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**ATOMIC FORCE MICROSCOPY (AFM) PHOTO CONDUCTIVE ANALYSIS AND CALCULATION FOR REGULAR AND MENDEZIZED® COMMERCIAL 24 KARATS GOLD BARS CONDUCTED IN FIVE DIFFERENT TRIPLICATE SERIES.**

**Date: June 23, 2016**

**Conducted for:**

**Alejandro Mendez, Ph.D.  
President & CEO Mendezized  
Metals Corporation**

**Prepared by:**

A handwritten signature in black ink, appearing to read "G. Shekhawat".

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MENDEZIZED® COMMERCIAL 24 KARATS GOLD BARS



REGULAR 24 KARATS COMMERCIAL GOLD BARS



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## **AFM PHOTO CONDUCTIVE REPORT**

**Requester: Mendezized Metals Corporation**  
**Analysis Date: June 23, 2016**

### **Purpose:**

The purpose of this scientific analysis was to find out and calculate with high precision using Atomic Force Microscopy the Photo Conductivity in 24 Karat Commercial Gold Bars manufactured by Credit Suisse under serial number 656079 and by Mendezized Metals Corporation under serial number 1001.

**Photoconductivity** is an optical and electrical and physical phenomenon in which a material becomes more electrically conductive due to the absorption of electromagnetic radiation such as visible light, ultraviolet light, infrared light, or gamma radiation. When light is absorbed by a material such as a semiconductor, the number of free electrons and electron holes increases and raises its electrical conductivity. To cause excitation, the light that strikes the semiconductor must have enough energy to raise electrons across the band gap, or to excite the impurities within the band gap. When a bias voltage and a load resistor are used in series with the semiconductor, a voltage drop across the load resistors can be measured when the change in electrical conductivity of the material varies the current through the circuit.

The instrumentation involved for Photo Conductive AFM is very similar to that necessary for traditional AFM or the modified conductive AFM. The main difference between Photo Conductive-AFM and other types of AFM instruments is the illumination source that is focused through the inverted microscope objective and the neutral density filter that is positioned adjacent to the illumination source. The technical parameters of Photo Conductive-AFM are identical to those of traditional AFM techniques. This section will focus on the instrumentation necessary for AFM and then detail the requirements for Photo Conductive-AFM modification. The main instrumental components to all AFM techniques are the conductive AFM cantilever and tip, the modified Piezo components and the sample substrate. The components for photoconductive modification include: the illumination source (532 nm laser), filter and inverted microscope. When modifying traditional AFM for Photo Conductive application, all components must be combined such that they do not interfere with one another and so that various sources of noise and mechanical interference do not disrupt the optical components. The photocurrent data reflects the amazing properties of the commercial Mendezized gold bar serial number 1001 as compared to normal Credit Suisse commercial gold bar serial number 656079. The photocurrent module is an add-on-module that we have on our Bruker ICON system. Through the photocurrent (PC) module we used the Newport Solar igniter and through fiber optical cable we can shine light on the sample. Once the sample is illuminated with photonic light sources, electron hole pairs are generated and they are collected by probe collector which is basically a highly conducting Photo light receptor probe when in contact with the metal. The current signal is processed by the Nanoscope Voltage controller. The measurement room was completely kept dark with no other light sources around except the solar simulator from Newport. The system was operated in contact mode and the normal gold bar image was recorded. The topographical

