Hanjiangite

\[ \text{Ba}_2\text{Ca}(\text{V}^{3+}\text{Al})[\text{Si}_3\text{AlO}_{10}(\text{OH})]\text{F(CO}_3\text{)}_2 \]

Crystal Data: Monoclinic.  \textit{Point Group}: 2. As tabular crystals and irregular grains to 15 mm.

\begin{align*}
\text{Hardness} &= 4 \quad \text{VHN} = 191-215 \quad (203 \text{ average}) \quad (25 \text{ g load}). \\
\text{D(meas.)} &= 3.69 \quad \text{D(calc.)} = 3.78
\end{align*}

\textit{Luster}: Vitreous.  \textit{Optical Class}: Biaxial (-).  
\begin{align*}
\alpha &= 1.615 \\
\beta &= 1.655 \\
\gamma &= 1.700 \\
2\text{V(meas.)} &= 114^\circ-115^\circ \\
2\text{V(calc.)} &= 88.8^\circ
\end{align*}

Pleochroism: Strong; pale yellow-green to deep green.  
\textit{Dispersion}: \( r > v \), medium.

Cell Data: \textit{Space Group}: \( \text{C}_2 \).  
\begin{align*}
a &= 5.2050(12) \\
b &= 9.033(2) \\
c &= 32.077(8) \\
\beta &= 93.49(8)^\circ \\
Z &= 4
\end{align*}

X-ray Powder Pattern: Shiti barium deposit, Dabashan region, China.  
2.676 (100), 5.340 (91), 2.294 (29), 3.209 (23), 2.008 (11), 4.010 (10), 15.866 (7)

Chemistry:  
\begin{align*}
\text{SiO}_2 &= 19.64 \\
\text{TiO}_2 &= 1.12 \\
\text{Al}_2\text{O}_3 &= 11.19 \\
\text{MgO} &= 0.54 \\
\text{CaO} &= 4.91 \\
\text{BaO} &= 34.89 \\
\text{V}_2\text{O}_3 &= 9.93 \\
\text{Cr}_2\text{O}_3 &= 1.75 \\
\text{Na}_2\text{O} &= 0.20 \\
\text{K}_2\text{O} &= 0.06 \\
\text{FeO} &= 0.02 \\
\text{NiO} &= 0.01 \\
\text{SrO} &= 0.34 \\
\text{Y}_2\text{O}_3 &= 0.14 \\
\text{Nd}_2\text{O}_3 &= 0.26 \\
\text{F} &= 1.80 \\
\text{Cl} &= 0.04 \\
\text{CO}_2 &= 10.37 \\
\text{H}_2\text{O} &= 1.30 \\
- \text{O} &= \text{F} \\
- \text{O} &= \text{Cl} \\
\text{Total} &= 98.60
\end{align*}

(1) Shiti barium deposit, Dabashan region, China; average of 44 electron microprobe analyses, supplemented by DTA, TGA, FTIR and Raman spectroscopy and high-frequency combustion infrared absorption spectroscopy; corresponds to \((\text{Ba}_{1.98}\text{Na}_{0.06}\text{K}_{0.01})\Sigma=2.05(\text{Ca}_{0.76}\text{Mg}_{0.12}\text{Y}_{0.06}\text{Sr}_{0.03}\text{La}_{0.01}\text{Nd}_{0.01})\Sigma=0.99(\text{V}_{1.15}\text{Al}_{0.75}\text{Cr}_{0.20}\text{Ti}_{0.12})\Sigma=2.22(\text{Si}_{2.84}\text{Al}_{1.16})\Sigma=4.00(\text{OH})_{1.25}\Sigma=2.02(\text{F}_{0.82}\text{Cl}_{0.01})\Sigma=0.83(\text{CO}_3)_{2.05}.

Occurrence: Disseminated in lenticular bodies and veins associated with strataform hydrothermal barium deposits.

Association: Witherite, barite, barytocalcite, quartz.

Distribution: From the Shiti barium deposit, Dabashan region, China.

Name: After the \textit{Hanjiang} River, that flows through the Shiti ore district and is the largest branch of the Yangtze River, China.

Type Material: Geological Museum of China, Beijing, China (M11740).

References: (1) Jiajun Liu, Guowu Li, Qian Mao, Shenghua Wu, Zhenjiang Liu, Shangguo Su, Ming Xiong, and Xiaoyan Yu (2012) Hanjiangite, a new barium-vanadium phyllosilicate carbonate mineral from the Shiti barium deposit in the Dabashan region, China.  
Amer. Mineral., 97, 281-290.