Windhoekite

\[ \text{Ca}_2\text{Fe}^{3+}_{3-\delta}\text{[Si}_8\text{O}_{20}]\text{(OH)}_4\cdot10\text{H}_2\text{O} \]

Crystal Data: Monoclinic. \textit{Point Group}: 2\textit{m}. As isolated prismatic crystals to 4 mm capped by epitaxial overgrowths of palygorskite and in radial aggregates to 5 mm.

Physical Properties: \textit{Cleavage}: Perfect on \{100\}. \textit{Tenacity}: Sectile. \textit{Fracture}: n.d. \textit{Hardness} = 2
\[ \text{D(meas.)} = 2.62(2) \quad \text{D(calc.)} = 2.630 \]

\textit{Luster}: Vitreous or silky. \textit{Optical Class}: Biaxial (−). \[ a = 1.610(3) \quad \beta = 1.662(3) \quad \gamma = 1.671(3) \quad 2\text{V(meas.)} = 50(10)^\circ \]
\[ 2\text{V(calc.)} = 44^\circ \]
\textit{Pleochroism}: Strong, brown to dark brown. \textit{Orientation}: \textit{X} ≈ \textit{a}, \textit{Z} = \textit{c}.
\textit{Absorption}: \textit{Y} ≈ \textit{Z} > \textit{X}.

Cell Data: \textit{Space Group}: \textit{C}2\textit{m}. \[ a = 14.319(5) \quad b = 17.825(4) \quad c = 5.242(1) \quad \beta = 103.5(2)^\circ \quad Z = 2 \]

X-Ray Diffraction Pattern: Ariskop Quarry, Aris, near Windhoek, Khomas Region, Namibia.
\[ 11.04 \text{ (100)}, \quad 3.486 \text{ (11)}, \quad 4.432 \text{ (10)}, \quad 2.636 \text{ (8)}, \quad 4.133 \text{ (6)}, \quad 2.505 \text{ (6)}, \quad 3.754 \text{ (4)} \]

Chemistry:
\[
\begin{array}{ccc}
\text{CaO} & 9.24 & 10.97 \\
\text{MnO} & 0.85 & \\
\text{Fe}_2\text{O}_3 & 23.14 & 20.86 \\
\text{Al}_2\text{O}_3 & 0.41 & \\
\text{SiO}_2 & 46.32 & 47.03 \\
\text{H}_2\text{O} & 21.0 & 21.15 \\
\text{Total} & 100.96 & 100.01
\end{array}
\]

(1) Ariskop Quarry, Aris, near Windhoek, Khomas Region, Namibia; average electron microprobe analysis supplemented by IR spectroscopy, \text{H}_2\text{O} by gas chromatography; corresponds to \((\text{Ca}_{1.68}\text{Mn}_{0.12})\text{Fe}^{3+}_{2.96}(\text{Si}_{7.87}\text{Al}_{0.08}\text{O}_{20})(\text{OH})_4\cdot10\text{H}_1.96\text{O}.

(2) \text{Ca}_2\text{Fe}_{2.67}(\text{Si}_8\text{O}_{20})(\text{OH})_4\cdot10\text{H}_2\text{O}.

Mineral Group: Palygorskite group.

Occurrence: In miarolitic cavities in alkaline phonolite.

Association: Fluorapophyllite, aegirine, microcline, arisite-(Ce), arisite-(La).

Distribution: From the Ariskop Quarry, Aris, near Windhoek, Khomas Region, Namibia.

Name: For \textit{Windhoek}, the district of Namibia where the studied samples were collected.

Type Material: A.E. Fersman Mineralogical Museum, RAS, Moscow, Russia (4018/1).