Zavalíaite  
\( \text{(Mn}^{2+},\\text{Fe}^{2+},\\text{Mg})_3(\text{PO}_4)_2 \)

**Crystal Data:** Monoclinic.  
*Point Group: 2/m.*  
As exsolution lamellae to 70 μm thick and 1.5 mm long in lithiophilite nodules.

**Physical Properties:**  
*Cleavage:* Perfect on \{100\} and \{001\}.  
*Fracture:* n.d.  
*Tenacity:* Brittle.  
*Hardness = ~4*  
*D(meas.) = n.d.*  
*D(calc.) = 3.68*

**Optical Properties:**  
*Color:* Colorless.  
*Streak:* White.  
*Luster:* Vitreous to resinous.  
*Optical Class:* Biaxial (-).  
*n = 1.66(1)*  
*2V(meas.) = 15(5)°*  
*Orientation:* X \( \perp \) the cleavage plane at 45° to elongation.

**Cell Data:**  
*Space Group:* \( P2_1/c \).  
*a = 6.088(1)\*

\[ \begin{align*}
\text{Chemistry:} & \\
\text{MgO} & 6.09 \\
\text{MnO} & 27.08 \\
\text{FeO} & 24.94 \\
\text{P}_2\text{O}_5 & 41.72 \\
\text{Total} & 99.49 \\
\end{align*} \]

(1) La Empleada pegmatite, Totoral pegmatite field, Argentina; average of 27 electron microprobe analyses. Absence of CO\(_2\) and H\(_2\)O confirmed by structure analysis; corresponding to  
\( \text{(Mn}^{2+}_{1.31}\text{Fe}^{2+}_{1.19}\text{Mg}_{0.52})_{2-3.02}(\text{P}_{1.00}\text{O}_4)_2 \).  
(2) \( \text{(Mn}^{2+}_{1.28}\text{Fe}^{2+}_{1.20}\text{Mg}_{0.51})_{2-3.00}(\text{P}_2\text{O}_5)_2 \).

**Mineral Group:** Sarcopeide group.

**Occurrence:** In the core margin of a zoned granitic pegmatite (beryl-columbite-phosphate subtype) as exsolution lamellae in ellipsoidal phosphate nodules.

**Association:** Lithiophilite, reddingite (by hydration).

**Distribution:** From the La Empleada granitic pegmatite, Totoral pegmatite field, San Luis Province, Argentina.

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**References:**  