

O T T A W A

May 1st, 1943.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1396.

Concentration Tests on a Tantalum Ore from
Aldous Prospecting Syndicate, Preissac
Township, Abitibi County, Quebec.

=====

FR 1396

al

1766

O T T A W A May 1st, 1943.

R E P O R T

of the

ORE DRESSING AND METALBURGICAL LABORATORIES.

Investigation No. 1396.

- Concentration Tests on a Tantalum Ore from
Aldous Prospecting Syndicate, Preissac
Township, Abitibi County, Quebec.

=====

Shipments:

One box of tantalum ore, net weight 42 pounds, was received on March 26th, and an additional bag of ore, weighing 30 pounds, was received on April 1st, 1943. Two small sacks of tantalite crystals plus some included gangue material, total weight 350 grams, were also received on April 1st, 1943. The different shipments were consigned to these Laboratories by the Aldous Prospecting Syndicate, Room 319, 56 Sparks Street, Ottawa, Ontario, per Mrs. B. Sladen.

Location of the Property:

The property of the Aldous Prospecting Syndicate from which the present shipments were received is situated in Lot No. 53, Range No. 7, Preissac township, in Abitibi County, Quebec.

Preparation of Sample:

The two lots of ore shipped were combined and 160 grams of the tantalite crystal added. The whole was crushed through a set of rolls to pass 100 per cent minus 14 mesh.

Characteristics of the Ore:

Two polished sections were prepared and examined under the reflecting microscope for the purpose of determining the character of the ore.

Gangue -

In the polished sections, gangue material is composed essentially of impure milky quartz. In hand specimens, however, it appears to consist largely of white feldspar containing quartz and numerous cleavable scales of muscovite.

Metallic Minerals:

Disseminated rather sparingly through gangue are small masses and coarse to fine subhedral crystals of hard, black tantalite-columbite. Only one of the polished sections shows this mineral as irregular grains and prismatic cross-sections embedded in gangue. Under the ore-microscope in reflected light it is almost galena-white in colour and is unaffected by any of the standard etching reagents.

The polished surfaces of the tantalite-columbite reveal numerous small irregular inclusions of a hard, grey anisotropic mineral. These inclusions range from about 300 microns down to only a few microns in size, with the smaller grain sizes predominating. Like their host, they are negative to all standard etching reagents, and could not be identified. Under crossed nicols, however, two

(Characteristics of the Ore, cont'd) -

or three of these inclusions show some internal reflection, and hence they may represent a non-metallic mineral.

Investigative Work:

The test work on the combined ore and crystal shipments consisted of Wilfley table concentration of the sized products, superpanner and magnetic concentration of the resulting table concentrates, specific gravity determinations on table and panner concentrates, binocular microscopic observations on the different products, and, finally, a chemical analysis on a composite sample of the superpanner concentrates.

DETAILS OF TEST WORK:

Test No. 1. - Table Concentration.

After combining the two ore shipments and a portion of the crystal shipment and crushing to minus 14 mesh, the resulting composite feed was well mixed and screened into different sized products, as follows:

<u>Mesh size</u>	<u>Weight, per cent</u>
-14+20	4.10
-20+28	13.42
-28+35	15.29
-35+50	13.84
-50+65	15.66
-65	37.73
Total	100.00

(Continued on next page)

B

(Test No. 1, cont'd) -

Table Concentration of Sized Products.

Product	W e i g h t,			Weight per cent		Spec. grav.
	per cent			of total feed		
	Conc.	Midd.	Tailing	Conc.	Midd.	of concs.
-14+20	2.45	4.08	93.47	0.10	0.17	5.42
-20+28	1.82	3.95	94.23	0.24	0.53	5.48
-28+35	1.39	3.07	95.54	0.21	0.47	5.78
-35+50	1.49	3.93	94.58	0.21	0.54	5.62
-50+65	1.50	3.43	95.07	0.23	0.54	5.30
-65	0.48	3.25	96.27	0.18	1.23	5.76
Totals	-	-	-	1.17	3.48	-

Examination of the minus 65 mesh tailing showed approximately 25 per cent of the tantalite mineral in the form of slime.

The table tailings from the -14+20, -20+28 and -28+35 products were crushed to pass 100 per cent minus 35 mesh, combined with the -35+50 and -50+65 mesh products, and then retabled.

Results:

Product	W e i g h t,		Spec. grav.
	per cent		
	Concentrate	Tailing	of concentrate
Combined tailings	0.10	99.90	4.58

The different concentrates were examined under the binocular microscope, with results as follows:

Mesh concentrate

- 14+20 - Showed adhering gangue with odd pieces of loose feldspar and a little mica.
- 20+28 - Gangue still adhering. A few garnet crystals and a little free feldspar.
- 28+35 - A little gangue still adhering. Garnet crystals more numerous.
- 35+50 - Very little gangue adhering. Some small garnet crystals and a little rose quartz.

(Continued on next page)

(Test No. 1, cont'd) -

Mesh concentrate

- 50+65 - Comparatively large amounts of garnet crystals and rose quartz.
- 65 - Practically no gangue adhering, very small amounts of garnet and rose quartz.

The concentrate obtained from the retabled table tailing showed large amounts of garnet crystals and rose quartz and a few particles of pyrite.

