Fengchengite \[\text{Na}_{12}\delta_{3}\text{Ca}(\text{Fe}^{3+},\square)_{3}\text{Zr}_{3}\text{Si}_{3}(\text{Si}_{2}\text{O}_{7})_{3}[(\text{H}_{2}\text{O})_{3}](\text{OH})_{2}]\]

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


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

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:

\[
\begin{array}{ccc}
\text{Na}_2\text{O} & 11.64 & \text{La}_2\text{O}_3 & 0.12 \\
\text{K}_2\text{O} & 0.52 & \text{Ce}_2\text{O}_3 & 0.23 \\
\text{CaO} & 8.96 & \text{Nd}_2\text{O}_3 & 0.13 \\
\text{MgO} & 0.07 & \text{Sc}_2\text{O}_3 & 0.01 \\
\text{SrO} & 3.53 & \text{Ti}_2\text{O}_2 & 0.38 \\
\text{BaO} & 0.02 & \text{Zr}_2\text{O}_2 & 11.72 \\
\text{Mn}_{\text{total}} & 0.93 & \text{Si}_2\text{O}_2 & 51.73 \\
\text{MnO} & [0.10] & \text{Cr}_2\text{O}_3 & 0.20 \\
\text{Mn}_2\text{O}_3 & [0.92] & \text{Nb}_2\text{O}_3 & 0.23 \\
\text{Fe}_{\text{total}} & 6.07 & \text{Cl} & 1.13 \\
\text{FeO} & [0.69] & \text{H}_2\text{O} & 2.09 \\
\text{Fe}_2\text{O}_3 & [5.98] & -\text{O} = \text{Cl}_2 & 0.26 \\
\hline
\text{Total} & & & 100.14
\end{array}
\]

(1) Fengcheng City, Liaoning Province, China; average of 16 electron microprobe analyses supplemented by IR and Mössbauer spectroscopy, \(\text{H}_2\text{O}\) by TGA, Cl by wet chemistry, FeO/Fe\(_2\)O\(_3\) apportioned by Mössbauer; corresponds to [(\(\text{Na}_3.0\text{Na}_3.0\))\(\square\)-6.00(\(\text{Na}_5\text{Si}_8\text{K}_0.33\square_0.39\))\(\square\)-6.00(\(\square\)-12.00(\(\square\)-2.71 \(\text{Sr}_{0.20}\text{REE}_{0.09}\))\(\square\)-3.00(\(\text{Ca}_{4.0.0}\text{Sr}_{0.82}\text{Fe}^{3+}_{0.20}\text{Mg}_{0.05}\text{Mn}^{2+}_{0.04}\))\(\square\)-6.00(\(\text{Fe}^{3+}_{0.20}\text{Mn}^{2+}_{0.35}\text{Ca}_{0.08}\square_0.32\))\(\square\)-3.00(\(\text{Zr}_{1.86}\text{Ti}_{0.08}\text{Nb}_{0.05}\))\(\square\)-3.00(\(\text{Si}_{11.87}\text{Ti}_{0.05}\square_0.08\))\(\square\)-1.00(\(\text{Si}_{\text{Na}_4.00}\text{O}_{73.00}\))(\(\text{H}_2\text{O})_{3.93}(\text{OH})_{0.07}\))\(\square\)-3.00[(\(\text{OH})_{1.04}\text{Cl}_{0.96}\))\(\square\)-2.00.]

Mineral Group: Eudialyte group.

Occurrence: In aegirine 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, catapleiite, zircon, titanite, Fe-rich phlogopite, rengeite, fluorapatite, REE-rich hydroxylellestadite, hezuolinite.

Distribution: From near Saima Town, \(\sim 60\) 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).