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Late Assyrian Plain Simple Ware: a ceramic analysis

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Senior Honors Project

Late Assyrian Plain Simple Ware: a ceramic analysis

1. Abstract

The focus of this project will be to firmly establish, characterize, and define the range of traits that describe the most common fabric type of the pottery found at Ziyaret Tepe, which was called by the excavators and ceramic experts Plain Simple Ware (code designation LA01). To characterize and describe the range of traits of Plain Simple Ware from Ziyaret Tepe, ceramic analysis, specifically, a method called ceramic petrography was employed in this study of thirty samples of pottery. The results include confirmation that the clay used to produce the pottery had mineral deposits consistent with the geomorphology of the area, and that the form and manufacturing technique of the pottery was consistent with pottery from the Assyrian heartland. However, the pottery at Ziyaret Tepe stands out for its heavy burnishing as a surface treatment, a surface treatment not commonly found on pottery made in Assyria.

2. Introduction

Pottery analysis is a common practice on many archaeological sites. Archaeological ceramicists, the specialists who study ancient pottery, not only study ceramic manufacture, consumption, and distribution, but also create typologies that can be used for dating archaeological deposits. These typologies can be used widely as reference to the diffusion of technology and style, and the migrations of people. Focusing generally on the archaeological

region of Mesopotamia, and particularly on the northern half of that region in the 1st millennium BC, this paper will examine the pottery produced within the Assyrian empire. Previous work on Assyrian pottery analysis speaks of a general lack of published detailed pottery sequencing for Assyrian pottery, especially for the Late Assyrian Period (c. 900-600 BC) (Jamieson, 2012: 14). Most pottery studies looking at Late Assyrian period pottery from excavations provide detailed information on the fine ware and highly decorated pottery, like Assyrian Palace Ware and Glazed Ware (Oates & Oates, 2001). The plain types of pottery, typically undecorated, were often noted as not being of intrinsically great interest (Oates, 1959: 131, Lines, 1954: 164).

However, more recent scientific expeditions working in ancient Assyria have focused on the recovery and study of the complete pottery corpus from the period, including the plain wares. As an example, the expedition led by Prof. Timothy Matney to the site of Ziyaret Tepe (the Assyrian city of Tušhan) from 1997-2014 produced one of the largest and most comprehensive databases on Assyrian pottery from any site, with full recording of the plain wares of the period. The publication of a pottery volume by the team from the Ziyaret Tepe excavations will lend a wealth of knowledge to the field of Assyrian archaeology beginning with the establishment, characterization, and definition of the range of traits that describes the most common fabric type of the pottery found at Ziyaret Tepe, like so many other Late Assyrian sites.

3. Background:

Ziyaret Tepe

The site of Ziyaret Tepe is located in the Upper Tigris River valley in southeastern Turkey (Fig. 1). It is surrounded by the Taurus Mountains to the north and east, the Mardin

Plateau to the south, and now extinct volcano peaks to the west. The site (Fig. 2: the plan of the site) is approximately 32 hectares in total size with a city center on a mound of 2 hectares and another 30 hectares of urban sprawl around the mound. The site was occupied continuously from the Early Bronze Age into the Middle Iron Age (ca. 3000 B.C.E. to 611 B.C.E.), when the city was abandoned after the fall of the Assyrian capital to the south (Matney et al. 2016:26). After a few centuries of abandonment, the site was reoccupied first as an outpost of the Roman Empire, and later during the medieval and Ottoman periods (Matney et al., 2016: 36-42).

During the Neo-Assyrian period (882-611 B.C.E), the site served as an Assyrian provincial capital. During this period, a succession of Assyrian kings were responsible for a mass expansion of the empire through military campaigns to the Levant (modern day Lebanon, Israel, Jordan, and Syria), Anatolia (modern day Turkey), Babylonia (modern day Iraq), and Iran (Matney et al. 2016: 18). After the imperial take-over of an area, they would set up provinces with a governor as the central authority overseeing both the current residents as well as the deportees they brought in, which was a common Assyrian practice. The governor's duties would also include the collection of taxes to be paid to the Assyrian empire. Thus, after the establishment of the provincial capital at Ziyaret Tepe, the settlement became a burgeoning city that functioned as an administrative, military and commercial center for the Assyrian Empire (Matney et al. 2016: 29).

Fig. 1 – Map of Ziyaret Tepe, courtesy of https://blogs.uakron.edu/ziyaret/2011/06/30/map-showing-where-ziyaret-tepe-is-located/

Geomorphology

The site of Ziyaret Tepe (Fig. 2) is located in an area called the Diyarbakir Basin, on a terrace that is approximately 10 meters above the Tigris River (Dogan 2005: 77). The Tigris River is a meandering river with an abundant suspension load that supplies a large amount of sediment during flooding (Dogan 2005: 78). The Tigris and its tributaries, flow through many formations with different ages and lithologies. In the southeastern Taurus Mountains where the sources of the river are located, there are pre-Neogene limestones which are mainly composed of calcium carbonate in the form of calcite, ophiolitic mélanges which consist of a chaotic mixture of sedimentary rocks and igneous rocks derived from the ophiolite suite of rocks, and metamorphic rocks. Large sections of the Tigris River and its tributaries flow through marine sediments that consist of Lower Miocene limestones, sandstone, which is a sedimentary rock that contains primarily quartz and feldspar, and silt. They also flow through Upper Miocene-Pliocene

terrestrial conglomerates, clay and silt. The Lower Miocene and Upper Miocene-Pliocene rock formations, which form the bedrock, are prone to erosion, thus providing a substantial portion of the sediment found in the Tigris and its tributaries (Dogan 2005: 76). It is highly likely that the clay sources at Ziyaret Tepe will be abundant with quartz and feldspar as the main mineral content.

