Provenance Investigation of Tanagra Figurine from the Diniacopoulos Collection at Queen's University

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Background

Tanagra Figurines are polychrome terracotta sculptures found in funerary settings in the town of Tanagra in Northern Greece from the Hellenistic Period, between 330 to 200 BCE. In the early 20th century, their unique style and subject made them popular among collectors creating a large market for forgeries. Today forgeries of Tanagra Figurines are commonplace in many collections. This research builds on previous work exploring a Tanagra Figurine in the Diniacopoulos Collection at Queen's University. The method of manufacture, materials used, and the chemical make-up of the ceramic body were investigated to determine the possible provenance of this figurine.

Experimental

This study focused on corroborating previous identification of pigments using FORS analysis, focusing on the presence of ultramarine, as this is an uncommon pigment for the period.[1] The clay body was analyzed to identify mineralogical species, relating to firing temperature and comparison with know archeological Tanagra Figurines.[2]

Analytical Techniques

Surface analysis for pigment ID
- Optical and Polarized Light Microscopy
- Fiber Optic Reflection Spectroscopy

Clay body analysis
- X-ray Diffraction
- Attenuated Total Reflection Fourier Transform Spectroscopy
- Scanning Electron Microscopy

Results

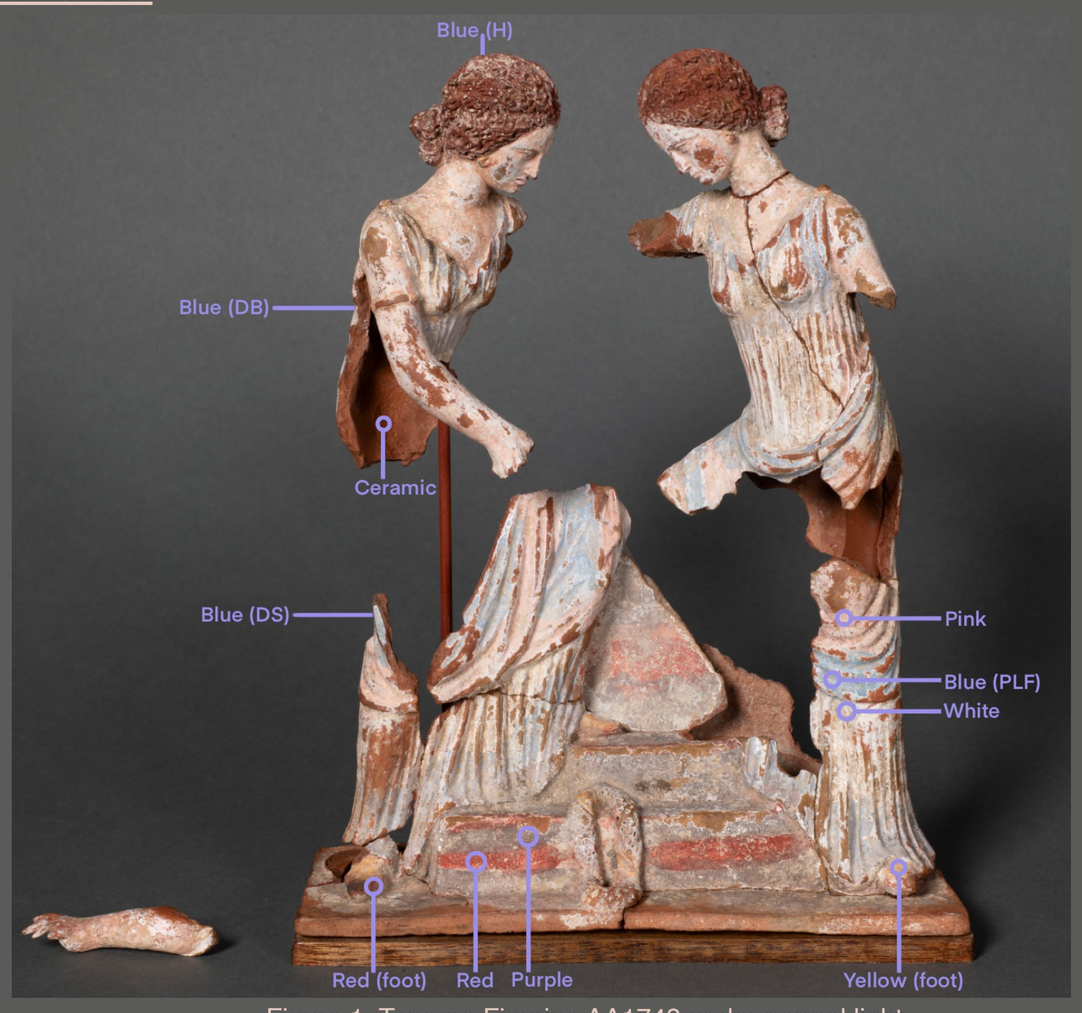


Figure 1. Tanagra Figurine AA1748 under normal light
FORS sampling sites indicate in periwinkle

Pigment analysis

Identified using O/PLM, and FORS, shown in Figure 2.
- **Reds:** Red ochre
- **Pink:** Lake pigment, possibly rose madder
- **Blues:** Ultramarine
- **Yellow:** Yellow ochre
- **Purple:** Mixture of red and blue pigments

