

**Crystal Data:** Monoclinic. *Point Group:* 2/m. Prismatic grains, elongated along [10 $\bar{1}$ ], fibrous, radial or lamellar || {010}, may show {010}, {100}, {10 $\bar{1}$ }, to 0.2 mm.

**Physical Properties:** *Cleavage:* {010}, perfect; {100}, {10 $\bar{1}$ }, good. *Hardness* = ~3  
D(meas.) = n.d. D(calc.) = 4.06

**Optical Properties:** Semitransparent. *Color:* Bright blue. *Luster:* Vitreous.  
*Optical Class:* Biaxial (+). *Pleochroism:* Light blue to blue. *Orientation:* Y = b; Z  $\wedge$  a = 28°.  
 $\alpha = 1.714(5)$   $\beta = 1.744(5)$   $\gamma = 1.783(5)$  2V(meas.) = 60(6)° 2V(calc.) = 84°

**Cell Data:** *Space Group:* C2/c. a = 11.882(4) b = 12.760(4) c = 6.647(2)  
 $\beta = 112.81(2)^\circ$  Z = 4

**X-ray Powder Pattern:** Nickenicher Sattel volcano, Germany.  
2.744 (10), 3.195 (4), 4.06 (3), 4.35 (3), 3.56 (3), 3.066 (3), 2.605 (3b)

**Chemistry:**

	(1)
P <sub>2</sub> O <sub>5</sub>	0.9
As <sub>2</sub> O <sub>5</sub>	64.3
V <sub>2</sub> O <sub>5</sub>	0.06
Al <sub>2</sub> O <sub>3</sub>	1.1
Fe <sub>2</sub> O <sub>3</sub>	5.5
MnO	0.5
CuO	4.7
MgO	17.9
CaO	2.8
Na <sub>2</sub> O	4.6
K <sub>2</sub> O	0.1
Total	102.5

(1) Nickenicher Sattel volcano, Germany; by electron microprobe, total Fe as Fe<sub>2</sub>O<sub>3</sub>, total Mn as MnO; corresponds to (Na<sub>0.81</sub>K<sub>0.01</sub>) $_{\Sigma=0.82}$ Ca<sub>0.27</sub>Cu<sub>0.32</sub>(Mg<sub>2.42</sub>Fe<sub>0.38</sub>Al<sub>0.12</sub>Mn<sub>0.03</sub>) $_{\Sigma=2.95}$  [(As<sub>1.02</sub>P<sub>0.02</sub>) $_{\Sigma=1.04}$ O<sub>4</sub>]<sub>3</sub>; crystal structure determination gives Na<sub>0.76</sub>Ca<sub>0.41</sub>Cu<sub>0.39</sub>(Mg<sub>2.33</sub>Fe<sub>0.52</sub>Al<sub>0.12</sub>Mn<sub>0.03</sub>) $_{\Sigma=3.00}$ [(As<sub>0.98</sub>P<sub>0.02</sub>) $_{\Sigma=1.00}$ O<sub>4</sub>]<sub>3</sub>.

**Occurrence:** In a cavity in volcanic scoria.

**Association:** Vanadinite, duhamelite.

**Distribution:** From the Nickenicher Sattel volcano, Eifel district, Germany.

**Name:** For the village of Nickenich, Germany, nearby the Nickenicher Sattel volcano.

**Type Material:** University of Vienna, Vienna, Austria.

**References:** (1) Auernhammer, M., H. Effenberger, G. Hentschel, T. Reinecke, and E. Tillmanns (1993) Nickenichite, a new arsenate from the Eifel, Germany. *Mineral. Petrol.*, 48, 153–166. (2) (1994) *Amer. Mineral.*, 79, 571 (abs. ref. 1).