Shafranovskite \((\text{Na}, \text{K})_6(\text{Mn}^{2+}, \text{Fe}^{2+})_3\text{Si}_9\text{O}_{24}\cdot6\text{H}_2\text{O}\)

Crystal Data: Hexagonal. Point Group: \(3m\). As granular aggregates, to 5 mm.

Physical Properties: Cleavage: Well developed on \(\{0001\}\). Fracture: Conchoidal. Hardness = 2–3 in aggregate. \(D(\text{meas.}) = 2.76–2.78\) \(D(\text{calc.}) = 2.78\) Strongly electromagnetic.

Optical Properties: Translucent. Color: Dark green to olive-green or yellow-green; pale yellow-green in thin section. Luster: Vitreous. Optical Class: Uniaxial (--). \(\omega = 1.587(2)\) \(\epsilon = 1.570(2)\)

Cell Data: Space Group: \(P31m\) or \(P3m1\). \(a = 14.58\) \(c = 21.01\) \(Z = 6\)

X-ray Powder Pattern: Kola Peninsula, Russia. 10.54 (100), 3.51 (70), 2.787 (60), 2.975 (50b), 3.60 (45b), 10.77 (35)

Chemistry:

\begin{align*}
\text{SiO}_2 & \quad 47.52 \\
\text{TiO}_2 & \quad 0.12 \\
\text{Al}_2\text{O}_3 & \quad 0.39 \\
\text{Fe}_2\text{O}_3 & \quad 1.85 \\
\text{FeO} & \quad 6.10 \\
\text{MnO} & \quad 14.50 \\
\text{MgO} & \quad 0.34 \\
\text{CaO} & \quad 0.61 \\
\text{Na}_2\text{O} & \quad 10.24 \\
\text{K}_2\text{O} & \quad 7.82 \\
\text{H}_2\text{O} & \quad 9.78 \\
\end{align*}

Total 99.27

(1) Kola Peninsula, Russia; corresponds to \((\text{Na}_{3.63}\text{K}_{1.82}\text{Mn}^{2+}_{0.29}\text{Ca}_{0.12})\Sigma=5.86(\text{Mn}^{2+}_{1.95}\text{Fe}^{2+}_{0.93}\text{Mg}_{0.06}\text{Ti}_{0.02}\text{Fe}^{3+}_{0.01})\Sigma=3.00(\text{Si}_{8.5}\text{Fe}^{3+}_{0.24}\text{Al}_{0.01})\Sigma=9.93\text{O}_{24}\cdot5.96\text{H}_2\text{O}\).

Occurrence: Produced by late-stage crystallization of alkalic nepheline syenite magmas in pegmatites in differentiated alkalic massifs.

Association: Thermonatrite, natrophosphate, nacaphite, olympite, sidorenkite, aegirine, villiaumite, phosinaite, rasvumite.

Distribution: On Mts. Rasvumchorr, Niorpakhkh, Koashkar, and Koashwa, Khibiny massif, and at the Jubilee pegmatite, Mt. Karnasurt, and several other localities in the Lovozero massif, Kola Peninsula, Russia.

Name: Honors Professor Ilarion Ilarionovich Shafranovskii (1907–1994), mineralogist and crystallographer at the Mining Institute, St. Petersburg, Russia.

Type Material: Geology Museum, Kola Branch, Academy of Sciences, Apatity, 5713/1; Mining Institute, St. Petersburg, 1202/1; Vernaedsky Geological Institute, 57772; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 81593.


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