## Dissakisite-(Ce) $Ca(Ce,La)MgAl_2(SiO_4)(Si_2O_7)O(OH)$



**Crystal Data:** Monoclinic. *Point Group:* $2/m$. Rarely crystallized; as anhedral grains, up to 0.6 mm.

**Physical Properties:** Hardness = n.d. D(meas.) = 3.75(15) D(calc.) = 3.97–4.02

**Optical Properties:** Transparent. *Color:* Pale yellow-brown in thin section.
*Luster:* Vitreous.
*Optical Class:* Biaxial (+). *Pleochroism:* Weak; $X$ = pale brown; $Y = Z$ = light yellow-brown.
*Orientation:* $Y = b$; $Z \wedge a = 23.7°$. *Dispersion:* $r < v$, medium. *Absorption:* $Y = Z > X$.
$\alpha = 1.735(3)$ $\beta = 1.741(3)$ $\gamma = 1.758(3)$ 2V(meas.) = 64.2(3)° 2V(calc.) = 62°

**Cell Data:** *Space Group:* $P2_1/m$. $a = 8.905(1)$ $b = 5.684(1)$ $c = 10.113(1)$
$\beta = 114.62(2)°$ Z = 2

**X-ray Powder Pattern:** Balchen Mountain, Antarctica.
2.698 (100), 2.910 (90), 2.622 (60), 3.50 (50), 2.842 (50), 9.1 (40), 2.177 (40)

**Chemistry:**

| | (1) | (2) | | (1) | (2) |
|---|---|---|---|---|---|
| $SiO_2$ | 32.09 | 31.85 | MnO | 0.00 | 0.27 |
| $TiO_2$ | 0.89 | 0.02 | MgO | 6.84 | 7.42 |
| $ThO_2$ | 0.08 | | CaO | 10.75 | 9.57 |
| $Al_2O_3$ | 17.67 | 10.09 | CdO | 0.10 | |
| $Y_2O_3$ | 0.04 | | F | 0.21 | 0.87 |
| $RE_2O_3$ | 12.87 | 15.50 | $H_2O$ | [1.54] | 1.79 |
| $Ce_2O_3$ | 16.94 | 11.66 | $P_2O_5$ | 0.02 | |
| $Fe_2O_3$ | | 5.83 | $-O = F_2$ | 0.09 | 0.37 |
| FeO | 1.80 | 5.34 | Total | [101.75] | 99.84 |

(1) Balchen Mountain, Antarctica; by electron microprobe, $H_2O$ calculated, $RE_2O_3 = La_2O_3$ 9.80%, $Nd_2O_3$ 2.08%, $Pr_2O_3$ 0.86%, $Sm_2O_3$ 0.13%, $Eu_2O_3 < 0.10\%$, $Gd_2O_3 < 0.10\%$, $Dy_2O_3 < 0.05\%$, $Er_2O_3 < 0.05\%$; corresponds to $Ca_{1.08}(Ce_{0.57}RE_{0.45})_{\Sigma=1.02}(Mg_{0.93}Fe_{0.14})_{\Sigma=1.07}(Al_{1.91}Ti_{0.06})_{\Sigma=1.97}Si_3O_{12.25}[(OH)_{0.69}F_{0.06}]_{\Sigma=0.75}$. (2) Östanmossa mine, Sweden; corresponds to $Ca_{1.00}(Ce_{0.42}RE_{0.55})_{\Sigma=0.97}(Al_{1.16}Mg_{1.08}Fe^{3+}_{0.43}Fe^{2+}_{0.43}Mn_{0.02})_{\Sigma=3.12}Si_{1.03}O_{12}[(OH)_{1.16}F_{0.27}]_{\Sigma=1.43}$.

**Mineral Group:** Epidote group.

**Occurrence:** Formed in marble, under amphibolite-facies metamorphism, at about 600 °C and 7 kbar (Balchen Mountain, Antarctica).

**Association:** Calcite, dolomite, forsterite, clinohumite, phlogopite, chlorite, ilmenite-geikelite, spinel, zircon, pyrrhotite (Balchen Mountain, Antarctica).

**Distribution:** On Balchen Mountain, Sør Rondane Mountains, east Antarctica. From the Östanmossa mine, Norberg, Sweden. At the Fedorovskoye deposit, Yakutia, Russia. From Outokumpu, Finland. Well crystallized from Luzenac, Ariège, France. In the Donghai district, Kiangsu Province, China.

**Name:** From the Greek for *twice over*, for a magnesium analog of allanite being described twice.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 168421.

**References:** (1) Grew, E.S., E.J. Essene, D.R. Peacor, S.-C. Su, and M. Asami (1991) Dissakisite-(Ce), a new member of the epidote group and the Mg analogue of allanite-(Ce), from Antarctica. Amer. Mineral., 76, 1990–1997. (2) Rouse, R.C. and D.R. Peacor (1993) The crystal structure of dissakisite-(Ce), the Mg analogue of allanite-(Ce). Can. Mineral., 31, 153–157.