Talc $Mg_3Si_4O_{10}(OH)_2$

Crystal Data: Triclinic or monoclinic. *Point Group:* $\bar{1}$ or 1; $2/m$. Crystals platy, pseudotrigonal pyramids, to 1 cm; fibrous, fine-grained compact, massive.

Physical Properties: *Cleavage:* Perfect on {001}. *Tenacity:* Sectile; flexible but not elastic. Hardness = 1 D(meas.) = 2.58–2.83 D(calc.) = [2.78]

Optical Properties: Translucent. *Color:* Light to dark green, brown, white; colorless in thin section. *Streak:* White. *Luster:* Pearly, greasy, dull.
Optical Class: Biaxial (–). *Orientation:* $Y \simeq a$; $Z \simeq b$. *Dispersion:* $r > v$. $\alpha = 1.539$–1.550 $\beta = 1.589$–1.594 $\gamma = 1.589$–1.600 2V(meas.) = 0°–30°

Cell Data: *Space Group:* $P\bar{1}$. $a = 5.291(3)$ $b = 9.460(5)$ $c = 5.290(3)$ $\alpha = 98.68(5)°$ $\beta = 119.90(5)°$ $\gamma = 85.27(5)°$ Z = 2, or *Space Group:* $C2/c$. $a = 5.287$ $b = 9.158$ $c = 18.95$ $\beta = 99.30°$ Z = 4

X-ray Powder Pattern: "Manchuria", China.
9.34 (100), 3.116 (100), 4.66 (90), 2.476 (65), 1.870 (40), 1.527 (40), 4.55 (30)

Chemistry:

	(1)	(2)	(3)
SiO_2	60.06	62.16	63.37
Al_2O_3	1.60	0.88	
FeO	1.74	1.41	
MgO	30.83	30.86	31.88
CaO	0.40		
H_2O^+	5.02	4.92	4.75
Total	99.65	100.23	100.00

(1) Parma district, Apennines, Italy; corresponds to $(Mg_{2.94}Fe^{2+}_{0.09}Ca_{0.03})_{\Sigma=3.06}(Si_{3.84}Al_{0.12})_{\Sigma=4.00}O_{10}(OH)_{2.14}$. (2) Malangen, Norway; corresponds to $(Mg_{2.91}Fe^{2+}_{0.07})_{\Sigma=2.98}(Si_{3.94}Al_{0.07})_{\Sigma=4.01}O_{10}(OH)_{2.08}$. (3) $Mg_3Si_4O_{10}(OH)_2$.

Polymorphism & Series: 1A, $2M_1$ polytypes.

Occurrence: In talc-rich schists or steatite through hydrothermal alteration of mafic rocks (steatitization) subsequent to serpentinization during greenschist facies metamorphism. Also formed by thermal low-temperature metamorphism of siliceous dolostones.

Association: Actinolite, tremolite, chlorite, pyroxene, vermiculite, serpentine, anthophyllite, dolomite, calcite.

Distribution: Of widespread occurrence. Some localities for good crystals or pure material include: on Mt. Greiner, Zillertal, Tirol, Austria. At Zermatt, Valais, and St. Gotthard, Ticino, Switzerland. From the Pfitschtal, Trentino-Alto Adige, Italy. At the Trimouns talc deposit, six km northeast of Luzenac, Ariège, France. From Goepfersgruen, Bavaria, Germany. At Snarum, Norway. In the Onotosk deposit, Irkutsk, Siberia, Russia. In the USA, near Fowler, St. Lawrence Co., New York; Delta, York Co., Pennsylvania; Smithfield, Providence Co., Rhode Island; Rochester, Windsor Co., Vermont; Holly Springs, Cherokee Co., Georgia; near San Andreas, Calaveras Co., California.

Name: Probably from the Arabic *talq*.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 678–680. (2) Deer, W.A., R.A. Howie, and J. Zussman (1963) Rock-forming minerals, v. 3, sheet silicates, 121–130. (3) Stemple, I.S. and G.W. Brindley (1960) A structural study of talc and talc-tremolite relations. J. Amer. Ceramic Soc., 43, 34–42. (4) Akizuki, M. and J. Zussman (1978) The unit cell of talc. Mineral. Mag., 42, 107–110. (5) Perdikatsis, B. and H. Burzlaff (1981) Strukturverfeinerung am Talk $Mg_3[(OH)_2Si_4O_{10}]$. Zeits. Krist., 156, 177–186 (in German with English abs.).