Ferrokinoshitalite \( \text{BaFe}^{2+3}\text{Si}_2\text{Al}_2\text{O}_{10}(\text{OH})_2 \)

Crystal Data: Monoclinic. Point Group: 2/m. As tabular crystals, to 0.2 mm.

D(meas.) = 3.69(8) \hspace{1cm} D(calc.) = 3.59

Optical Class: Biaxial(-). \( n(\text{calc.}) = 1.6939 \) \hspace{1cm} 2V ~ 20° Pleochroism: Strong; \( X = \) grass green, \( Y = \) dark brown-green, \( Z = \) dark greenish gray-brown. Absorption: \( X << Z < Y \).

Cell Data: Space Group: \( C2/m \) \hspace{1cm} \( a = 5.389(1) \) \hspace{1cm} \( b = 9.337(2) \) \hspace{1cm} \( c = 10.054(2) \) \hspace{1cm} \( \beta = 100.53(2)^\circ \) \hspace{1cm} \( Z = 2 \)

X-ray Powder Pattern: Broken Hill mine, near Aggeneys, northern Cape Province, South Africa.
2.651 (100), 2.176 (40), 1.551 (30), 1.659 (25), 1.529 (25), 3.655 (15), 2.446 (15)

Chemistry:

\[
\begin{align*}
\text{TiO}_2 & \quad 2.68 \\
\text{Al}_2\text{O}_3 & \quad 15.80 \\
\text{Fe}_2\text{O}_3 & \quad 2.35 \\
\text{FeO} & \quad 24.27 \\
\text{MnO} & \quad 1.14 \\
\text{MgO} & \quad 5.84 \\
\text{BaO} & \quad 14.14 \\
\text{SrO} & \quad 0.07 \\
\text{Na}_2\text{O} & \quad 0.26 \\
\text{K}_2\text{O} & \quad 3.18 \\
\text{F} & \quad 2.43 \\
\text{Total} & \quad 100.01
\end{align*}
\]

(1) Broken Hill mine, northern Cape Province, South Africa; average electron microprobe analysis, \( \text{Fe}^{2+}/\text{Fe}^{3+} \) from high-performance ion chromatography, total corrected for - \( \text{O} = \text{F} \) corresponds to \( (\text{Ba}_{0.49}\text{K}_{0.34}\text{Na}_{0.04})_{\Sigma=1.8}\text{Fe}_{1.72}\text{Mg}_{0.73}\text{Mn}_{0.08}\text{Fe}^{3+}_{0.15}\text{Ti}_{0.17})\Sigma=2.87(\text{Si}_{2.44}\text{Al}_{1.56})\Sigma=4.00\text{O}_{10}(\text{OH})_{1.35}\text{F}_{0.65})\Sigma=2.00.

Polymorphism & Series: Kinoshitalite-ferrokinoshitalite solid solution. \( 1M \) polytype.

Mineral Group: Brittle mica.

Occurrence: In massive Pb-Zn-Cu-Ag sulfide orebodies in banded iron formation that underwent high-grade metamorphism.

Association: Quartz, magnetite, spessartine-rich garnet, apatite, sillimanite, ferroan gahnite, Mn-rich grunerite, manganogrunerite, manganan fayalite, Mn-rich pyroxferroite.

Distribution: At the Broken Hill mine, near Aggeneys, northern Cape Province, South Africa.

Name: Prefix, ferro, indicates the \( \text{Fe}^{2+} \)-dominant analog of kinoshitalite.

Type Material: Department of Geological Sciences, University of Cape Town, South Africa.