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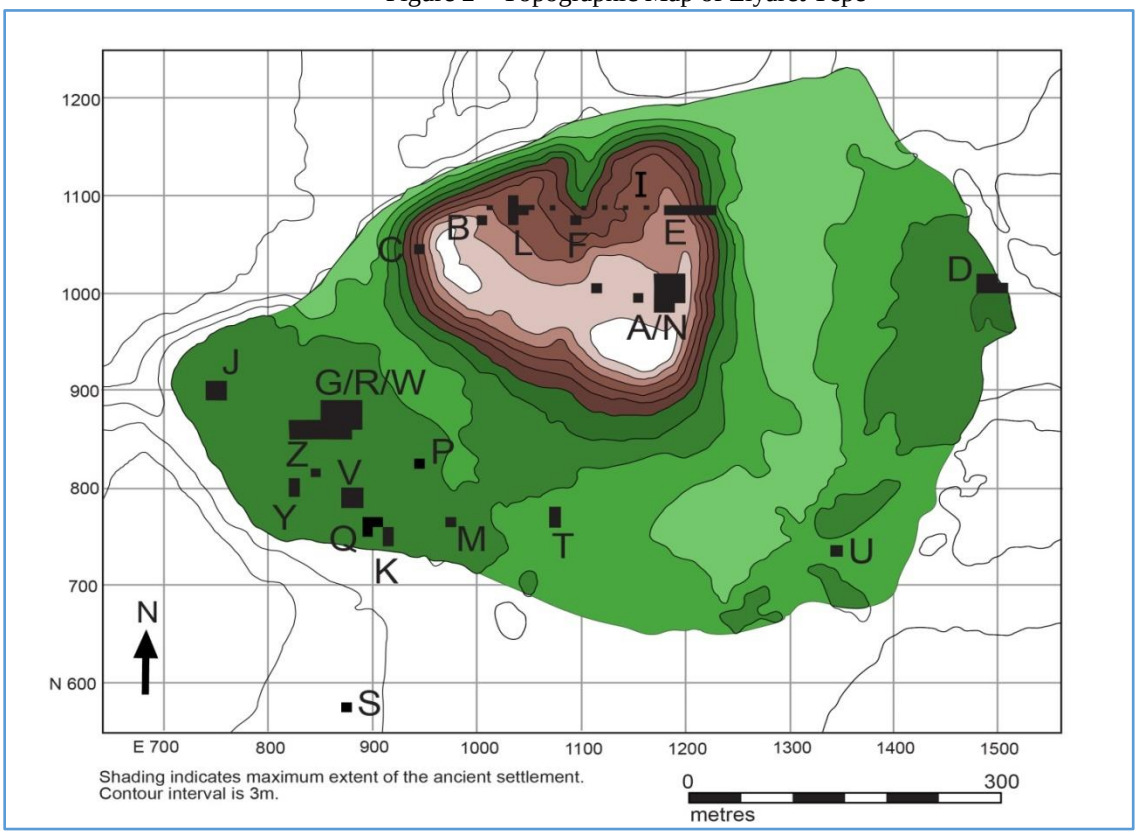
mineral content. Other minerals could, of course, have been added deliberately during the tempering process of turning raw clay into a useable potter's clay.

Figure 2 – Topographic Map of Ziyaret Tepe



Pottery at Ziyaret Tepe

Pottery is one of the best preserved artifacts often found at ancient sites due to the physical properties of clay after firing. Pottery has been used for cooking, storage and serving of food for more than 8,000 years. Pottery is an important part of the archaeological record because it can be used for dating time periods, it can give information on site chronology, sociopolitical complexity, diet and dining practices, the technology being used at the site, and prehistoric and early historic trade patterns (Sutton and Arkush 2009: 111).

The most abundant artifact found at Ziyaret Tepe are sherds of ancient pottery, with over a million sherds being collected at the site, as well as 200 complete, or nearly complete ceramic vessels (Matney et al. 2016: 178). From the Late Assyrian occupation level, thousands of pottery sherds were collected and divided into several ware categories like Palace Ware, Cooking Ware, and Plain Simple Ware. Despite the site functioning as a provincial capital producing many products at a large scale, neither a pottery production site nor any kilns have been uncovered during excavations to date.

The focus of this project will be to firmly establish, characterize, and define the range of traits that describe the most common fabric type of the pottery found at Ziyaret Tepe, which was called by the excavators and ceramic experts Plain Simple Ware (code designation LA01). Plain Simple Ware was the designation used for at least 75% of the Late Assyrian pottery sherds recovered during surface survey and excavation, and almost certainly represents the local clay source used for daily-use ceramic vessels. In terms of shapes, the most common forms are bowls, followed by jars, and beakers. Small cups and pot stands are also represented in smaller numbers. Bowls make up the most common forms among all Late Assyrian pottery. Jars, which make up the second most common form group, vary considerably in size, from small jars to large storage jars. Plain Simple Ware is comparable to “Common Ware” or “Simple Ware” as described from other contemporary Assyrian sites such as Nimrud (Oates, 1959: 131), and Tell Ahmar (Jamieson, 2012: 19). The pottery designated as Common Ware or Simple Ware is typically undecorated, with no surface treatments, except occasionally light burnishing. Texture, or coarseness, is fine, medium or coarse dependent on size of the vessel. Tempering is usually with organic matter such as straw or with inorganic matter, typically a fine grit of either minerals or grog (ground fired ceramics). Due to an uneven firing atmosphere, or incomplete firing, many

vessels and sherds have a two-toned effect with gray cores (Anastasio, 2010: 31, Oates, 1959: 131, Jamieson, 2012: 19). To characterize and describe the range of traits of Plain Simple Ware from Ziyaret Tepe, ceramic analysis, specifically, a method called ceramic petrography will be employed in this study on thirty samples of pottery that were designated as Plain Simple Ware by the ceramicists working at Ziyaret Tepe.

Ceramic Analysis

Ceramic analysis is a multi-faceted area of study. Ceramics can be studied on many levels, using a variety of techniques. To thoroughly analyze pottery, both a macroscopic and a microscopic description of the pottery should be made. Macroscopic descriptions include, but are not limited to: Shape, physical dimensions, fabric details including interior, exterior, and core color, coarseness, inclusions, suspected firing atmosphere, manufacturing method, interior and exterior surface treatments, interior and exterior decorations, and any other relevant information that can be gather by direct naked-eye observation, which can be aided by a loupe or hand-held magnifying glass (typically up to 10x magnification). Microscopic descriptions (with magnification around 100x) usually include but are not limited to: microstructure which describes the voids that are present, the groundmass which describes the matrix color and evenness of inclusions, and the inclusions.

