Xuite $Ca_3Fe_2[(AlO_3(OH)]_3$

Crystal Data: Cubic. *Point Group*: 4/*m* $\bar{3}$ 2/*m*. As crystals to 800 nm (0.8 μm).

Physical Properties: *Cleavage*: n.d. *Tenacity*: n.d. *Fracture*: n.d. Hardness = n.d.
D(meas.) = n.d. D(calc.) = 3.53

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

Cell Data: *Space Group*: *Ia* $\bar{3}$ *d*. *a* = 12.5056(5) Z = 8

X-Ray Diffraction Pattern: Rexburg, Madison Co., Idaho, USA.
(high-resolution synchrotron XRD pattern)
2.796 (100), 4.421 (65), 2.552 (63), 3.126 (62), 3.342 (24), 5.106 (16), 2.666 (15)

Chemistry:

	(1)
Fe_2O_3	44.64
CaO	29.84
Al_2O_3	12.98
MgO	1.87
TiO_2	1.23
SiO_2	1.85
H_2O	7.59
Total	100.05

(1) Rexburg, Madison Co., Idaho, USA; average EDS and FTIR spectroscopic analyses, H added for charge balance; corresponds to $(Ca_{0.92}Mg_{0.08})_3(Fe_{0.96}Ti_{0.04})_2[(AlO_4H)_{0.44}(FeO_4H)_{0.34}(SiO_4)_{0.05}(O_4H_4)_{0.17}]_3$.

Mineral Group: Garnet supergroup, hydrogarnet subgroup.

Occurrence: In basaltic scoria, formed by oxidation of Fe-bearing pyroclasts at high temperatures. Undergoes dehydroxylation to form brownmillerite from ~236 to ~396 °C.

Association: Luogufengite, valleyite, hematite, quartz, calcite.

Distribution From the Menan volcanic complex, near Rexburg, Madison Co., Idaho, USA (holotype) and paralava from Gillette, Campbell Co., Wyoming, USA (cotype).

Name: Honors Huifang *Xu*, University of Wisconsin, Madison, USA and Hongwu *Xu*, Los Alamos National Laboratory, USA, for their contributions to minerals research, including the discovery of two other Fe-bearing nanominerals, luogufengite and valleyite.

Type Material: Geology Museum, Department of Geoscience, University of Wisconsin-Madison, Wisconsin, USA (UWGM 2341 holotype Rexburg, UWGM 2342, UWGM 2343, UWGM 2352, and UWGM 2353 cotypes Rexburg and Gillette).

References: (1) Lee, S. and X. Guo (2022) Xuite, $Ca_3Fe_2[(Al,Fe)O_3(OH)]_3$, a new mineral of the garnet group: Implications for the wide occurrence of nanominerals. Amer. Mineral., 107, 930-935.