

Crystal Data: Cubic. *Point Group:* $\bar{4} 3m$. As crystals to ~500 nm, displaying {100}, { $\bar{1}11$ }, and {111}.

Physical Properties: *Cleavage:* n.d. *Fracture:* n.d. *Tenacity:* n.d. *Hardness =* n.d. *D(meas.) =* n.d. *D(calc.) =* n.d. *Magnetic:*

Optical Properties: Opaque. *Color:* n.d. *Streak:* n.d. *Luster:* n.d. *Optical Class:* n.d.

Cell Data: Space Group: $I\bar{4} 3m$. $a = 8.8852(7)$ $Z =$ n.d.

X-ray Powder Pattern: Menan Volcanic Complex, Idaho, USA (synchrotron XRD pattern). 3.6284 (100), 6.2871 (45), 2.8011 (40), 2.5644 (32), 2.3750 (27), 1.5604 (10), 2.0976 (9)

Chemistry:	(1)	(2)
Fe ₂ O ₃	49.57	49.47
CaO	31.58	34.74
Al ₂ O ₃	15.20	15.79
MgO	2.45	
TiO ₂	1.20	
Total	100.00	100.00

(1) Menan Volcanic Complex, Idaho, USA; average of 5 TEM-EDS analyses; corresponds to (Ca_{3.61}Mg_{0.39})(Fe_{3.97}Al_{1.91}Ti_{0.09})O₁₃. (2) Ca₄(Fe₄Al₂)O₁₃.

Occurrence: An oxidation product of basaltic glass, on the surface of vesicles, formed during the early stage of the scoria formation (Idaho) and in paralava, fused sedimentary rock (Wyoming).

Association: Hematite, maghemite, luogufengite, quartz (Idaho); esseneite (Wyoming).

Distribution: From the Menan Volcanic Complex, near Rexburg, Idaho and near Gillette, Wyoming, USA.

Name: Honors John W. Valley (b. 1948) of the University of Wisconsin-Madison. Valley was the President of the Mineralogical Society of America during 2005-2006. His groundbreaking contributions to mineralogy, petrology, and geochemistry have led to a deeper understanding of Earth's crustal evolution from early Earth to the Anthropocene.

Type Material: Geology Museum, Department of Geoscience, University of Wisconsin-Madison, USA (UWGM 2352 and UWGM2353).

References: (1) Lee, S., H. Xu, H. Xu, R. Jacobs, and D. Morgan (2019) Valleyite: A new magnetic mineral with the sodalite-type structure. *Amer. Mineral.*, 104(9), 1238-1245.