For macroscopic descriptions, the atmosphere during firing affects several properties of the finished products including color, hardness, porosity, and shrinkage. The color of a pot can tell a lot about the clay that was used, and the atmosphere it was fired in. Color is often rated using the Munsell Color Chart. Initially designed to categorized soil color, the Munsell Color System is utilized in a wide range of fields as a standard for color coding. Pottery can be

assigned a code from the Munsell Color Chart and easily referenced by anyone (Munsell.com). Color in pottery comes from two classes of impurities: organic matter and iron compounds. If the clay is essentially free from impurities it is typically white in color. Organics turn the clay shades of gray that vary all the way to black depending on the amount of organics present. Oxides like hematite, and hydroxides like limonite, contain highly oxidized iron and produce shades of red, brown, beige, and yellow clay. It is worth noting that the color of a fired pot is not indicative of the original color of the clay (Sutton and Arkush 2009: 113). There are two types of atmospheres for firing of pottery. The first is an oxidizing atmosphere, where there is an abundance of free oxygen that combines with elements in the clay, which will produce a clear, solid color of the ceramic body. The second is a reduced atmosphere, where there is an insufficient amount of oxygen for complete combustion of the fuel in the fire, and poor draft, which results in the build-up of gases such as hydrogen, carbon, and carbon monoxide, and prevents the pot from obtaining the correct amount of oxygen. This produces dark colors on the pots, a result that is sometimes intentional on the part of the potters. Unevenness in the pottery colors reflects the fluctuation in the firing atmosphere from shifting air currents (Sutton and Arkush 2009: 120).

For microscopic descriptions, the principal method of identifying minerals in archaeological ceramics is thin section petrography, which can be used to detect compositional and microstructural evidence for the technological steps taken in the manufacturing process of ceramics. Petrographic data can be interpreted within an archaeological context to provide answers to specific questions about sites, cultures and archaeological periods. The primary goals of thin section petrography include: compositional characterization of the ceramic thin section, classification in terms of provenance, and reconstruction of technology (Quinn, 2013: 4).

Thin section petrography is a technique borrowed from geology. The method aims at the identification of minerals (embedded in a clay matrix) that are identified by their optical properties observed using a polarizing light microscope (Rice, 1987: 376). Thin sections are slices taken from pottery sherds that are parallel to the vertical axis of the sherd, and are usually impregnated with a bonding agent like an epoxy resin to consolidate the friable material. The material is then adhered to a glass slide and ground to a uniform thickness of 0.03mm and covered with a thin cover glass (Rice, 1987: 379). Thin sections allow the identification of different kinds of minerals, as well as their abundance, association, and orientation. This datum is then used to characterize the fabric of the sherd and then classify a larger body of ceramics found in an assemblage.

There are both advantages and disadvantages to ceramic petrography. A rather large advantage of ceramic petrography is its high level of flexibility which allows adaptability to different types of archaeological questions, ceramic material, and scales of analysis. However, ceramic petrography is highly subjective. This process is normally carried out by scientifically trained archaeologists, or earth scientists that have an interest in archaeology. Students are also trained as specialists in ceramic petrography, and then apply the techniques learned to assemblages as part of a Master's or PhD thesis (Quinn, 2013: 10). The effectiveness of the approach is then dependent on the knowledge and experience of the analyst.

4. Data Collection and Analysis

Each of the thirty sherds selected for this project were drawn, photographed and macroscopically described before being sent to a facility to produce thin sections. Once received,

the slides were then microscopically analyzed using a polarizing light microscope set to 100x magnification. The following sections described in detail how each step of analysis was conducted, and what information was recorded.

Macroscopic Description

The macroscopic description for the thirty pot sherds designated as Plain Simple Ware, or LA01, are based on the following general features: (1) Shape, (2) fabric color, (3) coarseness of matrix, (4) inclusions, (5) firing atmosphere, (6) manufacturing method, and (7) surface treatments. Shape refers to shape of the vessel if known, and the location on the vessel where sherd came from (e.g., body sherd, rim sherd). Fabric color describes the matrix color, the interior, exterior and the core colors. Coarseness is described as either fine, medium, or coarse. Inclusions are labeled black or white grit, mica, and vegetal matter, with the amount present designated as sparse, occasional, or common. The color of the grit was used as descriptor in the field where it was not possible to analyze the parent material. Firing and core colors are used to characterize the different firing conditions (oxidizing or reduced) of the pottery. The manufacturing method is characterized by either hand-made or wheel thrown. Surface treatments include wet-slipped, wet-smoothed, burnished, or none. This information was obtained using the naked eye and a 10x magnification loupe. It was then recorded on a pottery identification form.

Microscopic (or Petrographic) Description

The petrographic descriptions for the thirty sherds for this project are based on the following characteristics: (1) microstructure, (2) groundmass, and (3) inclusions. Microstructure refers to the presence of voids in the matrix. Voids are characterized by their shape: *vesicles*, or

small, round voids which are typically created from air bubbles, *channels* which are typically found in coil-built pottery, *planar voids* which occur as drying faults along the planes of weakness in wheel-thrown pottery, and *vughs* which are random shapes in voids. The sizes for voids are labeled as mega (2mm or larger), macro (2mm-0.5mm), meso (0.5mm-0.005mm), and micro (0.005mm or less). Groundmass describes the matrix color by the following characteristics: even or uneven, active/*birefringent* or inactive/not birefringent, the *colors* as they appear in Plain Polarized Light (PPL) and Crossed Polarized Light (XPL), *coarseness* of the matrix as either fine, medium, or coarse, and the *inclusion distribution* as even or uneven. Birefringence refers to the refraction of light in an anisotropic material. Under microscope, the material will appear to be active, or light up, and may change colors depending on the position of the slide. Inclusions are characterized first by: (1) how well they are sorted: well, moderately well, poor, very poor, (2) second by their abundance or density, and labeled as: rare (1-2%), sparse (3-9%), moderate (10-19%), common (20-29%), very common (30-39%), abundant (40-50%), general size of the inclusions: small(less than 0.005mm), medium(0.5-0.005mm), large(0.5-2mm), extra-large (2mm or greater), and (3) their shape: well rounded, rounded, sub-rounded, sub-angular, angular, very angular. These characterizations are then followed by a brief break down of the abundance of each individual mineral inclusion into the following categories: dominant, common, few, very few, rare, and very rare. For this section of analyzation, the first step was to identify the different minerals present in each thin section. After the minerals were identified, the next step was to determine what mineral was the predominant mineral present. That mineral was then labeled as “dominant” in the microscopic description. If there were two minerals that were as abundant, they were both labeled common.

