Neighborite $NaMgF_3$

Crystal Data: Orthorhombic, pseudocubic. *Point Group*: 2/*m* 2/*m* 2/*m*. As pseudo-octahedral or pseudocubic crystals, to 3 mm, and as oblong to rounded grains. *Twinning*: Polysynthetic and interpenetrant, complex but poorly defined.

Physical Properties: *Fracture*: Uneven. Hardness = 4.5 D(meas.) = 3.03(3) D(calc.) = 3.08

Optical Properties: Transparent to opaque. *Color*: Colorless, cream, pink, red, brown, may be zoned. *Luster*: Vitreous to dull, greasy.
Optical Class: Isotropic, with birefringence = ~0.003. n = 1.364(2)

Cell Data: *Space Group*: *Pbnm*. a = 5.352(1) b = 7.485(1) c = 7.663(2) Z = 4

X-ray Powder Pattern: South Ouray, Utah, USA.
1.918 (100), 2.71 (50) ,3.83 (35), 2.30 (25), 1.556 (25), 2.23 (18), 2.20 (13)

Chemistry:

	(1)	(2)
Fe_2O_3	0.17	
MgO	39.36	38.65
CaO	1.10	
Na_2O	27.02	29.71
K_2O	0.77	
F	54.76	54.65
H_2O	0.25	
$- O = F_2$	[23.06]	23.01
Total	[100.37]	100.00

(1) Ural Mountains, Russia; original total given as 100.49%; corresponds to $(Na_{0.87}K_{0.02})_{\Sigma=0.89}(Mg_{0.98}Ca_{0.02})_{\Sigma=1.00}F_{2.97}$. (2) $NaMgF_3$.

Occurrence: An authigenic mineral, formed under aluminum-deficient conditions in dolomitic oil shale (South Ouray, Utah, USA); in metamorphosed tuff and clayey carbonate sediments (Ural Mountains, Russia); in miarolitic cavities in peralkalic granite (Lake Gjerdingen, Norway); in cavities in pegmatite and hornfels in an alkalic gabbro-syenite complex (Mont Saint- Hilaire).

Association: Burbankite, nahcolite, wurtzite, barytocalcite, garrelsite, pyrite, calcite, quartz (South Ouray, Utah, USA); quartz, aegirine, rhodochrosite, zircon, fluorite, gagarinite, monazite-(Ce), galena, sphalerite, molybdenite, brookite (Gjerdingen, Nordmarka, Norway).

Distribution: From the South Ouray and Sun Havenstrite wells, about 8 km south-southeast of South Ouray, Uintah Co., Utah, USA. At Mont Saint-Hilaire, Quebec, Canada. From near Lake Gjerdingen, Nordmarka, Norway. In the Lovozero, Khibiny, and Kovdor massifs, Kola Peninsula, the Ural Mountains, and other poorly defined localities in Russia.

Name: Honors Frank *Neighbor*, district geologist of Sun Oil Co., Salt Lake City, Utah, USA, for his assistance in providing samples.

Type Material: National Museum of Natural History, Washington, D.C., USA, 115216, 162603.

References: (1) Chao, E.C.T., H.T. Evans, Jr., B.J. Skinner, and C. Milton (1961) Neighborite, $NaMgF_3$, a new mineral from the Green River Formation, South Ouray, Utah. Amer. Mineral., 46, 379-393. (2) Efimov, A.F., E.M. Eskova and S.T. Kataeva (1967) On the first discovery of neighborite in the U.S.S.R. Doklady Acad. Nauk SSSR, 174, 5, 1182-1184 (in Russian). (3) Horvath, L. and R.A. Gault (1990) The mineralogy of Mont Saint-Hilaire, Quebec. Mineral. Record, 21, 284-359, esp. 325-326. (4) Pischedda, V., G. Ferraris, and G. Raade (2005) Single-crystal X-ray diffraction study on neighborite ($NaMgF_3$) from Gjerdingselva, Norway. Neus. Jb. Mineral. Abh., 182, 23-29. (5) (2006) Amer. Mineral., 91(8), 1457 (abs. ref. 4).