Katoptrite $(Mn^{2+}, Mg)_{13}(Al, Fe^{3+})_4Sb_2^{5+}Si_2O_{28}$

Crystal Data: Monoclinic. *Point Group:* $2/m$. Crystals commonly tabular on {010}; elongated along [100], [101], or equant. As minute grains or anhedral masses, to 1 cm.

Physical Properties: *Cleavage:* Perfect micaceous on {001}. *Tenacity:* Brittle. Hardness = 5.5 D(meas.) = 4.56 D(calc.) = 4.65

Optical Properties: Opaque, translucent in thin flakes. *Color:* Iron-black to jet-black; fire-red in thin section. *Luster:* Metallic, brilliant.
Optical Class: Biaxial (–). *Pleochroism:* Strong; red-brown to orange. *Orientation:* $X \simeq \perp \{001\}$; $Y = b$; $Z \wedge a \simeq -3°$. *Dispersion:* $r > v$, strong, inclined. $\alpha = 1.92$ $\beta = 1.95$ $\gamma = 1.95$ 2V(meas.) = Small.

Cell Data: *Space Group:* $C2/m$. $a = 5.617(2)$ $b = 23.02(2)$ $c = 9.079(6)$ $\beta = 101°23(3)'$ Z = 2

X-ray Powder Pattern: Brattfors mine, Sweden.
2.957 (100), 8.88 (65), 2.600 (50), 4.43 (45), 2.488 (45), 2.810 (40), 1.944 (35)

Chemistry:

	(1)	(2)
SiO_2	7.75	8.0
Al_2O_3	9.50	10.9
Fe_2O_3	3.58	
Sb_2O_5	20.76	22.4
FeO	2.44	2.5
MnO	52.61	54.3
ZnO		0.0
MgO	3.06	3.7
CaO	0.58	< 0.05
H_2O	0.11	
Total	100.39	101.8

(1) Långban, Sweden; average of four analyses. (2) Do.; by electron microprobe; corresponds to $(Mn^{2+}_{11.7}Mg_{1.4})_{\Sigma=13.1}(Al_{3.3}Fe_{0.5})_{\Sigma=3.8}Sb^{5+}_{2.1}Si_{2.0}O_{28}$.

Occurrence: In metamorphosed limestone (Brattfors mine, Sweden).

Association: Magnetite, garnet, manganosite (Brattfors mine, Sweden).

Distribution: In Sweden, in the Brattfors, Moss, and Jakobsberg mines, near Nordmark, and at Långban, Värmland; in the Sjö mine, near Grythyttan, Örebro.

Name: From the Greek for *mirror*, for the perfectly reflecting cleavage surfaces.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 1029–1030. (2) Moore, P.B. (1966) Catoptrite [katoptrite] and yeatmanite – stuffed pyrochroite structures? Amer. Mineral., 51, 1494–1500. (3) Moore, P.B., T. Araki, and G.D. Brunton (1976) Catoptrite [katoptrite], $(Mn^{2+}_5Sb^{5+}_2)^{VI}(Mn^{2+}_8Al_4Si_2)^{IV}O_{28}$, a novel close-packed oxide sheet structure. Neues Jahrb. Mineral., Abh., 127, 47–61.