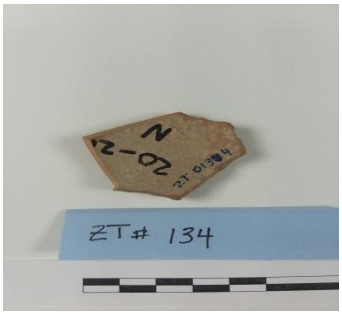
Catalogue

ZT134

Macroscopic description:

- This sherd is a body sherd from a nipple based vessel. The interior, exterior and core color is buff/light brown. The coarseness is fine with sparse fine black grit, sparse fine white grit, and occasional fine mica. The firing atmosphere is an oxidizing atmosphere. The manufacturing method is wheel thrown. The surface treatments are burnished for both the interior and exterior.

Interior View



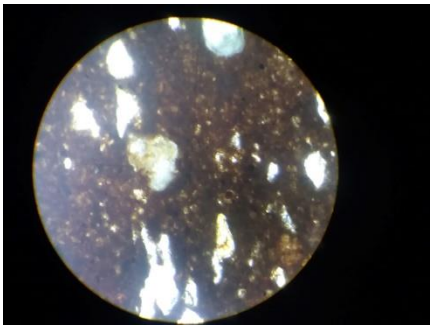
Exterior View

Microscopic description:

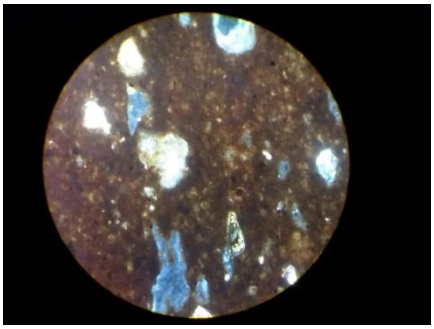
- Microstructure: there are very few voids, and they are characterized as macrovughs. There are no micritic calcareous infillings.
- Groundmass: the matrix color is continuously even. The color is an inactive reddish-brown (PPL), and inactive dark orange-brown (XPL). The coarseness is fine, and the inclusion distribution is relatively even.

- Inclusions: the inclusions are well sorted, very common in density, small in size, and sub-rounded in shape. Mineral abundance:
    - Dominant: quartz
    - Common: feldspar (alkali), garnet
    - Rare: biotite
    - Very rare: amphibole (brown)

ZT# 134 PPL View



ZT# 134 XPL View

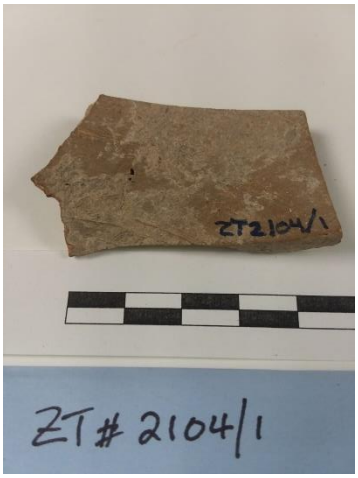


ZT2104/1

Macroscopic Description:

- This sherd is a body sherd from the shoulder of a jar with a grooved ridge on the exterior. The interior is a grayish-brown, the exterior is gray, and the core is gray. The coarseness is medium with occasional fine black grit and common fine white grit. The firing atmosphere is reduced as evidenced by the gray core. The manufacturing method is wheel thrown. The surface treatments include a wet-smoothed surface on the interior and a slip on the exterior.

Interior View

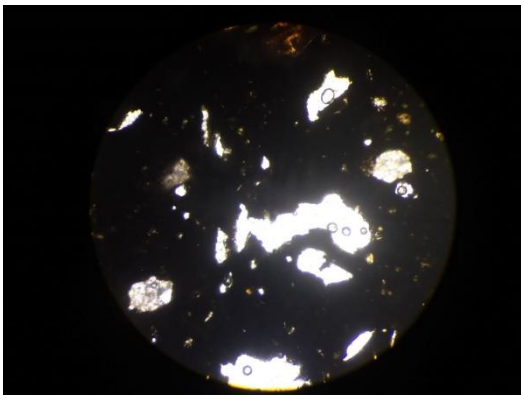


Exterior View

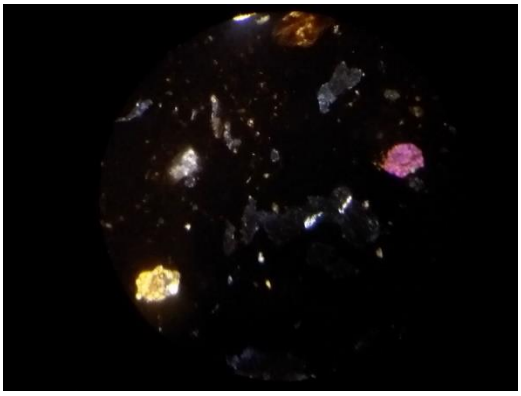
Microscopic Description:

- Microstructure: there are occasional voids, with macroplanar voids and megavughs. There are micritic calcareous infillings.
- Groundmass: The matrix color is uneven and ranges from optically inactive dark brown to very dark brownish-black (PPL) and inactive very dark brown (XPL). The coarseness is fine to medium, and the inclusions are unevenly distributed.
- Inclusion: the inclusions are poorly sorted, moderate in density, medium to large in side, with a sub-rounded to sub-angular shape. Mineral abundance:
    - Dominant: quartz
    - Few: feldspar (alkali)
    - Rare: calcite, grog
    - Very rare: sulfate, muscovite, garnet

ZT# 2104/1 PPLView



ZT# 2104/1 XPL View



ZT589/1

Macroscopic Description:

- This is a bowl rim with a grooved ridge on the exterior. The interior and exterior are brown with a gray core. The coarseness is medium with common fine black and white grit, occasional fine mica, and occasional fine vegetal matter. The firing atmosphere is reduced as indicated by the gray core. The manufacturing method is wheel thrown. The surface treatments include a wet-smoothed exterior.