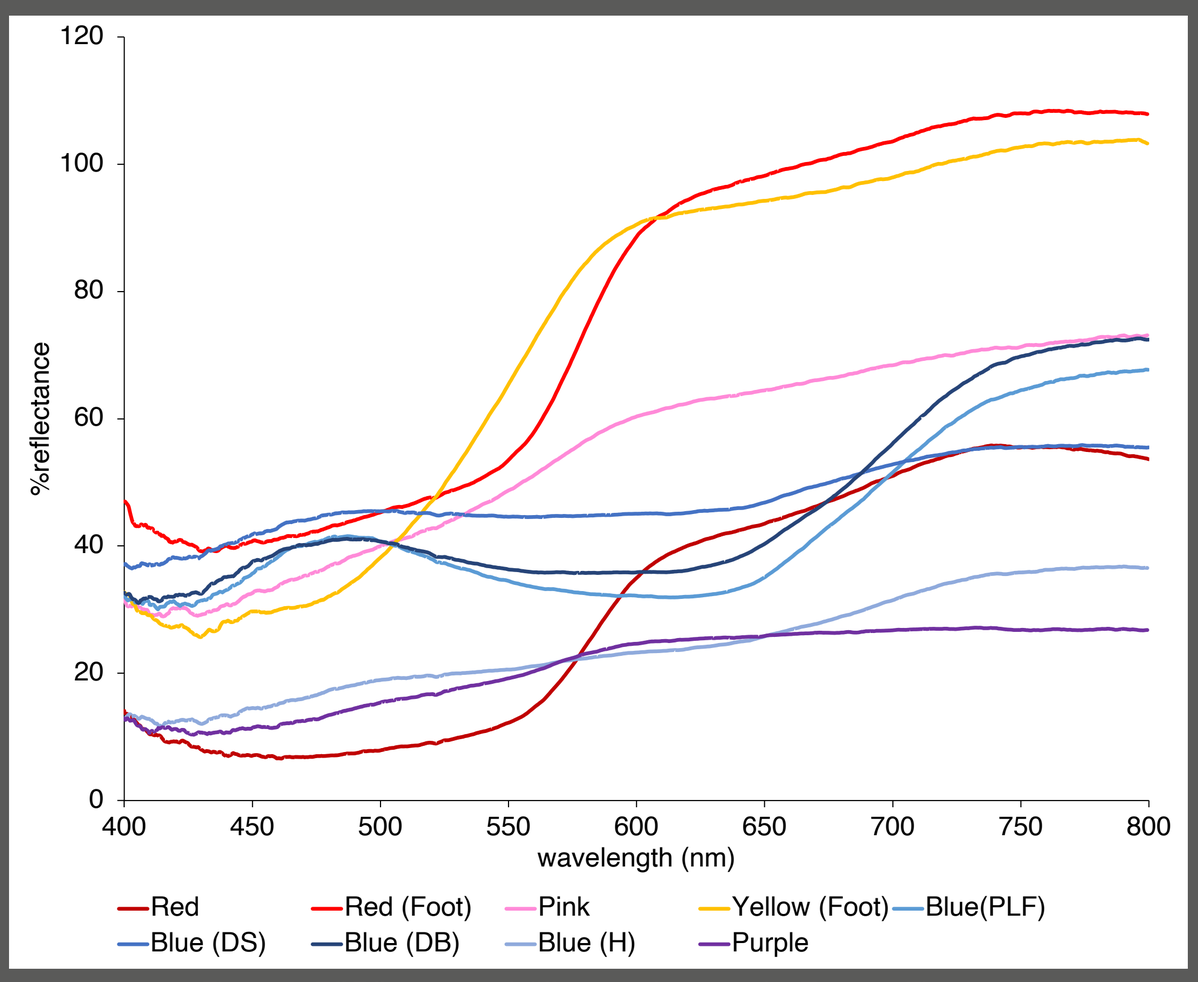


Figure 2. FORS spectra of different colours on the Tanagra Figurine

Clay body analysis

Identified major minerals, seen in Figure 3 and 4.
- **Quartz:** commonly present in terracotta
- **Calcite:** commonly present in low-fired terracotta
- **Albite:** commonly present feldspar in terracotta
- **Muscovite:** commonly present mica in terracotta

The lack of the minerals kaolinite and gehlenite suggest the figurine was fired between 550 – 850°C, which is consistent with historical firing technologies. The presence of micas is consistent with other archeological examples of Tanagra Figurines.[2]

