

**Arrojadite-(BaFe)****Crystal Data:** Monoclinic. *Point Group:* *m*. As massive lumps to 4 cm.**Physical Properties:** *Cleavage:* Good on {110}. *Tenacity:* Brittle. *Fracture:* Irregular. Hardness = 4-5 D(meas.) = n.d. D(calc.) = 3.544**Optical Properties:** Translucent. *Color:* Grayish green. *Streak:* White. *Luster:* Greasy. *Optical Class:* Biaxial. *n*(calc.) = 1.639**Cell Data:** *Space Group:* *Cc*. *a* = 16.406(5) *b* = 9.945(3) *c* = 24.470(5) *β* = 105.73(2)° *Z* = 4**X-ray Powder Pattern:** Madesimo, Spluga Valley, northern Italy.

3.010 (100), 3.178 (51), 2.678 (42), 2.523 (27), 2.805 (25), 4.519 (23), 2.775 (21)

<b>Chemistry:</b>	(1)		(1)
P <sub>2</sub> O <sub>5</sub>	40.50	SrO	1.09
Al <sub>2</sub> O <sub>3</sub>	2.45	CaO	2.09
FeO	27.64	Na <sub>2</sub> O	4.44
MnO	0.70	K <sub>2</sub> O	0.26
MgO	10.85	SiO <sub>2</sub>	0.02
PbO	0.76	H <sub>2</sub> O	[0.86]
BaO	5.68	Total	97.34

(1) Madesimo, Spluga Valley, northern Italy; average electron microprobe analysis, H<sub>2</sub>O calculated from stoichiometry; corresponds to (Ba<sub>0.78</sub>K<sub>0.12</sub>Pb<sub>0.07</sub>Sr<sub>0.02</sub>)<sub>Σ=0.99</sub>Na<sub>3.02</sub>(Ca<sub>0.79</sub>Sr<sub>0.20</sub>)<sub>Σ=0.99</sub>(Fe<sub>8.12</sub>Mg<sub>5.68</sub>Mn<sub>0.21</sub>)<sub>Σ=14.01</sub>Al<sub>1.01</sub>(OH)<sub>2</sub>(PO<sub>4</sub>)<sub>12</sub>.

**Mineral Group:** Arrojadite group. A<sub>2</sub>B<sub>2</sub>CaNa<sub>2+x</sub>M<sub>13</sub>Al(PO<sub>4</sub>)<sub>11</sub>(PO<sub>3</sub>OH<sub>1-x</sub>)W<sub>2</sub>.**Occurrence:** In phengitic quartzite formed by metamorphism of phosphatic organic matter (Spluga).**Association:** Quartz, albite, apatite, ferrous carbonates.**Distribution:** From Madesimo, Spluga Valley, northern Italy [TL]; at Chandler's Mills, Newport, New Hampshire, USA and at Buranga, Rwanda.**Name:** *Arrojadite* indicates a member of the group with Fe<sup>2+</sup> dominant at the *M* site; two suffixes indicate the dominant cation of the dominant valence state at the *A* and *B* sites. Honors Miguel Arrojado Ribeiro Lisbôa (1872-1932), Brazilian geologist. Formerly 'sigismundite'.**Type Material:** Civic Museum of Natural History, Morbegno, Sondrio, Italy.

**References:** (1) Chopin, C., R. Oberti, and F. Cámara (2006) The arrojadite enigma: II. Compositional space, new members, and nomenclature of the group. *Amer. Mineral.*, 91, 1260-1270. (2) Cámara, F., R. Oberti, C. Chopin, and O. Medenbach (2006) The arrojadite enigma: I. A new formula and a new model for the arrojadite structure. *Amer. Mineral.*, 91, 1249-1259. (3) Demartin, F., C.M. Gramaccioli, T. Pilati, and E. Sciesa (1996) Sigismundite, (Ba,K,Pb)Na<sub>3</sub>(Ca,Sr)(Fe,Mg,Mn)<sub>14</sub>(OH)<sub>2</sub>(PO<sub>4</sub>)<sub>12</sub>, a new Ba-rich member of the arrojadite group from Spluga valley, Italy. *Can. Mineral.*, 34, 827-834.