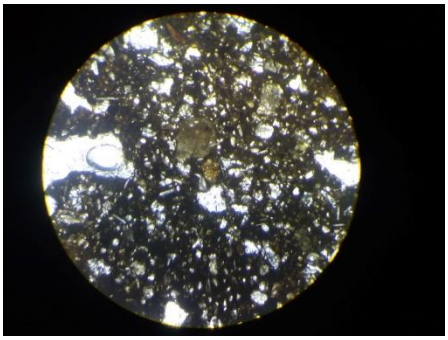
Interior View

Exterior View

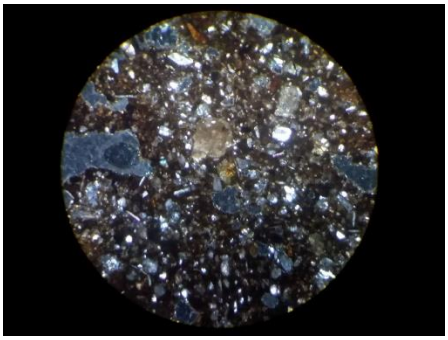
Microscopic Description:

- Microstructure: The matrix is dominated by voids that are equal amounts of vesicles and mesovughs. There are micritic calcareous infillings.
- Groundmass: The matrix color is uneven. The color ranges from inactive dark brown to black (PPL) and inactive dark brown to black (XPL). The coarseness is medium, and the inclusions are evenly distributed.
- Inclusions: the inclusions are moderately well sorted, sparse in density, medium to large in size, and sub-rounded to sub-angular in shape. Mineral abundance:
    - Dominant: quartz
    - Common: garnet
    - Very few: muscovite, biotite
    - Rare: grog
    - Very rare: feldspar (plagioclase), olivine, calcite

ZT# 589/1 PPL View



ZT# 589/1 XPL View

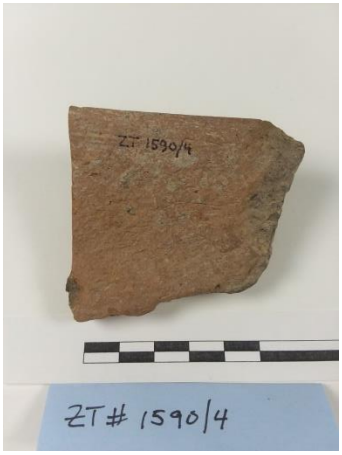


ZT1590/4

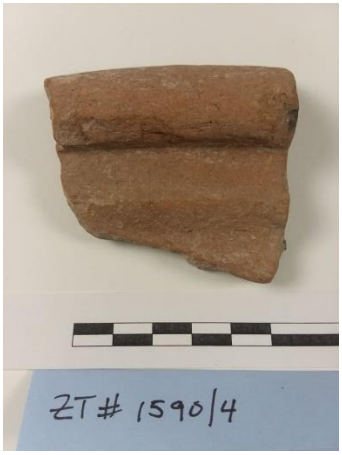
Macroscopic Description:

- This sherd is a bowl rim with a grooved ridge on the exterior. The interior and exterior colors are brown, and the core is gray. The matrix is coarse with common fie white grit and mica. The firing atmosphere is reduced as evidenced by the gray core. The manufacturing method is wheel thrown. There are no surface treatments.

Interior View



Exterior View

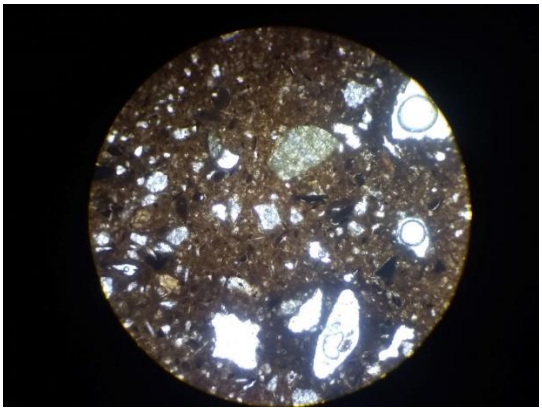


Microscopic Description:

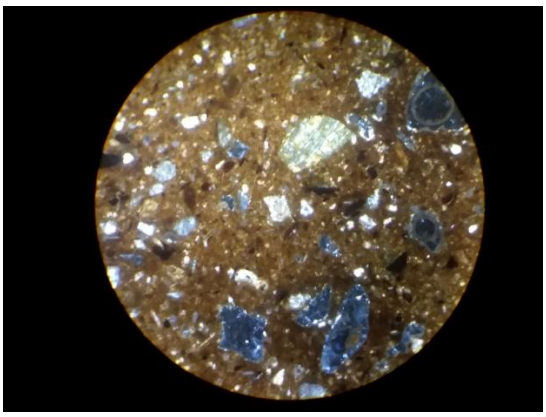
- Microstructure: the matrix had abundant voids that are macrovughs. There are no micritic calcareous infillings.
- Groundmass: the matrix color is uneven. The color ranges from inactive very dark brown to black (PPL) and inactive reddish-brown to very dark brown (XPL). The matrix is coarse with evenly distributed inclusions.

- Inclusions: the inclusions are moderately well sorted, sparse in density, small in size, and rounded to sub-rounded in shape. Mineral abundance:
    - Dominant: quartz
    - Common: biotite
    - Rare: garnet
    - Very rare: sulfate, clinopyroxene, olivine

ZT# 1590/4 PPL View



ZT# 1590/4 XPL View



ZT1581/6

Macroscopic Description:

- This sherd is a bowl rim with grooving on the rim. The exterior is buff/light brown, the interior is pinkish-brown, and the core is light gray. The coarseness is medium with common fine black grit, occasional fine white grit, and common fine mica. The firing atmosphere is slightly reduced as evidenced by the light gray core. The manufacturing

method is wheel thrown. The surface treatment is burnished for both the interior and exterior.

Interior View

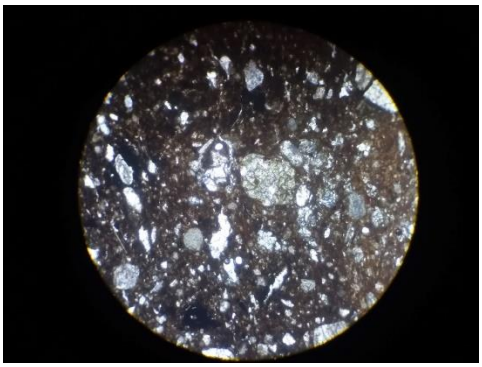
Exterior View

Microscopic Description:

