



# National Institute of Standards & Technology

## Certificate of Analysis

### Standard Reference Material 886

#### Refractory Gold Ore

(In Cooperation with the American Society for Testing and Materials)

This Standard Reference Material (SRM) is a refractory gold ore of the Carlin type, in the form of fine powder (nominal particle size between 50 and 100  $\mu\text{m}$  (<150, >300 mesh)). SRM 886 is intended for use in evaluating chemical and instrumental methods for the analysis of gold ores. The SRM is provided as a 200 g unit.

The certified value for the gold concentration is reported on an as-received basis. It was determined by gravimetric fire assay and by acid decomposition-HBr extraction-atomic absorption spectrometry, and is the present "best estimate" of the true value. The estimated uncertainty for gold includes the combined effects of material variability for samples of 5 g or more, method imprecision, and systematic differences among laboratories performing certification analyses.

Gold concentration . . . . .  $8.25 \pm 0.13^*$  mg/kg

\*The estimated uncertainty represents the 95% confidence interval of the certified value.

#### PLANNING, PREPARATION, TESTING, ANALYSIS

The SRM gold ore was collected by Newmont Exploration Limited, Carlin, NV at the Carlin black carbon ore stockpile. A total of 330 kg was dried and crushed to minus 7 mm (- 1/4 in). The material was then ground to fine powder (98% less than 150  $\mu\text{m}$  (100 mesh)) by Chemex Laboratories, Ltd. in Nevada before shipment to the NIST as a candidate SRM.

Further processing to segregate the middle size fraction of 50 to 100  $\mu\text{m}$  (150 to 300 mesh) from the coarser and finer fractions, blending, and bottling of the material in 200 g units was performed by the U.S. Geological Survey under contract with NIST. The middle fraction accounted for approximately 30% of the original sample. One-gram samples were taken prior to bottling and analyzed for gold by a HBr/Br<sub>2</sub> leach procedure to assess homogeneity. Since the leach procedure recovered only approximately 90% of the gold present, further homogeneity assessments of the bottled material were made by analyzing 20 ten-gram samples by fire-assay and 24 five-gram samples by acid decomposition/solvent extraction/atomic absorption analysis. Samples of 0.25 g were also analyzed for carbon and sulfur by combustion-IR detection to further assess the sample homogeneity prior to bottling. All homogeneity measurements indicate that material variability is negligible.

The overall coordination of the technical measurements leading to certification were performed under the direction of C. Bucknam, Newmont Metallurgical Services.

The technical and support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by J.S. Kane.

Gaithersburg, MD 20899  
April 12, 1993

Thomas E. Gills, Acting Chief  
Standard Reference Materials Program

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## ADDITIONAL INFORMATION ON THE COMPOSITION

The constituents carbon and sulfur were also determined, and values are indicated below. These constituents have an important impact on the selection of the ore beneficiation process. The values are not certified, but are reported as additional information on the composition of the ore.

<u>Constituent</u>	<u>Concentration</u> <u>wt % *</u>
Carbon, total	5.7
Carbon, inorganic	5.4
Sulfur, total	1.5
Sulfate Sulfur	0.7
Sulfide Sulfur	0.8

\* wt % = mg/kg x 10<sup>-4</sup>

Mineralogical analyses were performed by X-ray diffraction and X-ray fluorescence analysis to provide bulk matrix information. The mineralogic content is approximately:

<u>Mineral</u>	<u>wt %</u>
Quartz	34
Dolomite	31
Calcite	20
Sericite	8
Kaolin	4
Pyrite	3

Cooperative analyses for certification were performed by the following laboratories:

Newmont Metallurgical Services, Salt Lake City, UT, C. Bucknam

Newmont Gold Company, Carlin, NV, P. Braun

Barrick Goldstrike Mines, Carlin, NV, R. Richardson

Chemex Laboratories, Ltd., North Vancouver, BC Canada, L. Twaites

Amax Gold Company, Winnemucca, NV, J.L. Oleson

U.S. Geological Survey, Denver, CO, S.A. Wilson

Institute of Non-Ferrous Metals, Gilwice, Poland, W. Stankiewicz, M. Brzezicka, and E. Szmyd