Manganoblödite \( \text{Na}_2\text{Mn}(\text{SO}_4)_2\cdot4\text{H}_2\text{O} \)

Crystal Data: Monoclinic.  
Point Group: 2\(\text{Im}\).  
As aggregates of anhedral grains to 60 \(\mu\)m.

Physical Properties: Cleavage: None.  
Fracture: Uneven.  
Tenacity: Brittle.  
Hardness = 2.5  
\(D(\text{meas.}) = 2.25(2)\)  
\(D(\text{calc.}) = 2.338\)

Optical Properties: Transparent.  
Color: Colorless, reddish pink in aggregates.  
Streak: White.  
Luster: Vitreous.

Optical Class: Biaxial (−).  
\(a = 1.493(2)\)  
\(\beta = 1.498(2)\)  
\(\gamma = 1.501(2)\)  
2\(V(\text{meas.}) = 80(10)°\)

Cell Data: Space Group: \(\text{P2}_1/\text{a}\).

\(a = 11.137(2)\)  
\(b = 8.279(1)\)  
\(c = 5.5381(9)\)  
\(\beta = 100.42(1)°\)  
\(Z = 2\)

X-ray Powder Pattern: Blue Lizard mine, White Canyon district, San Juan County, Utah, USA.  
3.291 (100), 4.556 (70), 3.256 (67), 4.266 (45), 3.791 (26), 2.647 (24), 3.338 (21)

Chemistry: \(\text{(1)}\)

\[
\begin{array}{lcc}
\text{Na}_2\text{O} & 16.94 \\
\text{MgO} & 3.29 \\
\text{MnO} & 8.80 \\
\text{CoO} & 2.96 \\
\text{NiO} & 1.34 \\
\text{SO}_3 & 45.39 \\
\text{H}_2\text{O} & [20.14] \\
\text{Total} & 98.86 \\
\end{array}
\]

(1) Blue Lizard mine, White Canyon district, San Juan County, Utah, USA; average of 5 electron microprobe analyses, \(\text{H}_2\text{O}\) calculated from stoichiometry; corresponds to \(\text{Na}_{1.96}(\text{Mn}_{0.44}\text{Mg}_{0.29}\text{Co}_{0.14}\text{Ni}_{0.06})\text{SO}_3\text{O}_8\cdot4\text{H}_2\text{O}\).

Polymorphism & Series: Forms a series with blödite and cobaltoblödite, from which it can be distinguished only with a chemical analysis.

Mineral Group: Blödite group.

Occurrence: Coating the walls of underground mine works, related to post-mining oxidation of primary U deposits of the Colorado Plateau type hosted by sandstones.

Association: Mn-Co-Ni-bearing blödite, chalcantite, gypsum, johannite, sideronatrite, quartz, feldspar (Utah); szzikite, jökokuite (Australia).

Distribution: Blue Lizard mine, White Canyon district, San Juan County, Utah, USA and at the Womobi mine, near Thologolong, in northern Victoria, Australia.

Name: For the chemical composition of the \(\text{M}^{2+}\) structural site and relationship to blödite.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (4257/1) and in the Museum Victoria, Melbourne, Australia (M52196).

References:  