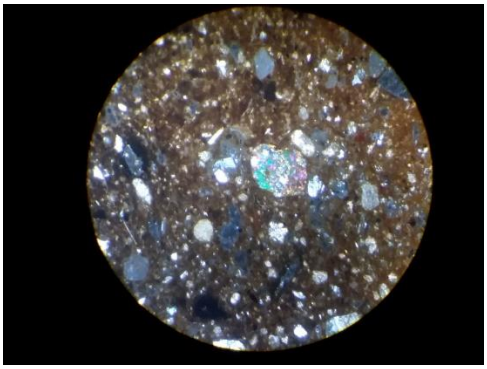
- Microstructure: The matrix has occasional voids that are vesicles, mesovughs, and macrovughs. There are micritic calcareous infillings.
- Groundmass: The matrix color is even. The color is an active brown (PPL) and active yellow-orange-brown (XPL). The coarseness is medium and the inclusions are evenly distributed.
- Inclusions: the inclusions are well sorted, common in density, small to medium in size, and sub-rounded to sub-angular in shape. Mineral abundance:
    - Dominant: quartz
    - Common: feldspar (alkali), garnet, muscovite

- Few: feldspar (plagioclase), amphibole (brown)
- Rare: orthopyroxene, clinopyroxene

ZT# 1581/6 PPL View



ZT# 1581/6 XPL View

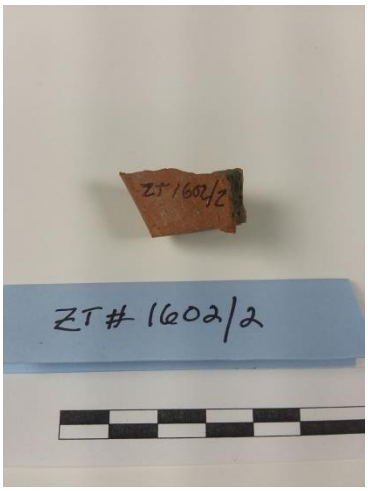


ZT1602/2

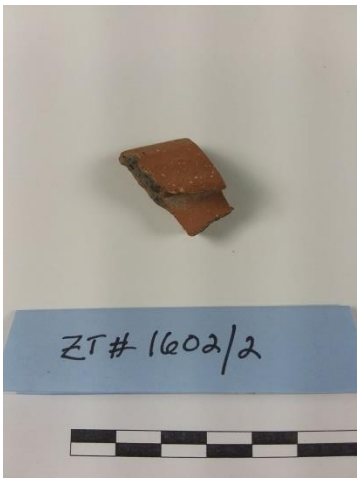
Macroscopic Description:

- This sherd is a bowl rim. The interior and exterior are buff/light brown, and the core is grayish-black. The coarseness is medium with occasional fine black grit, sparse fine white grit, sparse fine mica, and sparse fine vegetal matter. The firing atmosphere is reduced as evidenced by the grayish-black core. The manufacturing method is wheel thrown. The surface treatment is burnished for both the interior and exterior.

Interior View



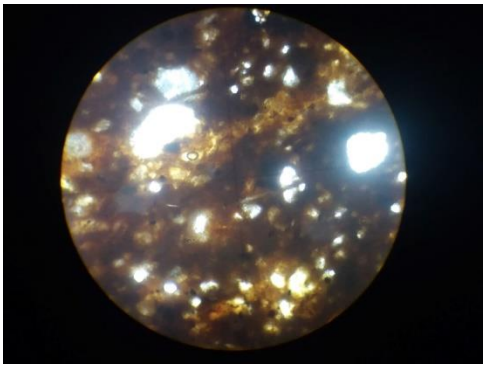
Exterior View



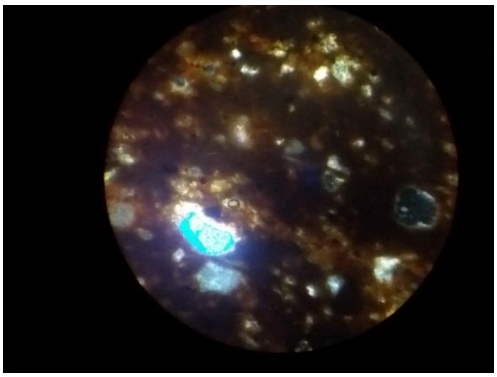
Microscopic Description:

- Microstructure: the matrix has common voids that include vesicles and macrovughs. There are no micritic calcareous infillings.
- Groundmass: The matrix color is uneven. The color ranges from inactive brown to very dark brown (PPL) and inactive orange-brown to black (XPL). The coarseness is medium and the inclusions are fairly even in distribution.
- Inclusions: the inclusions are well sorted, moderate in density, medium to large in size, and sub-rounded in shape. Mineral abundance:
    - Common: Tourmaline
    - Few: quartz, grog, garnet
    - Very few: feldspar (alkali)
    - Very rare: epidote, biotite

ZT# 1602/2 PPL View



ZT# 1602/2 XPL View

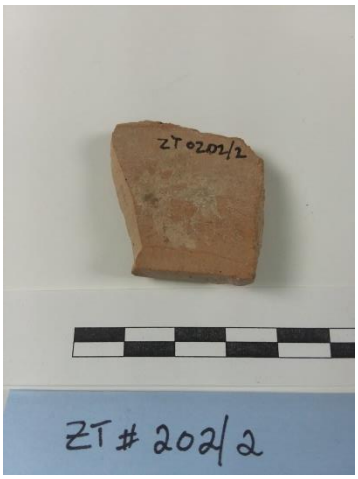


ZT202/2

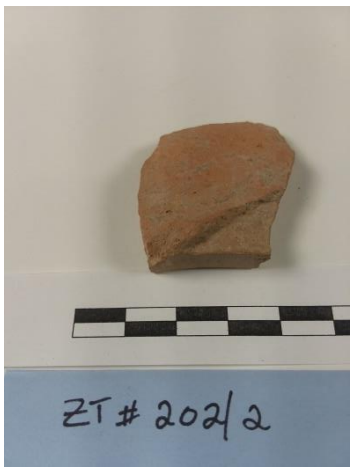
Macroscopic Description:

- This sherd is a body sherd. The interior and exterior are light brown, and the core is pinkish-gray. The coarseness is medium with occasional fine white grit, and occasional fine mica. The firing atmosphere is oxidizing with slight reduction as evidenced by the core color. The manufacturing method is wheel thrown. There are no surface treatments.