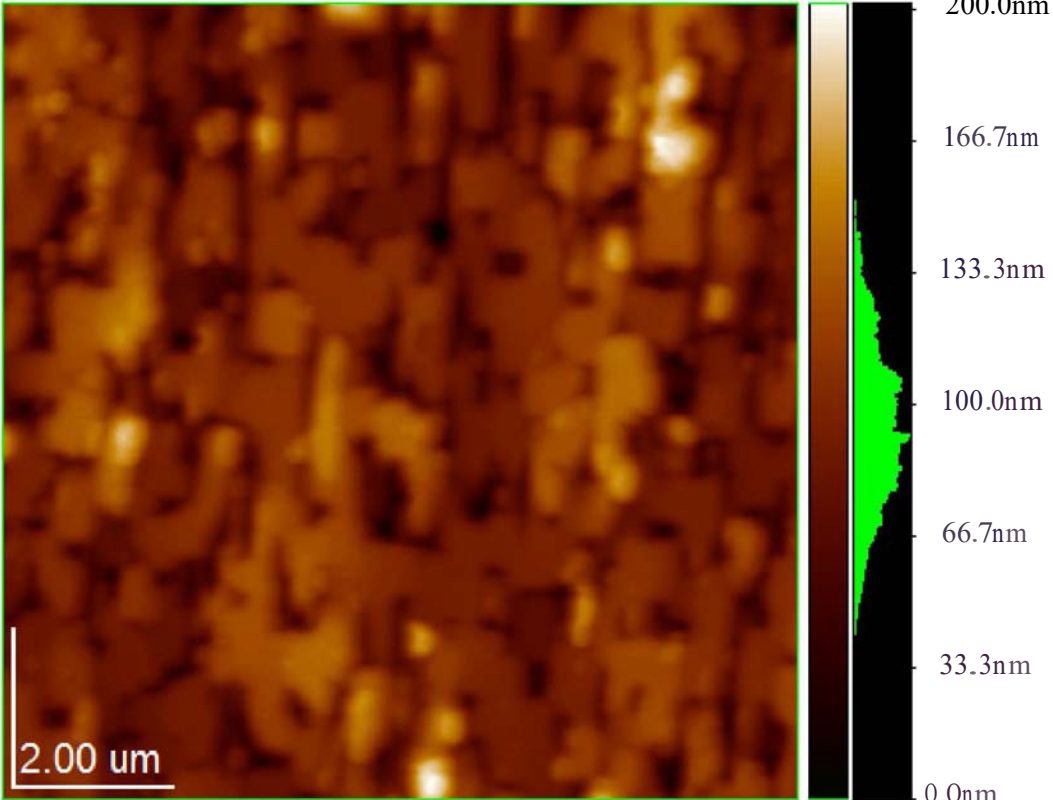
image seems to appear very rough with roughness close to 100 nm. Moreover, the Photo Conductive image for the Credit Suisse commercial gold bar serial number 656079 shows Photo Conductive data which is very typical of this metal. But when the Mendezized commercial gold bar serial number 1001 was investigated under similar conditions, the topography images looks very smooth and the Photo Conductive image is just amazing. The Photo Current was 5 orders of magnitude higher as compared with the Credit Suisse commercial normal gold bar serial number 656079. The Photo Current in the Mendezized commercial gold bar serial number 1001 was so high that we have to put a limiting resistor to avoid any hardware electronics breakdown in the head of the AFM scanner. The Photo Current scientific data and Photo Conductive Images shown below clearly indicate the highly conducting nature of the Mendezized commercial Gold Bar serial number 1001.

**Results:** Mendezized Commercial 24 Karats Gold Bar serial number 1001 have an incredible high Photo Conductivity and Photo Current of almost 500 Milli amperes and 8.4 Volts and the atoms are almost completely flat which doesn't happen with regular commercial Credit Suisse 24 Karats Commercial Gold Bar serial number 656079 that have a very negligible 350 Pico amperes and almost 0 Volts and the atoms are 33.3 nanometers in high.

