

Burgessite

Crystal Data: Monoclinic. *Point Group:* 2/m. Crystals, prismatic, to 0.1 mm, forms {011} and {h0l} observed; typically as rosettes, to 0.8 mm.

Physical Properties: *Cleavage:* Good on {010}; fair on {001}. *Fracture:* Hackly.
Tenacity: Brittle. *Hardness* = ~3 *D(meas.)* = 2.93(2) *D(calc.)* = 2.94

Optical Properties: Transparent. *Color:* Purplish pink with a brown tint. *Streak:* Colorless to pale pink. *Luster:* Vitreous to adamantine.

Optical Class: Biaxial (+). $\alpha = 1.596(2)$ $\beta = 1.604(2)$ $\gamma = 1.628(2)$ $2V(\text{meas.}) = 70(2)^\circ$
 $2V(\text{calc.}) = 61^\circ$ *Orientation:* $X = b$; $Y \wedge c = 29^\circ$ (in β obtuse); $Z \wedge a = 20^\circ$ (in β acute).

Cell Data: *Space Group:* $P2_1/n$. $a = 4.7058(12)$ $b = 9.299(3)$ $c = 12.738(4)$
 $\beta = 98.933(8)^\circ$ $Z = 2$

X-ray Powder Pattern: Keeley mine, Timiskaming District, Ontario, Canada.
7.446 (100), 6.267 (44), 2.998 (31), 3.725 (29), 3.260 (25), 2.596 (23), 2.970 (21)

Chemistry:

| | |
|--------------------------------|--------------|
| | (1) |
| As ₂ O ₅ | 47.91 |
| P ₂ O ₅ | 0.03 |
| CoO | 27.31 |
| NiO | 3.52 |
| ZnO | 0.04 |
| CaO | 0.18 |
| SO ₃ | 0.13 |
| <u>H₂O</u> | <u>22.65</u> |
| Total | 101.77 |

(1) Keeley mine, South Lorraine Township, Timiskaming District, Ontario, Canada; average of 8 electron microprobe analyses, H₂O by difference, structure analysis and IR confirm OH and H₂O, corresponding to $(\text{Co}_{1.75}\text{Ni}_{0.23}\text{Ca}_{0.02})_{\Sigma=2.00}(\text{AsO}_3\text{OH})_{\Sigma=2.00}(\text{H}_2\text{O})_5$.

Occurrence: A secondary mineral along fractures in the weathering zone of a polymetallic sulfarsenate deposit.

Association: Skutterudite, cobaltite, bismuth, arsenolite, bismuthoferrite, erythrite.

Distribution: Keeley mine, South Lorraine Township, Timiskaming District, Ontario, Canada.

Name: For David Burgess (b. 1951), of Newington, Connecticut, USA, who brought the sample to the authors' attention.

Type Material: Canadian Museum of Nature, Ottawa, Ontario (CNMMC 86051).

References: (1) Sejkora, J., F.C. Hawthorne, M.A. Cooper, J.D. Grice, J. Vadak, and J.L. Jambor (2009) Burgessite, $\text{Co}_2(\text{H}_2\text{O})_4[\text{AsO}_3(\text{OH})]_2(\text{H}_2\text{O})$, a new arsenate mineral species from the Keeley mine, South Lorraine Township, Ontario, Canada. *Can. Mineral.*, 47, 159–164. (2) Cooper, M.A. and F.C. Hawthorne (2009) The crystal structure of burgessite, $\text{Co}_2(\text{H}_2\text{O})_4[\text{AsO}_3(\text{OH})]_2(\text{H}_2\text{O})$, and its relation to erythrite. *Can. Mineral.*, 47, 165–172. (3) (2009) *Amer. Mineral.*, 94, 1495–1496 (abs. refs. 1 and 2).