

PLATINUM GROUP CONTENT OF SOME WESTERN NORTH CAROLINA CHROMITES

Minerals Research Laboratory January 1971 Progress Report
Laboratory Book No. 262

by Edwin H. Bentzen, III

Abstract

Results of work done by the Geologic Branch of the Tennessee Valley Authority in Knoxville has been made available to the Minerals Research Laboratory. This work concerns analyses of chromite samples for the presence of platinum, palladium, and rhodium. These results are presented in this report to allow greater circulation of the data.

Introduction

In light of recent work done by the Minerals Research Laboratory on chromite, Mr. Robin C. Hale offered to furnish data on the platinum group content of nine chromite samples he had collected. This data covers eight North Carolina chromites and one Georgia chromite.

Objective

The object of this work was to obtain data on the platinum group content of chromites in the T.V.A. area. The object of this report is to present this data in a format subject to wider distribution.

Procedure

The following samples were collected and prepared by Mr. R. C. Hale, T.V.A. The field numbers are those assigned by T.V.A.

- 5373-3-1a & b Burton Lake, Rabun County, Georgia Deposit: composite grab sample; disseminated chromite grains in olivine, from fractured zone, approximate mid-point of west wall of east pit.
- 5751-3-1 Addie Deposit: Webster-Addie Ring Dike; grab sample of chromite grains concentrated as distinct bands in olivine, from base of central portion of south wall of old pit - first major bench below dirt road around south part of pit complex.
- 5751-7-1 Addie Deposit: Webster-Addie Ring Dike; composite sample of disseminated grains of chromite in olivine from the face at the east end of the lowest bend of new pit on south side of tributary to Scott Creek.
- 5752-2-1 Dark Ridge Deposit: grab sample; two-inch "clot" of chromite in olivine from partly filled and overgrown prospect pit approximately 300 feet north of Dark Ridge Creek and 750 feet southeast of trestle, or north of dirt road and west of main prospect pit.
- 5752-3-1 Balsam Gap Deposit: composite sample disseminated coarse-grained chromite across 1.5-foot zone in olivine, halfway up face on north side of main pit (small pool at bottom).
- 6133-9-1 Democrat Deposit: massive chromite float from cleared field at southwest end of Democrat deposit - south of dirt road and east of Route 197 (almost due east of Morgan Hill Church).

- 6133-13-1 Democrat Deposit: composite sample disseminated chromite in olivine from scattered exposures at same location as 6133-9-1. Chromite grains fine to very coarse.
- 6334-6-1 Democrat Deposit: composite sample of coarse chromite grains concentrated as distinct bands in olivine in south face of pit just northwest of McKinney Cemetery; bands exposed in portion of face nearest dirt road.
- 6332-2-1 Day Book Deposit: massive chromite from 10 to 12 inch vein in upper part of active face, northern part of ultramafic body.

The samples were crushed and hand-picked to separate the chromite from the gangue.

Polished surface mounts were made of a few of the chromites.

Platinum, palladium and rhodium were determined by fire assay plus quantitative spectrographic analysis. These analyses were carried out by L. B. Riley, W. D. Goss and Joseph Haffty of the U. S. Department of the Interior, Geological Survey, Denver, Colorado.

Results

The hand-picked samples contained contaminants of intergranular olivine, mica, and brown surface stain (iron oxide). The following figures of percentage contaminants are based on visual estimates performed by R. C. Hale.

Table 1

Percent Contaminates in Hand-Picked Concentrates

5373-3-1a & b		6%
5751-3-1	less than	2%
5751-7-1		5%
5752-2-1	less than	3%
5752-3-1		2%
6133-9-1	less than	2%
6133-13-1		1%
6334-6-1	less than	3%
6332-2-1	less than	2%

The polished surface mounts did not disclose the presence of any of the readily identifiable platinum group minerals in samples 5751-3-1, 5751-7-1, and 6133-9-1.

Analyses by the U. S. Geological Survey, Denver, Colorado, are shown in Table 2.

Table 2

Analysis of Chromites for Platinum Group Values

<u>Tag No.</u>	<u>Field No.</u>	<u>Wt. Used</u>	<u>Analysis, ppm</u>			<u>Total ppm</u>
			<u>Pt</u>	<u>Pd</u>	<u>Rh</u>	
AEV 701	5373-3-1a & b	3.68	0.047	0.022	<0.025	<0.094
AEV 702	5751-3-1	4.54	0.036	0.013	<0.02	<0.069
AEV 703	5751-7-1	2.83	0.47	0.20	0.076	0.746
AEV 704	5752-2-1	4.23	<0.035	<0.015	<0.02	<0.070
AEV 705	5752-3-1	3.63	<0.045	<0.02	0.063	<0.128
AEV 707	6133-9-1	5.00	<0.03	<0.015	0.043	<0.088
AEV 708	6133-13-1	3.53	<0.045	<0.02	<0.025	<0.090
AEV 709	6334-6-1	2.92	<0.055	<0.025	<0.03	<0.110
AEV 710	6332-2-1	5.00	<0.03	<0.015	<0.02	<0.065

Discussion

The variation in the limits of determination shown in Table 2 (the "<") are due to the differences in sample size. The routine method is based on 15 gram samples, for which the limits of determination are:

Pt 0.010 ppm, Pd 0.004 ppm and Rh 0.005 ppm. These limits correspond to 0.15, 0.06, and 0.075 micrograms in a 15 gram sample and these weights are the limiting factors.

Using the following values, quoted from the September 1970 issue of Engineering and Mining Journal, Pt @ \$130 per oz., Pd @ \$36 per oz., and Rh @ \$210 per oz., only one sample shows a significant value. Sample 5751-7-1 has a value of \$2.46/short ton.

Conclusions

Although the chromites tested did not show attractive platinum group values, the information adds to the general knowledge of chromites in North Carolina.