Xenophyllite $Na_4Fe_7(PO_4)_6$

Crystal Data: Triclinic. *Point Group*: 1 or $\bar{1}$. As lamella to 0.15 mm cross-cutting millimeter-sized grains of sarcopside. *Twinning*: On (111).

Physical Properties: *Cleavage*: Perfect on {010}. *Tenacity*: n.d. *Fracture*: n.d. Hardness = 3.5-4 D(meas.) = 3.58(5) D(calc.) = 3.53

Optical Properties: Translucent. *Color*: Bluish green to gray-green. *Streak*: White. *Luster*: Vitreous.
Optical Class: Biaxial (-). α = 1.675(2) β = 1.681(2) γ = 1.681(2) 2V(meas.) = 10°-20°
Pleochroism: Distinct, *X* = yellow-green, *Z* = dark gray-green.

Cell Data: *Space Group*: *P*1 or $P\bar{1}$. a = 9.643(6) b = 9.633(5) c = 17.645(11) α = 88.26(5)° β = 88.16(5)° γ = 64.83(5)° Z = 3

X-Ray Diffraction Pattern: Augustinovka meteorite.
3.020 (100), 2.703 (77), 2.719 (67), 5.860 (56), 3.188 (47), 2.568 (39), 7.47 (32)

Chemistry:

	(1)
Na_2O	10.9
K_2O	0.4
MnO	5.8
FeO	42.1
Cr_2O_3	0.8
P_2O_5	40.7
Total	100.7

(1) Augustinovka meteorite; average electron microprobe analysis supplemented by Raman spectroscopy; corresponds to $(Na_{3.67}K_{0.09})_{\Sigma=3.76}(Fe^{2+}_{6.12}Mn^{2+}_{0.85}Cr_{0.11})_{\Sigma=7.08}P_{5.99}O_{24.00}$.

Occurrence: In phosphide-phosphate assemblages confined to troilite nodules of an iron meteorite (medium octahedrite, IIIAB).

Association: Sarcopside, schreibersite, chromite, pentlandite.

Distribution: From the Augustinovka meteorite.

Name: From the Greek, *xénos* (stranger) and *fýllo* (leaf), for its extraterrestrial origin and perfect cleavage.

Type Material: Mining Museum, St. Petersburg Mining University, Russia (23/2005).

References: (1) Britvin, S.N., S.V. Krivovichev, E.V. Obolonskaya, N.S. Vlasenko, V.N. Bocharov, and V.V. Bryukhanova (2020) Xenophyllite, $Na_4Fe_7(PO_4)_6$, an exotic meteoritic phosphate: new mineral description, Na-ions mobility and electrochemical implications. Minerals, 10(4), 300.