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## Credit Suisse Gold Bar

Topography



Topography Regular Gold

Photo Current

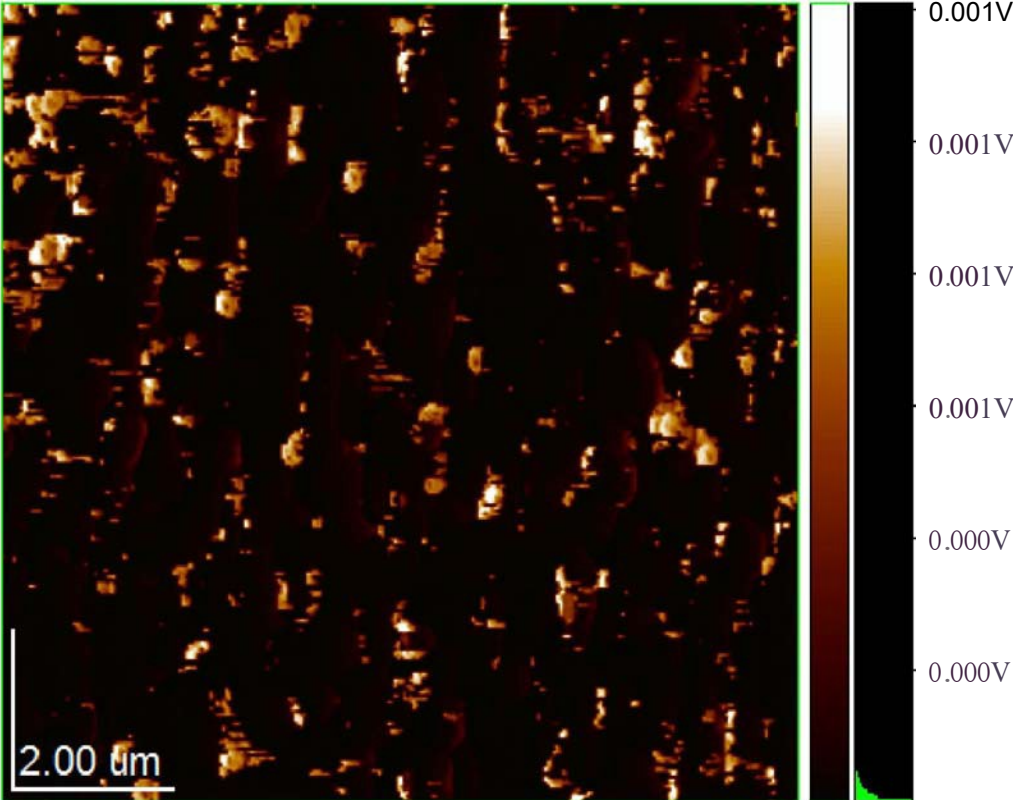
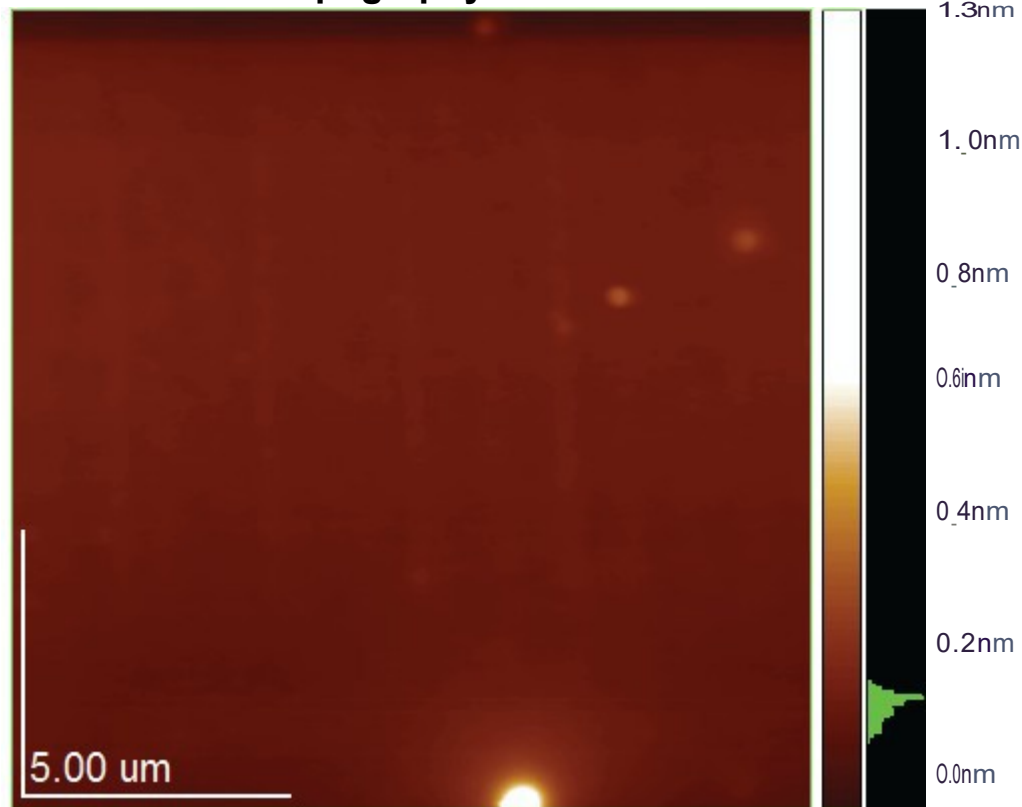


