

## Arsenohauchecornite and tellurohauchecornite: new minerals in the hauchecornite group

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**SUMMARY.** Arsenohauchecornite,  $Ni_9BiAsS_8$ , and tellurohauchecornite,  $Ni_9BiTeS_8$  from the Sudbury area, Ontario, are now recognized as distinct mineral species in the Hauchecornite Group and not as varieties as described previously. Descriptions of these two minerals are given, summarized from Gait and Harris (1972).

GAIT AND HARRIS (1972) described arsenic- and tellurium-rich hauchecornite from the Sudbury area as arsenian and tellurian varieties of hauchecornite on the basis of their chemistry. Subsequently Kocman and Nuffield (1974) published structural data on hauchecornite from the type locality in Westphalia. This study indicated that the general structural formula should be expressed as  $Ni_9A^{vi}B^{viii}S_8$ , thus allowing species

status for the arsenian- and tellurian-rich members. Tučekite, ideally  $Ni_9SbSbS_8$ , a new mineral in the hauchecornite group, was described by Just (1978) and his proposal to the International Mineralogical Association Commission on New Minerals and Mineral Names redefining the hauchecornite group had been favoured in 1975. The new names, arsenohauchecornite, ideally  $Ni_9BiAsS_8$ , and tellurohauchecornite ideally  $Ni_9BiTeS_8$ , have also been approved by the International Mineralogical Association Commission on New Minerals and Mineral Names.

### *Descriptive data*

*Arsenohauchecornite*, Vermilion Mine, Lot 6, Con. IV, Denison Tp., Sudbury Dist., Ontario,

TABLE I. *Electron microprobe analyses*

		Arsenohauchecornite		Tellurohauchecornite	
		wt%	At. prop.*	wt%	At. prop.*
	Ni	44.9	8.9	44.1	8.8
	Fe	1.4	0.3	0.9	0.2
	Co	0.3	0.1	0.9	0.2
site <sup>vi</sup>	Bi	26.5	1.0	22.4	1.0
	Bi		0.5		0.2
site <sup>viii</sup>	As	4.4	0.7	—	—
	Sb	0.1	—	—	—
	Te	—	—	8.5	0.8
	S	22.0	8	21.9	8
	Total	99.6		98.7	

\* Calculated on the basis of eight sulphur atoms.

TABLE II. Crystallographic data

Arsenohauchecornite			Tellurohauchecornite		
<i>P4/mmm</i>			<i>P4/mmm</i>		
<i>a</i> 14.517 Å			<i>a</i> 14.64 Å		
<i>c</i> 10.803 Å			<i>c</i> 10.87 Å		
<i>I</i> <sub>est</sub>	<i>d</i> <sub>meas</sub> Å	<i>hkl</i>	<i>I</i> <sub>est</sub>	<i>d</i> <sub>meas</sub> Å	<i>hkl</i>
70	4.33	022	40	4.35	022
70	3.63	040	40	3.66	040
70	3.24	240	40	3.28	240
100	2.771	242	100	2.80	242
90	2.381	224	50	2.405	224
80	2.284	{ 442 260	60	2.314	260
80	1.854	444	40	1.868	444
70	1.810	080			

TABLE III. Reflectance, microhardness and specific gravity

Wavelength (nm)	Arsenohauchecornite	Tellurohauchecornite
470	41.6-43.0	41.2-44.8
546	46.2-47.1	43.9-47.7
589	48.2-49.2	45.6-49.4
650	50.8-51.6	48.2-51.9
VHN <sub>50g</sub> (kg/mm <sup>2</sup> )	516-655	182-825
S.G. (Meas.)	6.35	—
S.G. (Calc.)	6.52	6.50

Canada; occurs as irregular masses up to 10 mm in diameter, occasionally as tabular crystals up to 2 × 20 mm embedded in chalcopyrite, and rarely as subhedral crystals exhibiting crystal faces several millimeters across. It has a metallic lustre, is bronze in colour, resembling pyrrhotine, though slightly darker. On fresh surfaces it is brilliant, metallic with a conchoidal fracture. Associated minerals are chalcopyrite, pyrrhotine, gersdorffite, pyrite, gold, nickeline, galena, copper, and sperrylite. The name alludes to its chemical relation to the hauchecornite group. Type material is deposited at the Royal Ontario Museum: ROM # M29206 (cotype), M29207 (holotype; specimen and polished section), and M29208 (cotype). Additional data are given in Tables I, II, and III.

*Tellurohauchecornite*, Strathcona Mine, Lot 4, Con. IV, Levack Tp., Sudbury Dist., Ontario, Canada; occurs as irregular grains up to 150 μm in diameter and is associated with chalcopyrite and millerite. Its optical properties, in polished section, are similar to pyrrhotine. The name alludes to its chemical relation to the hauchecornite group. Type material is deposited at the Royal Ontario

Museum: ROM # M30942 (holotype; specimen and polished section). Additional data are given in Tables I, II, and III.

*Acknowledgements.* The authors would like to thank the following: Dr J. Just of Perth, Western Australia, for his courtesy in making available his proposal for the redefinition of the hauchecornite group prior to publication, Dr M. Fleischer, Reston, Virginia, for his assistance in choosing the names, and Mr R. C. Butler, Lively, Ontario, for presenting the three arsenohauchecornite specimens to the Royal Ontario Museum.

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[Manuscript received 17 September 1979]