Hezuolinite

\[(\text{Sr,REE})_4\text{Zr}\{\text{Ti,Fe}^{3+},\text{Fe}^{2+}\}_2\text{Ti}_2\text{O}_8(\text{Si}_2\text{O}_7)_2\]

Crystal Data: Monoclinic. \(\text{Point Group: } 2/m\). As grains to several 100 \(\mu\text{m}\).

Twining: Polysynthetic twins were observed.


Hardness = 5.5-6 VHN = 683-964 (100 g load). \(\text{D(meas.)} = 4.28\) \(\text{D(calc.)} = 4.30\)


Optical Class: Biaxial (−). \(n > 1.8\) 2\(V\) = 75\(^\circ\). Dispersion: Strong, \(r > v\). Pleochroism: Strong, \(X = \) pale brown, \(Y = \) brown, \(Z = \) dark brown.

Cell Data: Space Group: \(\text{C}_{2/m}\). \(a = 13.973(3)\) \(b = 5.6984(11)\) \(c = 11.988(2)\) \(\beta = 114.10(1)\^\circ\)

\(Z = 2\)

Chemistry:

\[
\begin{align*}
\text{SiO}_2 & \quad 21.90 & \text{Na}_2\text{O} & \quad 0.35 \\
\text{TiO}_2 & \quad 24.42 & \text{ThO}_2 & \quad 0.80 \\
\text{Al}_2\text{O}_3 & \quad 0.16 & \text{UO}_2 & \quad 0.01 \\
\text{FeO} & \quad 1.84 & \text{La}_2\text{O}_3 & \quad 7.12 \\
\text{Fe}_2\text{O}_3 & \quad 2.61 & \text{Ce}_2\text{O}_3 & \quad 8.16 \\
\text{MnO} & \quad 0.07 & \text{Pr}_2\text{O}_3 & \quad 0.45 \\
\text{MgO} & \quad 0.01 & \text{Nd}_2\text{O}_3 & \quad 1.34 \\
\text{Nb}_2\text{O}_5 & \quad 0.28 & \text{Sm}_2\text{O}_3 & \quad 0.10 \\
\text{ZrO}_2 & \quad 9.18 & \text{Eu}_2\text{O}_3 & \quad 0.16 \\
\text{HfO}_2 & \quad 0.39 & \text{Gd}_2\text{O}_3 & \quad 0.06 \\
\text{SrO} & \quad 20.12 & \text{Total} & \quad 101.99 \\
\text{CaO} & \quad 2.46 & & & \\
\end{align*}
\]

(1) Saima alkaline complex, Liaoning Province, China; average of 25 electron microprobe analyses, oxidation ratio for iron from Mössbauer spectroscopy; corresponding to 
\((\text{Sr}_{2.15}\text{Ce}_{0.55}\text{La}_{0.49}\text{Ca}_{0.49}\text{Na}_{0.13}\text{Nd}_{0.09}\text{Pr}_{0.05}\text{Th}_{0.01}\text{Sm}_{0.01}\text{Eu}_{0.01}h_2.38(\text{Zr}_{0.82}\text{Fe}^{2+}_{0.14}\text{Hf}_{0.02}\text{Mn}_{0.01})h_2.100\) 
\((\text{Ti}_{1.38}\text{Fe}^{3+}_{0.36}\text{Fe}^{2+}_{0.14}\text{Al}_{0.06}\text{Nb}_{0.02})h_2.19\text{Ti}_2\text{O}_8(\text{Si}_2\text{O}_7)_2\).

Mineral Group: Chevkinite group.

Occurrence: In a series of alkaline volcanic and intrusive igneous rocks, associated with aegirine nepheline syenite.

Association: Microcline, nepheline, aegirine, biotite, eudialyte, rinkite, titanite.

Distribution: From the Saima alkaline complex, Fengcheng County, Liaoning Province, NE China.

Name: Honors He Zuolin (1900-1967), for his contributions to optical mineralogy and rare-earths mineralogy in China. Hezuolinite corresponds to the previously discredited “saimaite”.

Type Material: Museum of the Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing, China (KDX016).