Russoite \( (\text{NH}_4)\text{ClAs}^{3+}_2\text{O}_3(\text{H}_2\text{O})_{0.5} \)

**Crystal Data:** Hexagonal.  *Point Group:* 622.  As rosettes or subparallel aggregates to ~300 \( \mu \text{m} \), of hexagonal plates flattened on \{001\} and bounded by \{100\}.

**Physical Properties:**  *Cleavage:* Perfect on \{001\}.  *Fracture:* Irregular.  *Tenacity:* Brittle.  Hardness = n.d.  \( D(\text{meas.}) = 2.89(1) \)  \( D(\text{calc.}) = 2.911 \)

**Optical Properties:** Transparent to translucent.  *Color:* Colorless to white.  *Streak:* White.  *Luster:* Vitreous.  *Optical Class:* Uniaxial (−).  \( \omega = 1.810(6) \)  \( \epsilon = 1.650(5) \)

**Cell Data:** Space Group: \( P\overline{6}22 \).  \( a = 5.2411(7) \)  \( c = 12.5948(25) \)  \( Z = 2 \)

**X-ray Powder Pattern:**  “Bocca Grande” fumarole, Solfatara di Pozzuoli, near Naples, Italy.  6.32 (100), 4.547 (75), 4.218 (47), 2.627 (46), 3.094 (45), 2.428 (31), 1.820 (28)

**Chemistry:**

\[
\begin{array}{cc}
\text{Chemical} & \text{Formula} \\
\text{K}_2\text{O} & 1.05 \\
\text{As}_2\text{O}_3 & 74.16 \\
\text{Cl} & 11.96 \\
\text{Br} & 0.44 \\
(\text{NH}_4)_2\text{O} & [9.04] \\
\text{H}_2\text{O} & [3.35] \\
-\text{O} = \text{Cl}, \text{Br} & 2.75 \\
\text{Total} & 97.25
\end{array}
\]

(1) “Bocca Grande” fumarole, Solfatara di Pozzuoli, near Naples, Italy; average of 6 EDS analyses supplemented by FTIR spectroscopy, \( \text{H}_2\text{O} \) and \( (\text{NH}_4)_2\text{O} \) calculated from stoichiometry; corresponds to \( (\text{NH}_4)_{0.94}\text{K}_{0.06}\text{Cl}_{0.91}\text{Br}_{0.01}\text{As}_{2.02}\text{O}_3(\text{H}_2\text{O})_{0.5} \).

**Occurrence:** Found as a sublimate around a volcanic fumarole.

**Association:** Alacránite, dimorphite, realgar, mascagnite, salammoniac, amorphous arsenic sulfide.

**Distribution:** At the “Bocca Grande” fumarole, Solfatara di Pozzuoli, near Pozzuoli, Campi Flegrei area, Naples, Italy.

**Name:** Honors Dr. Massimo Russo (b. 1960), the Vesuvius Observatory, National Institute of Geophysics and Volcanology, Naples, for his contributions to the mineralogy of Italian volcanoes.

**Type Material:** Reference collection, Department of Structural Chemistry, University of Milan, Italy (2015-01).

**References:**  (1) Campostrini, I., F. Demartin, and M. Scavini (2019) Russoite, \( \text{NH}_4\text{ClAs}^{3+}_2\text{O}_3(\text{H}_2\text{O})_{0.5} \), a new phylloarsenite mineral from Solfatara Di Pozzuoli, Napoli, Italy.  Mineral. Mag., 83(1), 89-94.  (2) (2020) Amer. Mineral., 105(10), 1603-1604 (abs. ref. 1).