Demagistrisite $BaCa_2Mn^{3+}_4(Si_3O_{10})(Si_2O_7)(OH)_4 \cdot 3H_2O$

Crystal Data: Orthorhombic. *Point Group*: *mm*2. As tightly intergrown blades to 2 mm, as prisms to 4 mm elongated along [010], or as needles to 1 mm with square cross-section, typically with irregular terminations, and rarely terminated by a low-angle pyramid.

Physical Properties: *Cleavage*: Good on {001}. *Tenacity*: Brittle. *Fracture*: Irregular. Hardness = 3.5 D(meas.) = n.d. D(calc.) = 3.525 Nonfluorescent.

Optical Properties: Translucent to transparent. *Color*: Orange-brown to red-brown. *Streak*: Beige. *Luster*: Vitreous. *Optical Class*: Biaxial (-). $\alpha = 1.805(5)$ $\beta = 1.825(5)$ $\gamma = 1.8305(5)$ 2V(meas.) = 58(5)8° 2V(calc.) = 54.78° *Orientation*: $X = c$, $Y = b$, $Z = a$. *Dispersion*: Very strong, $r > v$. *Pleochroism*: Strong, X = orange-yellow, Y = red-brown, Z = red-brown. *Absorption*: $X << Z < Y$.

Cell Data: *Space Group: Amm*2. $a = 16.3160(6)$ $b = 6.1830(2)$ $c = 9.0740(3)$ $Z = 2$

X-Ray Diffraction Pattern: Cerchiara mine, eastern Liguria, La Spezia province, Italy. 2.731 (100), 2.671 (74), 4.34 (56), 2.871 (54), 2.426 (51), 16.21 (49), 4.86 (44)

Chemistry:

	(1)	(2)
Na_2O	0.38	
CaO	7.32	11.54
BaO	11.06	15.78
SrO	2.31	
MgO	0.09	
MnO	[5.18]	
Mn_2O_3	[32.79]	32.49
Al_2O_3	0.14	
SiO_2	31.40	30.92
H_2O	[9.54]	9.27
Total	100.21	100.00

(1) Cerchiara mine, eastern Liguria, La Spezia province, Italy; average electron microprobe and Raman spectroscopic analyses, H_2O calculated and $Mn_2O_3 = 38.55$ apportioned from structure; corresponds to $(Ba_{0.69}Ca_{1.25}Mn^{2+}_{0.70}Sr_{0.21}Na_{0.12}Mg_{0.02})_{\Sigma=2.99}(Mn^{3+}_{3.97}Al_{0.03})_{\Sigma=4}(Si_3O_{10})(Si_2O_7)(OH)_{3.873} \cdot 13H_2O$. (2) $BaCa_2Mn^{3+}_4(Si_3O_{10})(Si_2O_7)(OH)_4 \cdot 3H_2O$.

Occurrence: In rhythmically interlayered braunite-bearing metasediments and hematite-rich cherts formed as sedimentary-diagenetic deposits and that were re-equilibrated under prehnite-pumpellyite facies conditions.

Association: Cerchiaraite-(Mn), namansilite, noelbensonite, orientite, richterite, ruizite, saponite, braunite, calcite, cryptomelane, orthoclase, quartz.

Distribution: At the Cerchiara mine, eastern Liguria, La Spezia province, Italy.

Name: Honors Leandro *de Magistris* (1906-1990), a leading Italian mineral collector from the 1940s through the 1980s and an expert on the mineral localities of Liguria.

Type Material: Museum of the Earth Sciences Department, University of Milan, Italy (MCMGPG-H2018-004 holotype) and the Natural History Museum of Los Angeles County, Los Angeles, California, USA (66942, 66943, and 67129 cotypes).

References: (1) Cámara, F., A.R. Kampf, F. Nestola, M.E. Ciriotti, D. Spartà, and C. Balestra (2021) Demagistrisite, the missing link in a polysomatic series from lawsonite to orientite. Can. Mineral., 59, 91-105.