	2.77	4.94
TiO_2		0.23	CaO	0.53	0.83
Al_2O_3	7.26	6.48	Na_2O	0.03	
Fe_2O_3	20.82	4.12	K_2O	2.06	0.83
FeO	14.04	22.88	H_2O^+	6.41	6.90
MnO	0.05	2.67	H_2O^-	1.35	2.64
			Total	99.77	100.55

(1) Zuckmantel, Poland. (2) Western Otago, New Zealand.

Occurrence: In banded iron formations and enclosing slates and schists. In metamorphic rocks of the blueschist and greenschist facies, and in some metamorphosed massive sulfide deposits.

Association: Quartz, siderite, apatite, hematite, minnesotaite, greenalite, chamosite, grunerite (iron formations); magnetite, chlorite, quartz, pyrrhotite, chalcopyrite (massive sulfides); quartz, glaucophane, manganoan garnet, albite, epidote, actinolite, chlorite (greenschists).

Distribution: From Obergrund, near Zuckmantel, Silesia, Poland. At Beroun na Morave, Czech Republic. From Prägraten, Tirol, Austria. In Sweden, at the Brunsjö mine, near Grythyttan, Örebro. From Mullion Island, The Lizrd, Cornwall, England. In the USA, at the Sterling mine, Antwerp, Jefferson Co., New York; from Franklin, Sussex Co., New Jersey; in the Laytonville quarry, Mendocino Co., and a number of other places in California; at Bald Knob, near Sparta, Alleghany Co., North Carolina; in the Animikian Iron Formations of Minnesota. From Poplar Creek, British Columbia, Canada. At the Great Cobar mine, New South Wales, and in the Hamersley Ranges, Western Australia. From French Ridge and Queenstown, West Otago, New Zealand.

Name: From the Greek for *shining* and *black*, in allusion to its luster and color.

Type Material: Wroclaw University, Wroclaw, Poland, II–11434, II–11437.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 658.
(2) Deer, W.A., R.A. Howie, and J. Zussman (1963) Rock-forming minerals, v. 3, sheet silicates, 103–114. (3) Eggleton, R.A. and S.W. Bailey (1965) The crystal structure of stilpnomelane. Part I. The sub cell. Clays and Clay Minerals, 13, 49–63. (4) Eggleton, R.A. (1972) The crystal structure of stilpnomelane. Part II. The full cell. Mineral. Mag., 38, 693–711. (5) Eggleton, R.A. and B.W. Chappell (1976) The crystal structure of stilpnomelane. Part III. Chemistry and physical properties. Mineral. Mag., 42, 361–368. (6) Crawford, E.S., D.A. Jefferson, and J.M. Thomas (1977) Electron-microscope and diffraction studies of polytypism in stilpnomelane. Acta Cryst., A33, 548–553.

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