

**Kircherite**

**Crystal Data:** Hexagonal. *Point Group:* 32. Crystals dominated by {0001} and {10 $\bar{1}$ 1} are hexagonal, thin, and tabular to 3 mm.

**Physical Properties:** *Cleavage:* Good on {001}. *Tenacity:* Brittle. *Fracture:* Uneven. Hardness = ~ 5.5 D(meas.) = 2.42 D(calc.) = 2.457 Fluoresces light pink under LW UV; deep red under SW UV.

**Optical Properties:** Transparent to translucent. *Color:* Colorless to light gray. *Streak:* White. *Luster:* Greasy to silky. *Optical Class:* Uniaxial (-).  $\omega = 1.510(2)$   $\varepsilon = 1.502(2)$  Non-pleochroic.

**Cell Data:** *Space Group:* R32.  $a = 12.8770(7)$   $c = 95.244(6)$   $Z = 1$

**X-ray Powder Pattern:** Valle Biachella, Sacrofano community, Latium, Italy. 3.717 (100), 2.648 (100), 3.232 (65), 3.584 (60), 3.604 (53), 3.799 (52), 3.220 (38)

<b>Chemistry:</b>	(1)	(2)
SiO <sub>2</sub>	32.05	31.44
Al <sub>2</sub> O <sub>3</sub>	27.13	26.68
FeO	0.07	
K <sub>2</sub> O	4.38	4.11
CaO	8.75	9.78
Na <sub>2</sub> O	13.62	13.51
MgO	0.01	
MnO	0.02	
TiO <sub>2</sub>	0.01	
SO <sub>3</sub>	12.87	13.96
Cl	0.35	
F	0.05	
<u>H<sub>2</sub>O</u>		<u>[0.52]</u>
Total	99.82	100.00

(1) Valle Biachella, Sacrofano community, Latium, Italy; average of 18 electron microprobe analyses supplemented by FTIR spectroscopy; corresponds to (Na<sub>89.09</sub>Ca<sub>31.63</sub>K<sub>18.85</sub>Fe<sub>0.20</sub>Mn<sub>0.06</sub>Mg<sub>0.05</sub>Ti<sub>0.03</sub>) $\Sigma=139.91$ [(Si<sub>108.13</sub>Al<sub>107.87</sub>) $\Sigma=216.00$ O<sub>430.00</sub>](SO<sub>4</sub>)<sub>32.58</sub>Cl<sub>2.00</sub>F<sub>0.53</sub>·6.86H<sub>2</sub>O.

(2) [Na<sub>90</sub>Ca<sub>36</sub>K<sub>18</sub>] $\Sigma=144$ (Si<sub>108</sub>Al<sub>108</sub>O<sub>432</sub>)(SO<sub>4</sub>)<sub>36</sub>·6H<sub>2</sub>O; H<sub>2</sub>O calculated from structure analysis.

**Mineral Group:** Cancrinite-sodalite group.

**Occurrence:** A late-stage metasomatic phase within miarolitic cavities in volcanic ejecta.

**Association:** Sodalite, biotite, iron oxides, titanite, fluorite, an unspecified pyrochlore-group mineral.

**Distribution:** From Valle Biachella, Sacrofano community, 20 km north of Rome, Latium, Italy.

**Name:** Honors Athanasius Kircher (1602-1680), a German Jesuit scholar who published ~ 40 works, some of which dealt with magnetism, geology, mineralogy, and volcanology. Kircher founded the museum of the Collegium Romanum in 1651, hereafter named the Museum Kircherianum.

**Type Material:** Mineralogy Museum, University of Rome, Italy (MMUR 33035/1).

**References:** (1) Cámara, F., F. Bellatreccia, G. Della Ventura, M.E. Gunter, M. Sebastiani, and A. Cavallo (2012) Kircherite, a new mineral of the cancrinite-sodalite group with a 36-layer stacking sequence: Occurrence and crystal structure. *Amer. Mineral.*, 97, 1494-1504.