The middling products were also examined with a view to ascertaining whether the included columbite-tantalite was free of gangue.

<u>Middling product</u>	-	<u>Free of gangue, per cent</u>
-14+20	-	25
-20+28	-	45
-28+35	-	75
-35+50	-	85
-50+65	-	90
-65	-	95

The coarser-sized products contained a large percentage of mica, rose quartz and garnet crystals, besides the predominant gangue mineral, albite feldspar.

The combined middling products were then crushed through a set of rolls to pass 100 per cent minus 35 mesh and retabled. The resulting table concentration was as follows:

Product	: Weight, per cent	: Weight, per cent	: Weight, per cent	: Spec. grav.
	: per cent	: of original feed:	: of original feed:	: of
	: Conc.:	: Tailing:	: Conc.:	: Tailing:
	: Conc.:	: Tailing:	: Conc.:	: Tailing:
Combined middling:	15.70:	84.30:	0.55:	2.83:
	:	:	:	4.0

Examination under the microscope still showed a

(Test No. 1, cont'd) -

large amount of garnet, rose quartz and micaceous material.

Superpanner Tests on Table Concentrates.

The table concentrates were concentrated on the Haultain superpanner, with the following results:

Product	: Percentage : weight of : table : conc.	: Percentage: : weight of : original : feed	: Spec. : grav.
-14+20	: 36.0	: 0.04	: 6.20
-20+28	: 69.9	: 0.17	: 6.21
-28+35	: 80.4	: 0.17	: 6.22
-35+50	: 61.2	: 0.13	: 6.22
-50+65	: 83.6	: 0.19	: 6.06
-65	: 62.4	: 0.11	: 6.30
Total	: -	: 0.81	: -

A microscopic examination of these panner concentrates showed very few impurities, the columbite-tantalite mineral being generally free of adhering gangue. An exception was the -50+65 mesh size, which showed numerous garnet crystals and some rose quartz.

Superpanner Tests on Table Middling Products.

The combined middling retabled concentrates were superpanned with results as follows:

Product	: Percentage : weight of : combined : middling	: Percentage: : weight of : original : feed	: Spec. : grav.
Panner concs.	: 40.1	: 0.22	: 5.86

(Continued on next page)

(Test No. 1, cont'd) -

Summary of Table and Panner Concentration.

	<u>Per cent</u>
Total weight of concentrates recovered from superpanner concentration of table concentrates	- 0.81
Total weight of concentrates recovered from superpanner concentration of middling products	- 0.22
	<hr/>
Total weight of concentrates recovered	- 1.03
Weight of crystals added to feed (the microscope showed approximately 30 per cent impurities and adhering material)	- 0.38
Weight of concentrate recovered from ore shipment	- 0.65

Magnetic Concentration.

A number of tests were conducted on portions of the table and panner concentrates. A powerful hand magnet, a Ball-Norton magnetic machine, and a high intensity Wetherall concentrator were used in these tests. The results obtained by the use of the hand magnet and the Ball-Norton machine were negligible, only slightly over 1 per cent of the exposed material proving to be magnetic. On the high-intensity machine a large portion of the concentrate proved to be magnetic. Owing to the machine being only adjustable for a comparatively large amount of feed, it was not found possible to determine the exact amount of the magnetic material in the few grams of the concentrate available for the test.

Chemical Analysis.

A composite sample was made from the different panner concentrates. The percentage weight of each concentrate used corresponding to the percentage recovery from the

B

(Test No. 1, cont'd) -

original feed.

Results were as follows:

		<u>Per cent</u>
Ta ₂ O ₅	-	54.17
Cb ₂ O ₅	-	26.37
Fe	-	6.73
Mn	-	5.10
TiO ₂	-	0.36

SUMMARY AND CONCLUSIONS:

The results obtained from the table concentration of the sized products gave concentrates of a specific gravity of 5.30 to 5.76. These concentrates were 1.17 per cent of the weight of the feed and an additional 0.55 per cent was obtained by the retabling of the middling products.

An examination of these table concentrates under the binocular microscope indicated that the optimum grind was -35+50 mesh. In the coarser grinds the particles of tantalite were not freed of adhering gangue material, while in the finer grinds the freed tantalite showed a tendency to slime, particularly in the minus 65 mesh size. The microscopic examination also showed that while table separation is effective in disposing of the main gangue material, albite feldspar, and also the muscovite mica, there is a marked tendency for numerous garnet crystals and particles of rose quartz to report in the table concentrate.

The Haultain superpanner concentration of the table concentrates gave an average specific gravity of 6.2. A composite chemical analysis of these concentrates was

(Summary and Conclusions, cont'd) -

54.7 per cent Ta_2O_5 .

Magnetic concentration of the table concentrates gave results indicating that a high intensity was necessary to effect a separation. The small amount of the concentrate available, however, precluded a definite determination.

From the above summary of the results obtained in this test work on this ore shipment, it is indicated that table concentration of the sized products should produce a marketable grade of tantalite concentrate. A definite determination of the optimum grade that could be produced by this method was not found possible owing to the small amount of the shipment, the superpanner concentration of the table concentrates being a laboratory method.

A larger shipment, which would permit the use of full-size tables for the concentration procedure, should be the next step in the metallurgical investigation of this ore deposit.

ooooooooooooo
oooooo
oo

HLB:GHB.