

**Crystal Data:** Monoclinic. *Point Group:* 2/m. As tabular crystals to 130 μm dominated by {100} and striated parallel to [010]; as curved, worm-like aggregates of subparallel crystals to ~1 mm.

**Physical Properties:** *Cleavage:* Perfect on {100}. *Tenacity:* Brittle. *Fracture:* Irregular. Hardness = 4-5 D(meas.) = 3.15(5) D(calc.) = 3.241 Dissolves slowly in dilute HCl.

**Optical Properties:** Transparent. *Color:* Greenish black. *Streak:* Olive green. *Luster:* Vitreous. *Optical Class:* Biaxial (+).  $a = 1.787(3)$   $\beta = 1.792(3)$   $\gamma = 1.806(3)$   $2V(\text{meas.}) = 60(5)^\circ$   $2V(\text{calc.}) = 62.1^\circ$  *Dispersion:* Moderate,  $r < v$ . *Pleochroism:* Strong,  $X = \text{bluish-green}$ ,  $Z = \text{orange}$ ,  $Y = \text{yellow}$ . *Absorption:*  $X \gg Z > Y$ . *Orientation:*  $Y = b$ ,  $X \wedge a = 48^\circ$  in obtuse  $\beta$ .

**Cell Data:** *Space Group:* C2/c.  $a = 25.975(3)$   $b = 5.1766(4)$   $c = 13.929(1)$   $\beta = 111.293(2)^\circ$   $Z = 4$

**X-ray Powder Pattern:** Gigante pegmatite, Punilla department, Córdoba province, Argentina. 3.179 (100), 3.424 (71), 5.045 (60), 1.585 (50), 2.881 (42), 2.109 (39), 4.147 (37)

Chemistry:	(1)	(2)
TiO <sub>2</sub>	0.12	
Al <sub>2</sub> O <sub>3</sub>	3.10	
Fe <sub>2</sub> O <sub>3</sub>	41.95	45.62
MnO	5.97	8.11
MgO	0.08	
CaO	0.23	
ZnO	0.15	
Na <sub>2</sub> O	3.03	3.54
P <sub>2</sub> O <sub>5</sub>	32.73	32.44
<u>H<sub>2</sub>O</u>	<u>10.31</u>	<u>10.30</u>
Total	97.67	100.00

(1) Gigante pegmatite, Punilla department, Córdoba province, Argentina; average of 28 electron microprobe analyses; H<sub>2</sub>O calculated from stoichiometry; corresponds to (Na<sub>0.85</sub>Ca<sub>0.02</sub>)<sub>Σ=0.87</sub>(Mn<sup>2+</sup><sub>0.74</sub>Fe<sup>2+</sup><sub>0.12</sub>Mg<sub>0.02</sub>Zn<sub>0.02</sub>Ti<sup>4+</sup><sub>0.01</sub>)<sub>Σ=0.90</sub>(Fe<sup>3+</sup><sub>4.47</sub>Al<sub>0.53</sub>)<sub>Σ=5.00</sub>(P<sub>4.03</sub>O<sub>16</sub>)(OH)<sub>6</sub>·2H<sub>2</sub>O.

(2) NaMnFe<sub>5</sub>(PO<sub>4</sub>)<sub>4</sub>(OH)<sub>6</sub>·2H<sub>2</sub>O.

**Mineral Group:** Dufrenite group.

**Occurrence:** In vugs in hydrothermal apatite-(CaF) in a zoned granitic pegmatite.

**Association:** Morinite, natrodufrénite, quartz, apatite-(CaF).

**Distribution:** From the Gigante granitic pegmatite, 18.45 km west-southwest of Tanti, Punilla department, Córdoba province, Argentina.

**Name:** Honors Hebe Dina Gay (b. 1927), Professor Emeritus of Mineralogy, National University of Córdoba, Argentina, whose accomplishments include a 60-year career in teaching, research, and since 1971, curation of the University's Alfredo Stelzner Museum of Mineralogy and Geology, one of Argentina's most important geological museums.

**Type Material** Natural History Museum of Los Angeles County, Los Angeles, California, USA (59843), and the Alfredo Stelzner Museum of Mineralogy and Geology, National University of Córdoba, Argentina (MS003278).

**References:** (1) Kampf, A.R., F. Colombo, and J.G. del Tánago (2010) Gayite, a new dufrénite-group mineral from the Gigante granitic pegmatite, Córdoba province, Argentina. *Amer. Mineral.*, 95, 386-391.