Interior View



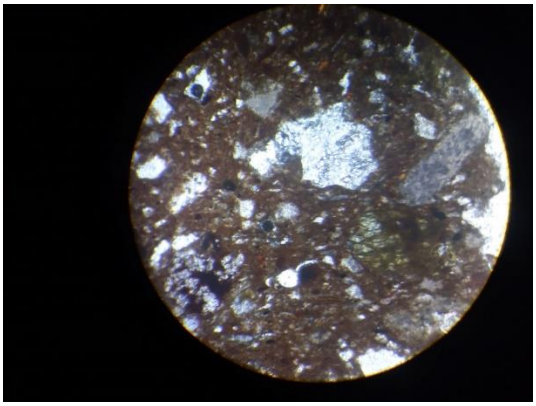
Exterior View



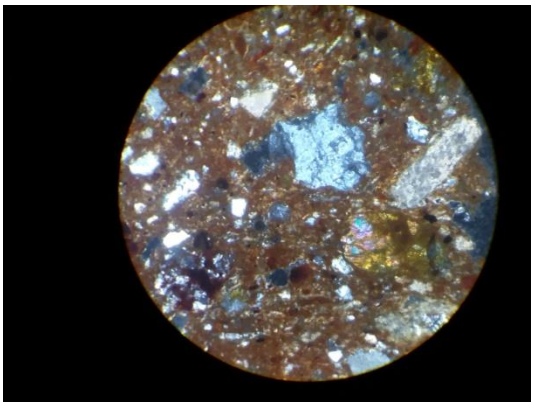
Microscopic Description:

- Microstructure: the matrix has sparse voids that are predominately vesicles with a few megavughs. There are micritic calcareous infillings.
- Groundmass: the matrix is even in color. The color is an inactive brown (PPL) and inactive reddish-brown (XPL). The coarseness is medium and the inclusions are evenly distributed.
- Inclusions: the inclusions are moderately well sorted, rare in density, medium to large in size, and rounded to sub-angular in shape. Mineral abundance:
    - Common: quartz, clinopyroxene
    - Few: garnets, muscovite
    - Very few: feldspar (plagioclase), calcite

ZT# 202/2 PPL View



ZT# 202/2 XPL View



ZT48343/1

Macroscopic Description:

- This sherd is a base sherd. The interior, exterior, and core are all buff/light brown. The coarseness in medium with occasional fine black and white grit, occasional medium white grit, and occasional fine mica. The firing atmosphere is oxidizing. The manufacturing method is wheel thrown. There are no surface treatments.

Interior View

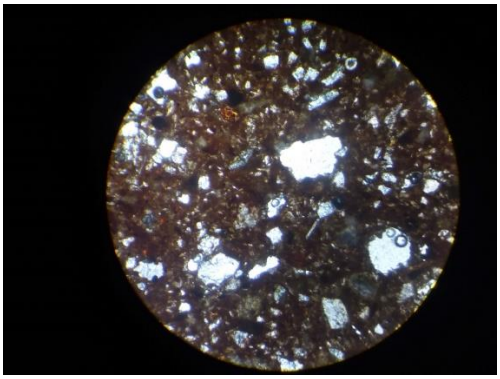
Exterior View

Microscopic Description:

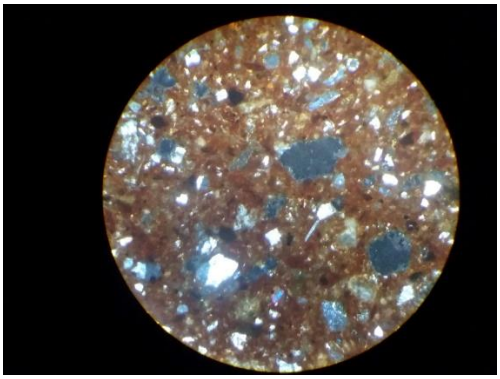
- Microstructure: the matrix has occasional voids that are mesovughs and megavughs. There are micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is an inactive brown (PPL) and inactive reddish-brown (XPL). The coarseness is medium and the inclusions are evenly distributed.
- Inclusions: the inclusions are well sorted, very common in density, small to medium in size except for extra-large pieces of quartz, and sub-angular in shape. Mineral abundance:
    - Dominant: quartz

- Common: garnet
- Few: biotite, feldspar (alkali)
- Rare: amphibole (green), feldspar (plagioclase)
- Very rare: tourmaline, calcite

ZT# 48343/1 PPL View



ZT 48343/1 XPL View



ZT48343/2

Macroscopic Description:

- This sherd is a body sherd with a ridge in the center on the interior. The interior, exterior, and core are buff/light brown in color. The coarseness is medium with sparse medium white grit, occasional fine black grit, and occasional fine mica. The firing atmosphere is oxidizing. The manufacturing method is wheel thrown. There are no surface treatments.

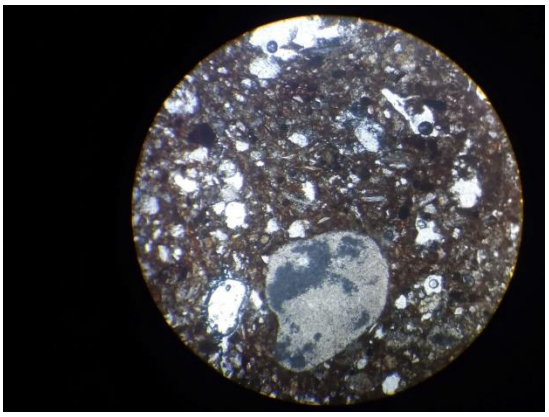
Interior View

Exterior View

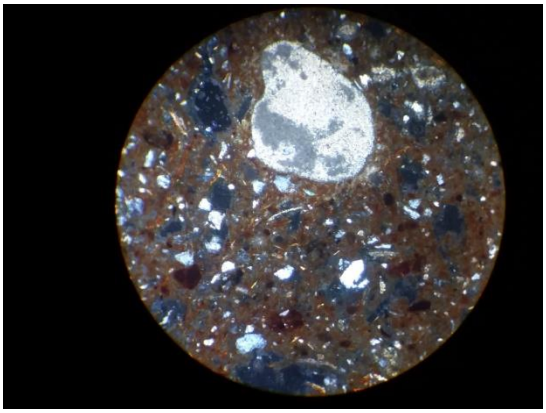
Microscopic Description:

- Microstructure: the matrix has occasional voids that are megavughs and macrovughs. There are no micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is an inactive brown (PPL) and an inactive brown (XPL). The coarseness is medium and the inclusions are evenly distributed.
- Inclusions: the inclusions are well sorted, sparse in density, small to medium in size, and sub-rounded in shape. Mineral abundance:
    - Dominant: quartz
    - Common: garnet, feldspar (alkali)
    - Few: grog, amphibole (green)
    - Rare: feldspar (plagioclase)

ZT# 48343/2 PPL View



ZT# 48343/2 XPL View



ZT48343/3

Macroscopic Description:

- This sherd is a rim sherd with ridges. The interior, exterior and core are buff/light brown in color. The coarseness is medium with occasional medium vegetal matter, common fine white grit, common medium white grit, and common fine mica. The firing atmosphere is oxidizing. The manufacturing method is wheel thrown. The surface treatment is wet-smoothed on the exterior.

