

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

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

(1) Menan Volcanic Complex, Idaho, USA; average of 5 TEM-EDS analyses; corresponds to (Ca<sub>3.61</sub>Mg<sub>0.39</sub>)(Fe<sub>3.97</sub>Al<sub>1.91</sub>Ti<sub>0.09</sub>)O<sub>13</sub>. (2) Ca<sub>4</sub>(Fe<sub>4</sub>Al<sub>2</sub>)O<sub>13</sub>.

**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.