

Fengchengite

Crystal Data: Hexagonal. *Point Group:* $\bar{3} 2/m$. As grains, to 15 mm, forms {001}, {100}, {110} are observed.

Physical Properties: *Cleavage:* None. *Fracture:* Uneven. *Tenacity:* Brittle.
Hardness = ~5 VHN = 420-570, 562 average (25 g load). D(meas.) = 2.90(4) D(calc.) = 2.839

Optical Properties: Transparent to translucent. *Color:* Rose to deep rose. *Streak:* White.
Luster: Vitreous.

Optical Class: Uniaxial (+). $\omega = 1.603$ $\varepsilon = 1.607$

Cell Data: Space Group: $R\bar{3} m$. $a = 14.2467(6)$ $c = 30.033(2)$ $Z = 3$

X-ray Powder Pattern: Fengcheng City, Liaoning Province, China.

2.857 (100), 2.978 (61), 7.186 (55), 4.187 (53), 3.201 (47), 5.761 (44), 1.771 (36)

Chemistry:	(1)		(1)
Na ₂ O	11.64	La ₂ O ₃	0.12
K ₂ O	0.52	Ce ₂ O ₃	0.23
CaO	8.96	Nd ₂ O ₃	0.13
MgO	0.07	Sc ₂ O ₃	0.01
SrO	3.53	TiO ₂	0.38
BaO	0.02	ZrO ₂	11.72
MnO _{total}	0.93	SiO ₂	51.73
MnO	[0.10]	Cr ₂ O ₃	0.20
Mn ₂ O ₃	[0.92]	Nb ₂ O ₅	0.23
Fe _{total}	6.07	Cl	1.13
FeO	[0.69]	H ₂ O	2.09
Fe ₂ O ₃	[5.98]	<u>-O = Cl₂</u>	<u>0.26</u>
		Total	100.14

(1) Fengcheng City, Liaoning Province, China; average of 16 electron microprobe analyses supplemented by IR and Mössbauer spectroscopy, H₂O by TGA, Cl by wet chemistry, FeO/Fe₂O₃ apportioned by Mössbauer; corresponds to [(Na_{3.0}Na_{3.0}) $\Sigma=6.00$ (Na_{5.28}K_{0.33} $\square_{0.39}$) $\Sigma=6.00$] $\Sigma=12.00$ ($\square_{2.71}$ Sr_{0.20}REE_{0.09}) $\Sigma=3.00$ (Ca_{4.80}Sr_{0.82}Fe²⁺_{0.29}Mg_{0.05}Mn²⁺_{0.04}) $\Sigma=6.00$ (Fe³⁺_{2.25}Mn³⁺_{0.35}Cr_{0.08} $\square_{0.32}$) $\Sigma=3.00$ (Zr_{2.86} Ti_{0.09}Nb_{0.05}) $\Sigma=3.00$ (Si_{0.87}Ti_{0.05} $\square_{0.08}$) $\Sigma=1.00$ Si(Si_{24.00}O_{73.00})[(H₂O)_{2.93}(OH)_{0.07}] $\Sigma=3.00$ [(OH)_{1.04}Cl_{0.96}] $\Sigma=2.00$.

Mineral Group: Eudialyte group.

Occurrence: In agpaitic nepheline syenite and pegmatite, crystallized directly from a REE-, U-, Th-, and Zr-rich alkaline magma enriched in volatile components.

Association: Microcline, orthoclase, albite, nepheline, sodic amphiboles, aegirine, lamprophyllite, Na-poor rinkite, loparite, catapleite, zircon, titanite, Fe-rich phlogopite, rengerite, fluorapatite, REE-rich hydroxyllestadite, hezuolinite.

Distribution: From near Saima Town, ~60 km NNE of Fengcheng City, Liaoning Province, China.

Name: For *Fengcheng* City, China, near the type locality.

Type Material: Geological Museum of China, Beijing, China (M11632).

References: (1) Shen, G., J. Xu, P. Yao, and G. Li (2017) Fengchengite: A new species with the Na-poor but vacancy-dominant M(5) site in the eudialyte group. *Acta Mineral. Sinica*, 37(1/2), 140-151. (2) (2019) *Amer. Mineral.*, 104(4), 625 (abs. ref 1).