



CCRMP

Canadian Certified Reference Materials Project

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PCMRC

Projet canadien de matériaux de référence certifiés

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Certificate of Analysis

First issued: 1991

Last revision: April 1996

UMT-1

Ultramafic Ore Tailings PGE Reference Material

| <i>Certified Values</i> | | | | | |
|-------------------------|-------------|-------------|------------|-------------|------------|
| Au | Pt | Pd | Rh | Ru | Ir |
| ng/g | ng/g | ng/g | ng/g | ng/g | ng/g |
| 48. | 129. | 106. | 9.5 | 10.9 | 8.8 |
| ± 2. | ± 5. | ± 3. | ± 1.1 | ± 1.5 | ± 0.6 |

| <i>Provisional Values</i> | | | | <i>Information Value</i> |
|---------------------------|-----------|-----------|-----------|--------------------------|
| Os | Ni | Cu | Co | Re |
| ng/g | µg/g | µg/g | µg/g | ng/g |
| 8.0 | 1396. | 743. | 77. | 3. |

DESCRIPTION

UMT-1 was released for sale in 1991 after a preliminary interlaboratory certification program because of the pressing need for a 50 ng/g gold reference material. UMT-1 was also included in a program consisting of a series of six geochemical PGE reference materials.

UMT-1 was prepared and certified in cooperation with the Analytical Method Development Section of the Mineral Deposits Division of the Geological Survey of Canada (GSC).

UMT-1 is a sample of mill tailings from the nickel-copper Giant Mascot Mines, Hope, British Columbia. UMT-1 is composed almost entirely of silicates including pyroxene (enstatite), amphibole (tremolite) and chlorite. Ore minerals comprise a minor portion of the tailings, and include magnetite, ilmenite, goethite and some iron, magnesium, aluminum and magnesium spinels. Both sulphide species present, pentlandite and chalcopyrite, occur as liberated grains and as small inclusions in the silicates.



The pulverized material from an old tailings impoundment was purchased in July 1988. After drying at 100 degrees Celsius, approximately 840 kg of the material was passed through Denver rollers, ground in a vibration-energy mill and sieved through a 74µm screen. The oversize material was reprocessed as above. A total of 772 kg of tailings was obtained which exceeded the capacity of CCRMP's 570-L conical blender. A split-blending protocol was utilized; a series of five blending operations of 386-kg portions was performed prior to bottling in 400-g units.

Homogeneity measurements for gold, platinum, and palladium were performed by CANMET and an independent laboratory employing fire-assay (FA) preconcentrations with ICP-AES finish. Additional independent homogeneity measurements were obtained by FA-ICP-MS and INAA techniques. UMT-1 was found to be sufficiently homogeneous with respect to its gold, platinum, and palladium distributions to qualify as a candidate reference material.

CERTIFICATION

Thirty-three university, commercial, and government laboratories from Canada, United States, Europe, Australia, Africa, and Japan participated in an interlaboratory certification program. These were in addition to the seventeen laboratories that participated in the original program. Up to 80 elements were analyzed by methods of each laboratory's choice. A statistical analysis of the PGE data yielded recommended values for gold, platinum, palladium, rhodium, ruthenium, and iridium. Provisional values for osmium, nickel, copper, and cobalt are also given.

UMT-1 will be certified for additional elements at a later date. In the meantime, the approximate composition, estimated from a few laboratories, is given below.

LEGAL NOTICE

The Canadian Certified Reference Materials Project has prepared this reference material and statistically evaluated the analytical data of the inter-laboratory certification program to the best of its ability. The purchaser, by receipt hereof, releases and indemnifies the Canadian Certified Reference Materials Project from and against all liability and costs arising out of the use of this material and information.

REFERENCE

The preparation and certification procedures used for UMT-1 will be given in CANMET report *CCRMP 94-2E* which is in preparation. This report will be made available free of charge on application to:

**Coordinator, CCRMP
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| Approximate Composition, wt % | | | | | | | | | | | |
|-------------------------------|--------------------------------|--------------------------------|------------------|-----|-----|------------------|-------------------|-----|-------------------------------|-----|------------------|
| SiO ₂ | Al ₂ O ₃ | Fe ₂ O ₃ | TiO ₂ | CaO | MgO | K ₂ O | Na ₂ O | MnO | P ₂ O ₅ | LOI | S _{tot} |
| 49. | 4.4 | 13.6 | 0.4 | 6.2 | 23. | 0.09 | 0.65 | 0.2 | 0.03 | 1.8 | 0.2 |