Kudryavtsevaite  

\[ \text{Na}_3\text{MgFe}^{3+}\text{Ti}_4\text{O}_{12} \]

**Crystal Data:** Orthorhombic.  
**Point Group:** 2\(\text{l}m\) 2\(\text{l}m\) 2\(\text{l}m\).  
As prismatic crystals, to 100 \(\mu\)m, elongated on [010].

**Physical Properties:** Cleavage: None.  
Fracture: Uneven.  
Tenacity: Brittle.  
Hardness = 6  
VHN = 901 (100 g load).  
\(D(\text{meas.}) = \text{n.d.} \)  
\(D(\text{calc.}) = 3.845 \)

**Optical Properties:** Opaque.  
Color: Grayish black, dark gray in reflected light.  
Streak: Black.  
Luster: Vitreous.  
Pleochroism: Weak, dark gray to slightly bluish gray.  
Anisotropy: Weak, grayish blue.  
**Optical Class:** n.d.

\[ R_1-R_2: (471.1) 21.3-25.4, (548.3) 20.6-24.1, (586.6) 20.0-23.5, (652.3) 19.1-22.4 \]

**Cell Data:**  
**Space Group:** Pnma.  
\(a = 27.714(1) \)  
\(b = 2.9881(3) \)  
\(c = 11.3564(6) \)  
\(Z = 4 \)

**X-ray Powder Pattern:** Orapa area, Botswana.  
7.17 (100), 4.84 (70), 2.450 (70), 2.841 (50), 2.706 (50), 2.541 (50), 2.296 (45)

**Chemistry:**  
\[
\begin{array}{l}
\text{Na}_2\text{O} & 16.46 \\
\text{CaO} & 1.01 \\
\text{MgO} & 5.31 \\
\text{Fe}_2\text{O}_3 & 22.24 \\
\text{Cr}_2\text{O}_3 & 1.05 \\
\text{Al}_2\text{O}_3 & 0.03 \\
\text{TiO}_2 & 53.81 \\
\text{Total} & 99.91 \\
\end{array}
\]

(1) Orapa area, Botswana; average of 12 electron microprobe analyses; corresponds to  
\((\text{Na}_{2.89}\text{Ca}_{0.10})\Sigma=2.99(\text{Ti}_{3.67}\text{Fe}^{3+}_{1.52}\text{Mg}_{0.72}\text{Cr}_{0.08})\Sigma=5.99\text{O}_{12}\).

**Occurrence:** In a serpentinized xenolith in kimberlite.

**Association:** Mg-rich ilmenite, freudenbergite, ulvöspinel.

**Distribution:** In a drill-core sample (depth 138 m, pipe AK-8) from the Orapa area, Botswana.

**Name:** Honors Galina Kudryavtseva (1947-2006), founder of the Diamond Mineralogy Laboratory, Lomonosov State University, Moscow, Russia.

**Type Material:** Natural History Museum, Florence, Italy (3115/I).

**References:**  
(1) Anashkin, S., A. Bovkun, L. Bindi, V. Garanin, and Y. Litvin (2013)  
Kudryavtsevaite, \(\text{Na}_3\text{MgFe}^{3+}\text{Ti}_4\text{O}_{12}\), a new kimberlitic mineral. Mineral. Mag., 77(3), 327-334.  