

**Crystal Data:** Triclinic. *Point Group:*  $\bar{1}$ . As pseudopyramidal crystals to 4 mm in aggregates to several centimeters.

**Physical Properties:** *Cleavage:* None. *Fracture:* n.d. *Tenacity:* n.d. Hardness = 5.5-6  
D(meas.) = 3.55 D(calc.) = 3.58

**Optical Properties:** Transparent to translucent. *Color:* Grayish green to yellowish green.  
*Streak:* n.d. *Luster:* Vitreous.

*Optical Class:* Biaxial (-).  $\alpha = 1.654$   $\beta = 1.674$   $\gamma = 1.684$   $2V(\text{meas.}) = 45^\circ\text{-}65^\circ$

*Dispersion:* Distinct,  $r < v$ . *Pleochroism:* Distinct, brown-yellow to pale blue-violet.

**Cell Data:** *Space Group:*  $P\bar{1}$ .  $a = 5.457(1)$   $b = 9.131(2)$   $c = 9.769(2)$   $\alpha = 108.47(3)^\circ$   
 $\beta = 91.72(3)^\circ$   $\gamma = 97.44(3)^\circ$   $Z = 1$

**X-ray Powder Pattern:** Saint-Aubin-des-Châteaux quarry, Loire-Atlantique, France.  
3.218 (100), 3.132 (62), 2.8119 (58), 3.016 (56), 3.591 (50), 2.6526 (44), 2.6635 (43)

Chemistry:	(1)	(2)
SrO	21.79	21.25
BaO	1.20	
FeO	16.13	16.20
MgO	2.97	3.31
Al <sub>2</sub> O <sub>3</sub>	19.16	20.91
P <sub>2</sub> O <sub>5</sub>	28.50	29.09
V <sub>2</sub> O <sub>5</sub>	0.64	
H <sub>2</sub> O	10.29	9.24
Total	100.68	100.00

(1) Saint-Aubin-des-Châteaux quarry, Loire-Atlantique, France; average electron microprobe, H<sub>2</sub>O by TGA; corresponding to (Sr<sub>2.18</sub>Ba<sub>0.08</sub>) $\Sigma=2.26$ (Fe<sub>2.23</sub>Mg<sub>0.77</sub>) $\Sigma=3.10$ Al<sub>3.90</sub>(P<sub>4.17</sub>V<sub>0.08</sub>) $\Sigma=4.25$ O<sub>27.60</sub>H<sub>11.88</sub>.

**Occurrence:** In hydrothermal veinlets associated with metamorphism at the contact between quartzite and ironstone.

**Association:** Siderite, pyrite, goyazite, apatite, quartz, calcite, marcasite, pyrrhotite.

**Distribution:** From Saint-Aubin-des-Châteaux quarry, ~8 km west of Châteaubriant, Loire-Atlantique, France.

**Name:** Honors geologist Y. Lulzac (b. 1934), who discovered the mineral.

**Type Material:** Mineralogical Museum, School of Mines, the Museum of Natural History, and the Mineral Collection, Sorbonne, Paris University, Paris, France.

**References:** (1) Moëlo, Y., B. Lasnier, P. Palvadeau, P. Léone, and F. Fontan (2000) Lulzacite, Sr<sub>2</sub>Fe<sup>2+</sup>(Fe<sup>2+</sup>,Mg)<sub>2</sub>Al<sub>4</sub>(PO<sub>4</sub>)<sub>4</sub>(OH)<sub>10</sub>, a new strontium phosphate (Saint-Aubin-des-Châteaux, Loire-Atlantique, France). C.R. Acad. Sci. Paris, Earth Planet. Sci., 330, 317-324 (in French, abridged English). (2) Léone, P., P. Palvadeau, and Y. Moëlo (2000) Structure cristalline d'un nouvel hydroxyphosphate naturel de strontium, fer et aluminium (lulzacite), Sr<sub>2</sub>Fe(Fe<sub>0.63</sub>Mg<sub>0.37</sub>)<sub>2</sub>Al<sub>4</sub>(PO<sub>4</sub>)<sub>4</sub>(OH)<sub>10</sub>. C.R. Acad. Sci. Paris, Série IIC 3, 301-308. (3) (2000) Amer. Mineral., 85, 1844 (abs. ref. 1). (4) (2002) Can. Mineral., 40, 1010, (abs. refs. 1 and 2).