Photo Current  
Image of Regular  
Gold Bar. 0.0 Volts  
and 350 Picoamps.

**Negligible Photocurrent seen in the right image. The image represents several images taken at random locations for data consistency and reproducibility. The topography on the left image is also very rough. Look at the height scale.**

## Mendezized Gold Bar 1001

Topography



Topography Mendezized Gold Bar / Atoms are almost completely flat.

Photo Current

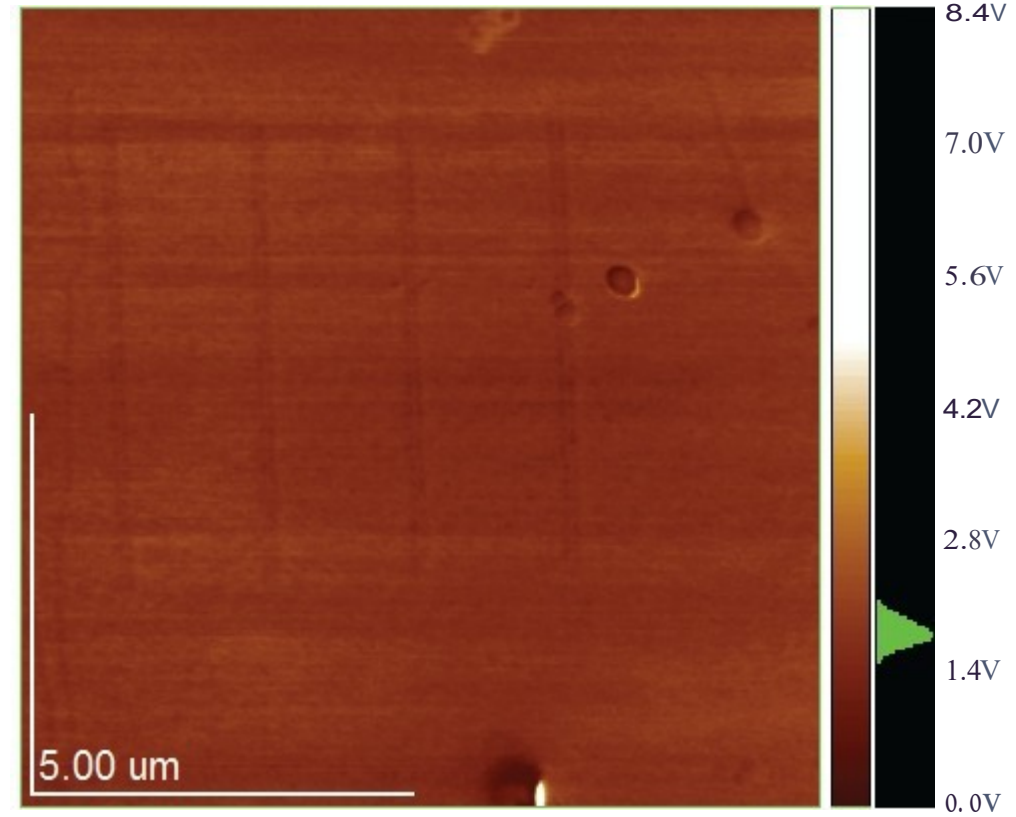


Photo Current Image of Mendezized Gold Bar / Almost 500 Milli amperes and 8.4 Volts per each 30 nanometers areas.

**Massive Photocurrent seen in the right image. The image represents several images taken at random locations for data consistency and reproducibility**

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