

Fluorarrojadite-(BaNa)**BaNa₄CaFe₁₃Al(PO₄)₁₁(PO₃OH)F₂**

Crystal Data: Monoclinic. *Point Group:* *m*. As irregular aggregates to 4 cm of grains to 0.01 mm.

Physical Properties: *Cleavage:* None. *Tenacity:* Brittle. *Fracture:* Irregular. Hardness = ~4.5-5
D(meas.) = 3.61(2) D(calc.) = 3.650

Optical Properties: Transparent. *Color:* Yellowish brown to greenish yellow. *Streak:* Pale yellow.
Luster: Vitreous to greasy.
Optical Class: Biaxial (+). *n*(calc.) = 1.674 Nonpleochroic.

Cell Data: *Space Group:* *Cc*. *a* = 16.563(1) *b* = 10.0476(6) *c* = 24.669(1) β = 105.452(4)° *Z* = 4

X-ray Powder Pattern: Elisabeth adit, near Gemerská Poloma, Rožňava Co., Slovak Republic.
3.040 (100), 2.714 (56), 3.224 (37), 2.556 (33), 2.512 (23), 2.850 (22), 3.412 (21)

Chemistry:	(1)	(2)	(1)	(2)
K ₂ O	0.76		FeO	25.51 42.44
Na ₂ O	5.72	5.63	Al ₂ O ₃	2.43 2.32
Li ₂ O	0.26		Sc ₂ O ₃	0.26
BaO	4.91	6.97	Ga ₂ O ₃	0.08
SrO	0.98		TiO ₂	0.07
CaO	1.93	2.55	P ₂ O ₅	39.75 38.69
PbO	0.23		F	1.36 1.73
MgO	0.23		H ₂ O	[0.47] 0.41
ZnO	0.22		- O = F ₂	0.57 0.73
MnO	17.08		Total	101.67 100.00

(1) Elisabeth adit dump, near Gemerská Poloma, Rožňava Co., Slovak Republic; average of 5 electron microprobe and LA-ICP-MS analyses supplemented by Raman spectroscopy, H₂O calculated; corresponds to (Na_{3.96}Ca_{0.74}Ba_{0.69}K_{0.35}Sr_{0.20}Pb_{0.02}) $\Sigma=5.96$ (Fe_{7.62}Mn_{5.17}Li_{0.37}Mg_{0.12}Sc_{0.08}Zn_{0.06}Ti_{0.02}Ga_{0.02}) $\Sigma=13.46$ Al_{1.02}(P_{12.02}O₄₇)(F_{1.54}OH_{1.00}O_{0.46}) $\Sigma=3.00$. (2) BaNa₄CaFe₁₃Al(PO₄)₁₁(PO₃OH)F₂.

Mineral Group: Arrojadite group.

Occurrence: In hydrothermal quartz veins in highly fractionated, topaz-zinnwaldite S-type leucogranite.

Association: Fluorapatite, triplite, viitaniemiite, potentially new mineral “fluordickinsonite-(BaNa)”, albite, orthoclase, muscovite, fluorite, Mn-siderite, rhodochrosite, arsenopyrite, pyrite, bismuthinite, kobellite, tintinaite, giessenite, bismuth (Elisabeth audit); lazulite, wagnerite, fluorapatite (China).

Distribution: On the dump of the Elisabeth adit, near Gemerská Poloma village, Rožňava Co., Košice Region, Slovak Republic. From the Nanping No. 31 pegmatite dike, northwest Fujian Province, southeastern China and from the Sidibou-Kricha pegmatite, Morocco.

Name: Indicates a member of the *arrojadite* group (Fe²⁺ dominant at the *M* sites) and suffixes for dominant Ba at the *A1* and Na at the *B1* sites. The prefix “*fluor*” indicates dominant F in the *W* site.

Type Material: Department of Mineralogy and Petrology, National Museum, Prague, Czech Republic (PIP 13/2016) and the Department of Mineralogy and Petrology, Faculty of Natural Sciences, Comenius University, Bratislava, Slovak Republic (7401).

References: (1) Števkó, M., J. Sejkora, P. Uher, F. Cámara, R. Škoda, and T. Vaculovič (2018) Fluorarrojadite-(BaNa), BaNa₄CaFe₁₃Al(PO₄)₁₁(PO₃OH)F₂, a new member of the arrojadite group from Gemerská Poloma, Slovakia. *Mineral. Mag.*, 82(4), 863-876. (2) (2021) *Amer. Mineral.*, 106, 159-160 (abs. ref. 1). (3) Rao, C., R.C. Wang, F. Hatert, and M. Bajot (2014) Hydrothermal transformations of triphylite from the Nanping No. 31 pegmatite dyke, southeastern China. *Eur. J. Mineral.*, 26, 179-188. (4) Chopin, C., R. Oberti, and F. Cámara (2006) The arrojadite enigma: II. Compositional space, new members, and nomenclature of the group. *Amer. Mineral.*, 91, 1260-1270.