## Catapleiite $Na_2ZrSi_3O_9 \cdot 2H_2O$



**Crystal Data:** Monoclinic, pseudohexagonal. *Point Group:* $2/m$. Crystals pseudohexagonal, thin tabular on {001}, to 15 cm; as rosettes of crystal plates. *Twinning:* Polysynthetically twinned at 30°, 60°, and 90°.

**Physical Properties:** *Cleavage:* {100}, perfect; {101} and {102}, imperfect. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 5.5–6 D(meas.) = 2.65–2.9 D(calc.) = [2.77]

**Optical Properties:** Transparent, translucent to opaque. *Color:* Colorless, white, light yellow to yellowish brown, pale brown, grayish blue, violet; colorless in thin section. *Streak:* White to pale yellow. *Luster:* Weakly vitreous or dull.
*Optical Class:* Biaxial (+); may be uniaxial (+). *Dispersion:* $r < v$, moderate.
$\alpha = 1.582 - -1.603$ $\beta = 1.582 - -1.618$ $\gamma = 1.600 - -1.639$ 2V(meas.) = 40° untwinned; 0° twinned.

**Cell Data:** *Space Group:* $I2/c$. $a = 12.779$ $b = 7.419$ $c = 20.157$ $\beta = 90.41°$ Z = 8

**X-ray Powder Pattern:** Langesundsfjord, Norway; very close to calcium catapleiite.
3.94 (100), 3.05 (100), 2.96 (100), 2.69 (100), 6.35 (90), 1.969 (60), 5.37 (50)

**Chemistry:**

| | (1) | (2) | | (1) | (2) |
|---|---|---|---|---|---|
| $SiO_2$ | 41.56 | 44.90 | MnO | 0.00 | |
| $TiO_2$ | 0.00 | | CaO | 5.21 | |
| $ZrO_2$ | 32.53 | 30.69 | $Na_2O$ | 9.74 | 15.44 |
| FeO | 1.02 | | $H_2O^+$ | 9.35 | 8.97 |
| | | | Total | 99.41 | 100.00 |

(1) Låven Island, Langesundsfjord, Norway. (2) $Na_2ZrSi_3O_9 \cdot 2H_2O$.

**Polymorphism & Series:** Dimorphous with gaidonnayite; forms a series with calcium catapleiite.

**Occurrence:** In syenites and nepheline syenites; in pegmatites, typically the result of metasomatic alteration of eudialyte.

**Association:** Zircon, leucophanite, rinkite, eudialyte, epididymite, låvenite, astrophyllite, sodalite, natrolite, analcime, aegirine.

**Distribution:** From Låven Island and other localities around the Langesundsfjord, and at Bratthagen, Norway. In the USA, at Magnet Cove, Hot Springs Co., and from Granite Mountain, near Little Rock, Pulaski Co., Arkansas; in the Rocky Boy stock, Bearpaw Mountains, Hill Co., Montana; at Wind Mountain, Otero Co., New Mexico. In Canada, in Quebec, large crystals at Mont Saint-Hilaire, from the Miron quarry, Montreal, and near Saint-Amable; along the Ice River valley, 25 km south of Field, British Columbia. In the Ilímaussaq intrusion, at Narssârssuk, and the Kangderdlugssuaq Fjord, Greenland. From the Norra Kärr complex, near Gränna, Sweden. In Russia, in the Khibiny and Lovozero massifs, Kola Peninsula, and the Inagli massif, 30 km west of Aldan, Yakutia. On the Los Islands, Guinea.

**Name:** From the Greek *kata*, for *with*, and *pleios*, for *many*, because it is always accompanied by other rare minerals.

**References:** (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 412–413. (2) Deer, W.A., R.A. Howie, and J. Zussman (1986) Rock-forming minerals, (2nd edition), v. 1B, disilicates and ring silicates, 364–371. (3) Chao, G.Y., J.F. Rowland, and T.T. Chen (1973) The crystal structure of catapleiite. Geol. Soc. Amer. Annual Meeting Abs. with Prog. 572 (abs.). (4) Chen, T.T. and G.Y. Chao (1973) Twinning in catapleiite. Geol. Soc. Amer. Annual Meeting Abs. with Program, 573–574 (abs.). (5) Ilyushin, G.D., A.A. Voronkov, V.V. Ilyukhin, N.N. Nevskii, and N.V. Belov (1981) Crystal structure of natural monoclinic catapleiite $Na_2ZrSi_3O_9 \cdot 2H_2O$. Soviet Physics, Doklady Acad. Nauk SSSR, 260, 623–627 (in Russian). (6) 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. Survey of Canada, Paper 60-4, 19.