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,

		Arsenohauchecornite		Tellurohauchecornite	
		wt %	At. prop.*	wt%	At. prop.*
	Ni	44.9	8.9	44. I	8.8
	Fe	I.4	0.3	0.9	0.2
	Со	0.3	0. I	0.9	0.2
site ^{vi}	Bi	26.5	1.0	22.4	1.0
	(Bi		0.5		0.2
aita Viii	As	4.4	0.7	_	
site) Sb	0.I			
	l Te		_	8.5	0.8
	S	22.0	8	21.9	8
	Total	99.6		98.7	

TABLE I. Electron microprobe analyses

* Calculated on the basis of eight sulphur atoms.

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Arser P4/m a 14. c 10.8	Arsenohauchecornite P4/mmm a 14.517 Å c 10.803 Å		Tellu P4/m a 14.0 c 10.8	rohauchec mm 54 Å 37 Å	ornite	
I _{est}	d _{meas} Å	hkl	Iest	d _{meas} Å	hki	
70 70 70 100 90 80 80	4.33 3.63 3.24 2.771 2.381 2.284 1.854 1.810	022 040 240 242 224 { 442 260 444 080	40 40 40 100 50 60 40	4.35 3.66 3.28 2.80 2.405 2.314 1.868	022 040 240 242 224 260 444	

TABLE II. Crystallographic data

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 VHN 500	50.8-51.6	48.2-51.9	
(kg/mm^2)	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 μ m 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.

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