

Manganoeudialyte**Na₁₄Ca₆Mn₃Zr₃[Si₂₆O₇₂(OH)₂]Cl₂·4H₂O**

Crystal Data: Hexagonal. *Point Group:* 3m. As cm-wide massive patches in igneous rock.

Physical Properties: *Cleavage:* None. *Fracture:* Uneven. *Tenacity:* Brittle.
Hardness = 5-6 D(meas.) = 2.890 D(calc.) = 2.935

Optical Properties: Transparent to translucent. *Color:* Pink to purple. *Streak:* White.
Luster: Vitreous.

Optical Class: Uniaxial (+). $\omega = 1.603(2)$ $\varepsilon = 1.608(2)$

Cell Data: *Space Group:* R3m. $a = 14.2418(1)$ $c = 30.1143(3)$ $Z = 3$

X-ray Powder Pattern: Poços de Caldas massif, Minas Gerais, Brazil.
3.218 (100), 1.609 (77), 3.526 (46), 1.605 (41), 6.421 (37), 4.329 (30), 3.023 (25)

Chemistry:	(1)	(2)	(1)	(2)
Na ₂ O	12.01	14.18	SiO ₂	48.70 51.05
K ₂ O	0.59		TiO ₂	0.47
CaO	10.70	11.00	ZrO ₂	12.08 12.08
MnO	3.51	6.96	Nb ₂ O	1.21
SrO	3.00		HfO ₂	0.25
FeO	2.72		F	0.08
Al ₂ O ₃	0.41		Cl	0.99 2.32
La ₂ O ₃	0.15		H ₂ O	3.5 2.94
Ce ₂ O ₃	0.12		<u>- O = (Cl,F)₂</u>	0.26 0.52
Nd ₂ O ₃	0.00		Total	100.23 100.00

(1) Poços de Caldas massif, Minas Gerais, Brazil; average of 12 electron microprobe analyses, IR spectroscopy confirms absence of CO₂ and presence of OH and H₂O; corresponding to [Na_{11.93}Sr_{0.81}(H₃O)_{0.70}K_{0.39}Ce_{0.07}]_{Σ=13.90}[Ca₆]_{VI}Mn_{1.56}^VFe_{1.20}^VNa_{0.24}_{Σ=3.00}[Zr₃]_{IV}(Si_{0.38}Al_{0.25}_{VI}(Nb_{0.29}Zr_{0.08})_{Σ=1.00}[^{IV}Si_{0.81}_{VI}Ti_{0.19}]_{Σ=1.00}[Si₂₄O₇₂][(OH)₂][(H₂O)_{3.55}Cl_{0.88}(OH)_{0.84}O_{0.40}F_{0.13}]_{Σ=5.80}.
(2) Na₁₄Ca₆Mn₃Zr₃[Si₂₆O₇₂(OH)₂]Cl₂·4H₂O.

Mineral Group: Eudialyte group.

Occurrence: An interstitial phase in nepheline syenite (khibinite).

Association: Eudialyte, K-feldspar, nepheline, aegirine, analcime, sodalite, rinkite, lamprophyllite, astrophyllite, titanite, fluorite, cancrinite.

Distribution: At the northern edge (“Anel Norte”), Poços de Caldas massif, Minas Gerais, Brazil.

Name: As a member of the *eudialyte* group with dominant manganese in the M2 structural sites and silicon dominant in M3 and M4 sites.

Type Material: Museum of Geosciences, Institute of Geosciences, University of São Paulo, São Paulo, Brazil (DR704).

References: (1) Nomura, S.F., D. Atencio, N.V. Chukanov, R.K. Rastsvetaeva, J.M.V. Coutino, and T.K. Karipidis (2010) Manganoeudialyte - a new mineral from Poços De Caldas, Minas Gerais, Brazil. Zap. Ross. Mineral. Obshch., 139(4), 35-47 (in English with Russian abstract). (2) (2012) Amer. Mineral., 97, 1263-1264 (abs. ref. 1).