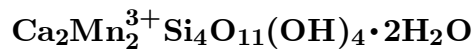


Ruizite

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Crystal Data: Monoclinic. *Point Group:* $2/m$. Euhedral prismatic crystals, to 1 mm, elongated $\parallel$ [010] and somewhat flattened on {100}; as spherules of radial acicular crystals.

Twinning: Common on {100}, always involving only two individuals.

Physical Properties: Hardness = ~ 5 D(meas.) = 2.9(1) D(calc.) = 2.997

Optical Properties: Translucent. *Color:* Orange, inclining to brown. *Streak:* Pale apricot.

Optical Class: Biaxial (-). *Orientation:* $X = b$; $Z \wedge c = 44^\circ$. *Dispersion:* $r > v$, strong, inclined. *Absorption:* $Y > Z \gg X$. $\alpha = 1.663$ $\beta = 1.715$ $\gamma = 1.734$ 2V(meas.) = 60.2° 2V(calc.) = 60.7°

Cell Data: *Space Group:* $C2/m$. $a = 11.95\text{--}11.976$ $b = 6.17\text{--}6.175$ $c = 9.03\text{--}9.064$
 $\beta = 91.375^\circ$ $Z = 4$

X-ray Powder Pattern: Christmas, Arizona, USA.

11.95 (100), 4.19 (70), 3.12 (60), 5.09 (50), 3.64 (40), 2.951 (40), 2.591 (40)

Chemistry:

	(1)	(2)
SiO ₂	39.14	41.26
Mn ₂ O ₃	23.42	27.11
CaO	20.57	19.26
H ₂ O	16.0	12.37
Total	99.13	100.00

(1) Christmas, Arizona, USA; SiO₂ by solvent extraction, Mn and Ca by AA, H₂O by the Penfield method. (2) Ca₂Mn₂Si₄O₁₁(OH)₄ • 2H₂O.

Occurrence: In veinlets and on fracture surfaces in metalimestones, formed during cooling of a high-temperature calc-silicate assemblage under oxidizing conditions (Christmas, Arizona, USA).

Association: Apophyllite, kinoite, junitoite, wollastonite, grossular, diopside, vesuvianite, calcite, chalcophyrite, bornite, sphalerite, smectite (Christmas, Arizona, USA); apophyllite, pectolite, datolite, inesite, orientite, quartz (Wessels mine, South Africa).

Distribution: In the Christmas copper mine, Christmas, Gila Co., Arizona, USA. From the N'Chwaning and Wessels mines, near Kuruman, Cape Province, South Africa.

Name: For Joe Ana Ruiz, of Mammoth, Arizona, USA, collector of microscopic minerals, who discovered the mineral.

Type Material: University of Arizona, Tucson, Arizona; Harvard University, Cambridge, Massachusetts, 119096; National Museum of Natural History, Washington, D.C., USA, 136689; The Natural History Museum, London, England, 1980,534.

References: (1) Williams, S.A. and M. Duggan (1977) Ruizite, a new silicate mineral from Christmas, Arizona. *Mineral. Mag.*, 41, 429–432. (2) (1978) *Amer. Mineral.*, 63, 794–795 (abs. ref. 1). (3) Wilson, W.E. and P.J. Dunn (1978) The Kalahari manganese field. *Mineral. Record*, 9, 137–153. (4) Hawthorne, F.C. (1984) The crystal structure of ruizite, a sorosilicate with an [Si₄O₁₃] cluster. *Tschermaks Mineral. Petrog. Mitt.*, 33, 135–146. (5) Moore, P.B., J. Shen, and T. Araki (1985) Crystal chemistry of the ${}^2_{\infty}[\text{M}_2^{3+}\Phi_2(\text{TO}_4)_2]$ sheet: structural principles and crystal structures of ruizite, macfallite and orientite. *Amer. Mineral.*, 70, 171–181.