Hazenite $KNaMg_2(PO_4)_2 \cdot 14H_2O$

Crystal Data: Orthorhombic. *Point Group*: 2/*m* 2/*m* 2/*m*. As radiating clusters of prismatic crystals elongated along [100] to 0.4 mm.

Physical Properties: *Cleavage*: Good on {001}. *Fracture*: n.d. *Tenacity*: Brittle. Hardness = 2-2.5 D(meas.) = 1.91(3) D(calc.) = 1.875 Slowly soluble in water.

Optical Properties: Transparent. *Color*: Colorless. *Streak*: White. *Luster*: Vitreous. *Optical Class*: Biaxial (+). α = 1.494(1) β = 1.498(1) γ = 1.503(1) 2V(meas.) = 41(2)° 2V(calc.) = 42° *Orientation*: $X = b$, $Y = c$, $Z = a$. *Dispersion*: Strong, $r < v$.

Cell Data: *Space Group*: *Pmnb*. a = 6.9349(4) b = 25.174(2) c = 11.2195(8) Z = 4

X-ray Powder Pattern: Mono Lake, California, USA.
4.302 (100), 2.767 (51), 2.670 (51), 2.742 (48), 2.786 (43), 2.803 (32), 4.659 (30)

Chemistry:

	(1)
K_2O	8.27
Na_2O	5.35
MgO	15.09
CaO	0.21
P_2O_5	25.27
SO_3	0.54
H_2O	[45.27]
Total	100.00

(1) Mono Lake, California, USA; average of 20 electron microprobe analyses supplemented by Raman spectroscopy, H_2O by difference; corresponds to $K_{0.97}(Na_{0.96}Ca_{0.02})Mg_{2.07}[(P_{0.98}S_{0.02})O_4]_2 \cdot 13.90H_2O$.

Occurrence: In and/or on completely dried-out or decomposed cyanobacteria on porous calcium carbonate (mainly calcite and aragonite) substrates or tufa in a hypersaline alkaline lake in a hydrologically closed basin.

Association: Calcite, aragonite.

Distribution: From the south shore of Mono Lake, California, USA.

Name: Honors Robert Miller *Hazen*, staff scientist at the Geophysical Laboratory, Carnegie Institution of Washington, D.C, USA, for his contributions to Earth sciences in general, and mineralogy in particular, in both research and education, as well as for his contributions to understanding interactions between minerals and organic molecules.

Type Material: Mineral Museum, University of Arizona, Tucson, Arizona, USA (18812).

References: (1) Yang, H., H.J. Sun, and R.T. Downs (2011) Hazenite, $KNaMg_2(PO_4)_2 \cdot 14H_2O$, a new biologically related phosphate mineral, from Mono Lake, California, U.S.A. Amer. Mineral., 96, 675-681.