Ferro-fluoro-edenite $NaCa_2Fe^{2+}_5(Si_7Al)O_{22}F_2$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As stout prismatic crystals to 1 mm that display {010}, {110}, {210}, {021}, {001}, {100} and {211}.

Physical Properties: *Cleavage*: Fair on {110}. *Tenacity*: Brittle. *Fracture*: Uneven.
Hardness = 5-6 D(meas.) = n.d. D(calc.) = 3.358

Optical Properties: Transparent or semitransparent. *Color*: Dark brown to black.
Streak: Light brown. *Luster*: Vitreous.
Optical Class: Biaxial (-). $\alpha = 1.629(2)$ $\beta = 1.659(2)$ $\gamma = 1.667(2)$ 2V(calc.) = -53.88°
Orientation: $Y = b$. *Dispersion*: Weak to very weak, $r < v$. Non-pleochroic.

Cell Data: *Space Group: C*2/*m*. $a = 9.913(2)$ $b = 18.174(4)$ $c = 5.294(1)$ $\beta = 104.85(3)°$ Z = 2

X-Ray Diffraction Pattern: La Fossa crater, Vulcano Island, Messina province, Sicily, Italy.
8.54 (100), 2.833 (43), 4.506 (16), 3.154 (16), 1.662 (15), 2.057 (14), 1.910 (12)

Chemistry:

	(1)	(2)
SiO_2	44.86	42.20
TiO_2	1.03	
Al_2O_3	5.74	5.12
FeO	22.13	36.08
MnO	0.74	
MgO	9.56	
CaO	10.21	11.27
K_2O	1.15	
Na_2O	2.47	3.12
F	3.87	3.82
Cl	0.32	
-O = F	1.63	1.61
-O = Cl	0.07	.
Total	100.41	100.00

(1) La Fossa crater, Vulcano Island, Messina province, Sicily, Italy; electron microprobe analysis; corresponds to $(Na_{0.69}K_{0.23}\square_{0.08})(Ca_{1.69}Mg_{0.16}Mn_{0.10}Na_{0.05})_{\Sigma=2}(Fe^{2+}_{2.86}Mg_{2.04}Ti_{0.10})_{\Sigma=5}(Si_{6.93}Al_{1.05}Ti_{0.02})_{\Sigma=8}O_{22}[F_{1.89}Cl_{0.09}(OH)_{0.02}]_{\Sigma=2}$. (2) $NaCa_2Fe^{2+}_5(Si_7Al)O_{22}F_2$.

Mineral Group: Amphibole supergroup, calcium amphibole subgroup.

Occurrence: In cavities in volcanic ejecta probably crystallized during a late-stage hydrothermal phase.

Association: Quartz, magnetite, vonsenite.

Distribution: From La Fossa crater, Vulcano Island, Messina province, Sicily, Italy.

Name: Prefixes indicate the Fe^{2+} analogue of *edenite* with fluorine dominant in the *W* site.

Type Material: National History Museum, Milan, Italy (M38849).

References: (1) Campostrini, I., F. Demartin, P. Vignola, and F. Pezzotta (2021) Ferro-fluoro-edenite, a new amphibole endmember from Vulcano Island (Sicily, Italy). Can. Mineral., 59, 741-749.