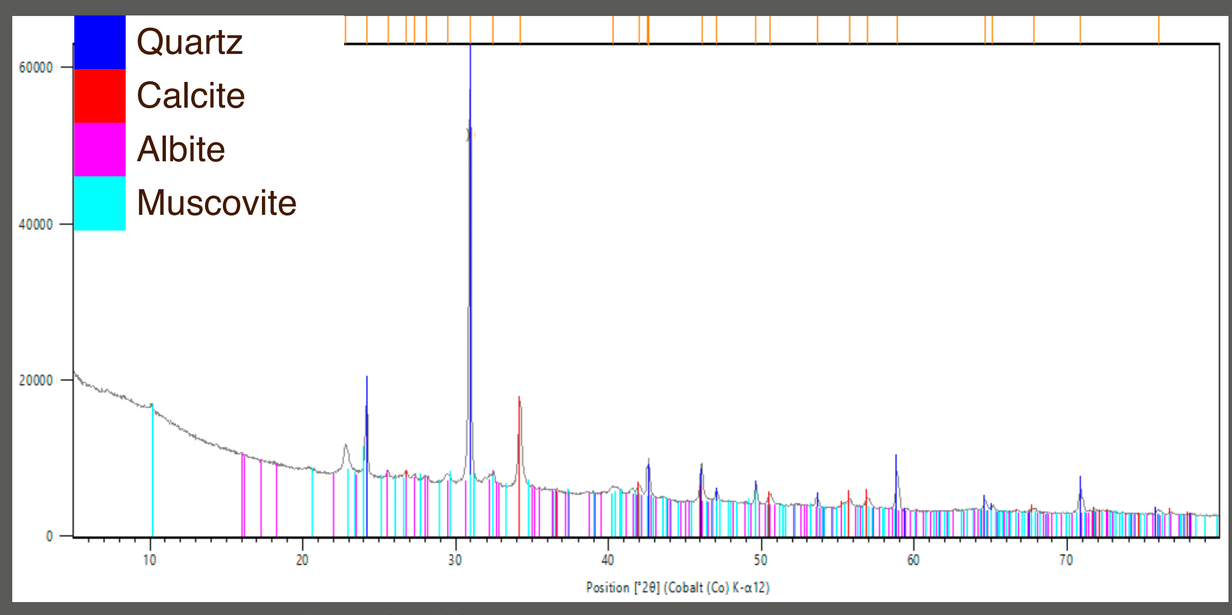
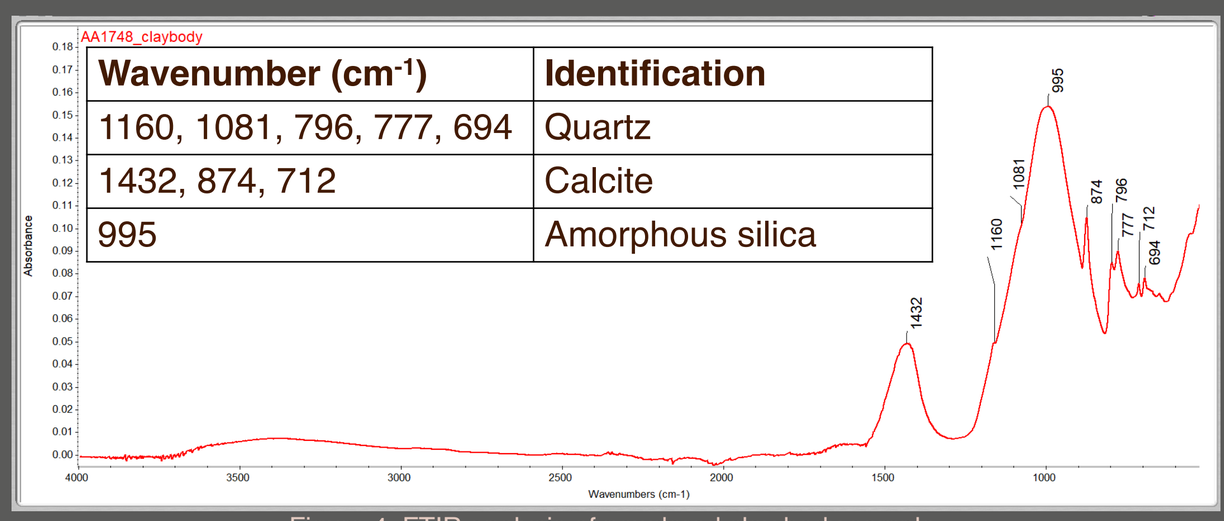


Figure 3. XRD analysis of powdered clay body sample



Wavenumber (cm^{-1})	Identification
1160, 1081, 796, 777, 694	Quartz
1432, 874, 712	Calcite
995	Amorphous silica

Figure 4. FTIR analysis of powdered clay body sample

Conclusions

This analysis in conjunction with previous studies highlights the uncommon use of ultramarine. Historically, blues were rarely used and unlikely to be ultramarine. The constituents of the clay body are consistent with historic materials present especially the presence of mica, and a lack of gehlenite. Methods of making and firing are consistent with our understanding of how Tanagra Figurines were made, but this knowledge and techniques were used to create forgeries as well. More analysis is required to know if this example is a forgery.

1. Queen's University. 2023. "Antiquities through Modern Eyes: An Exhibition and Symposium Integrating Classics with Art Conservation" Case 1: What Colour Can Tell Us - Vitrine 1: Ce que la couleur peut révéler. https://www.queensu.ca/antiquities-through-moderneyes/cases/case-1-colour
2. Ricca, Michela, Maria Pia Albanese, Maria Francesca Alberghina, Salvatore Schiavone, Mauro Francesco La Russa, Armando Taliano Grasso, and Luciana Randazzo. 2022. "Archaeometric Study of Two Tanagra Type Statuettes of Unknown Provenance to Support Forensic Study" *Heritage* 5, no. 2: 849-859. https://doi.org/10.3390/heritage5020046

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