IMR TEST LABS
A Curtiss-Wright Business Unit
www.imrlouisville.com

4510 Robards Lane
Louisville, KY 40218
T: 1.502.810.9007 | **F**: 1.502.810.0380

POSITIVE MATERIAL IDENTIFICATION

IMR Report Number 201602910

November 15th, 2016

Nickolas Paglia
6176 Chesham Drive, #3
New Port Richie, FL 34653

Date Received
November 7th, 2016

Description
Silver Tetradrachm
Silver Denarius "Mars"
Silver Denarius "Nike"
#1 Aurelian & Vabalathus
#2 Aurelian
#3 Probus
#4 Maximian

SUMMARY

Seven Roman Era coins were received for Positive Material Identification. The results are listed on the following pages. Note, these samples do not meet any specific alloy type.

Positive Material Identification (PMI) is an alloy verification technique, where analytical results are not certified, but are sufficient to identify a material or otherwise distinguish one material from another, especially when standards are unavailable. Due to the potential for alloy segregation, and the limited array of analysis techniques, there are accuracy limitations during PMI testing when compared to destructive full quantitative analysis. Accordingly, IMR follows a customer specified standard which requires that major elements be within +/- 10% of the specified range, minimum, or maximum for PMI testing.

ANALYTICAL PROCEDURES & TEST EQUIPMENT

I. Approximate Chemical Analysis

A. X-Ray Fluorescence Spectrometry, ASTM E1916-11

A2LA ACCREDITED Testing Cert # 1140.03 & 1140.04

Nadcap Accredited Materials Testing Lab

Reviewed by

Brian Herndon
Chemistry Technician

Reviewed by

Brett A. Miller, P.E., FASM
Technical Director

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TABLE 1
RESULTS OF XRF CHEMICAL ANALYSIS

Element	Silver Tetradrachm AD 111	Silver Denarius; Mars	Silver Denarius; Nike
Silver	79.04	95.13	95.31
Copper	14.99	2.36	3.12
Tin	2.92	0.42	----
Lead	2.02	1.90	1.02
Gold	0.45	0.35	0.38
Iron	0.34	----	----
Chromium	0.03	0.03	0.03
Nickel	0.02	0.02	0.02
Zinc	0.03	0.01	----
Bismuth	0.05	0.08	----
Vanadium	0.03	----	----
Cobalt	----	0.01	----
Molybdenum	----	0.03	----

*Results in weight percent

METHODS

X-Ray Fluorescence Spectrometry, ASTM E1916-11

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TABLE 2
RESULTS OF XRF CHEMICAL ANALYSIS

Element	#1 Aurelian & Vabalathus	#2 Aurelian	#3 Probus	#4 Maximian
Copper	90.29	91.21	87.85	68.64
Lead	2.19	1.58	2.41	24.14
Tin	2.84	2.57	6.75	5.82
Silver	2.09	2.03	0.07	0.09
Silicon	1.55	1.97	1.99	0.87
Iron	0.02	----	0.03	----
Arsenic	0.19	0.11	0.06	----
Nickel	0.05	0.09	0.05	----
Zinc	0.51	0.05	0.35	0.26
Bismuth	----	0.03	----	----
Antimony	----	0.14	0.18	0.19
Cobalt	0.01	0.02	0.01	0.04
Aluminum	0.25	0.30	0.24	----
Phosphorus	----	0.03	0.05	----
Sulfur	0.07	0.05	0.06	----
Zirconium	----	----	----	0.03

*Results in weight percent

METHODS

X-Ray Fluorescence Spectrometry, ASTM E1916-11