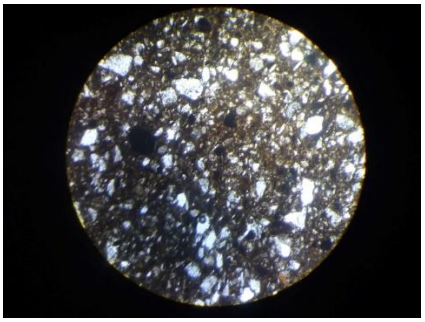
Interior View

Exterior View

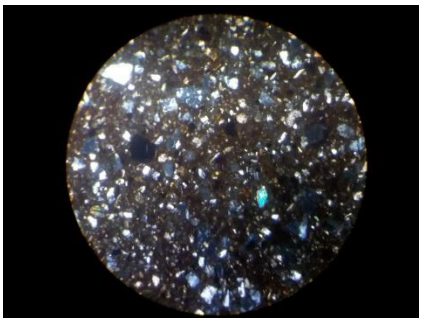
Microscopic Description:

- Microstructure: the matrix has sparse voids that are mostly megavughs with a few vesicles. There are no micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is an inactive brown (PPL) and an inactive grayish-brown (XPL). The coarseness is medium and the inclusions are fairly even in distribution.
- Inclusions: the inclusions are moderately well sorted, moderate in density, small to medium in size, and sub-rounded in shape. Mineral abundance:
    - Dominant: quartz
    - Common: grog, garnet, feldspar (plagioclase)
    - Few: amphibole (brown)
    - Rare: olivine, biotite

ZT# 48343/3 PPL View



ZT# 48343/3 XPL View



ZT48343/4

Macroscopic description:

- This sherd is a body sherd, possible from a base, with a ridge on the interior. The interior, exterior, and core are brown in color. The coarseness is medium with common fine white and black grit, and common fine mica. The firing atmosphere is oxidizing. The manufacturing method is wheel thrown. The surface treatment is wet-smoothed on the exterior.

Interior View

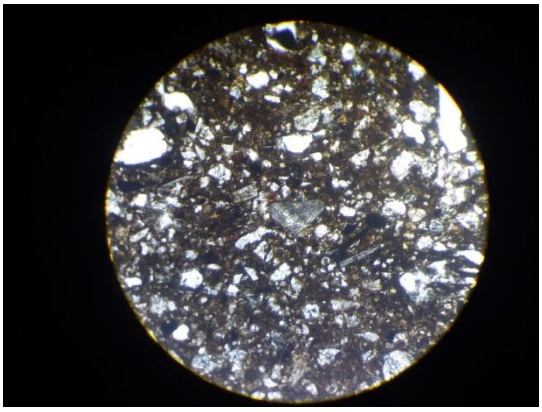
Exterior View

Microscopic Description:

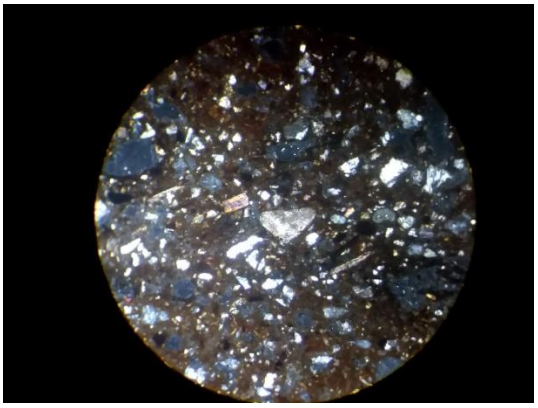
- Microstructure: the matrix has sparse voids that are mainly vesicles with a few megavughs. There are no micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is an inactive brownish-black (PPL) and an inactive very dark brownish-black (XPL). The coarseness is medium and the inclusions are fairly even in distribution.
- Inclusions: the inclusions are moderately well sorted, common in density, medium in size, and sub-rounded to angular in shape. Mineral abundance:

- Dominant: quartz
- Common: garnet, feldspar (alkali)
- Few: olivine, biotite
- Very few: clinopyroxene
- Rare: amphibole (brown)

ZT# 48343/4 PPL View



ZT# 48343/4 XPL View



ZT48343/5

Macroscopic Description:

- This sherd is a body sherd. The exterior is brown, the interior is grayish-brown, and the core is brownish-gray. The coarseness is medium with common fine mica, and common fine white grit. The firing atmosphere is slightly reduced as evidenced by the core color. The manufacturing method is wheel thrown. The surface treatment is burnished on the exterior.

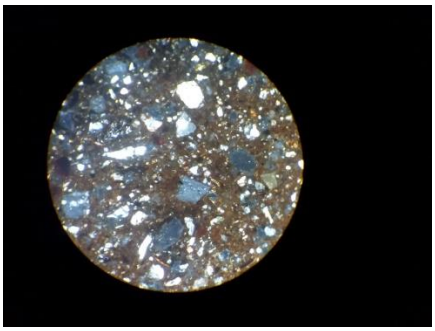
Interior View

Exterior View

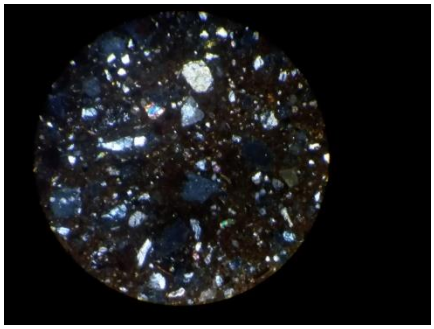
Microscopic Description:

- Microstructure: the matrix has common voids that are macrovughs and megavughs. There are micritic calcareous infillings.
- Groundmass: the matrix color is uneven. The color ranges from an inactive brown to dark brownish-black (PPL) and an inactive brown to dark brown (XPL). The coarseness is medium and the inclusions are evenly distributed.
- Inclusions: the inclusions are well sorted, moderate in density, small to medium in size, and sub-rounded to angular in shape. Mineral abundance:
    - Dominant: quartz
    - Common: feldspar (alkali), garnet
    - Few: biotite, olivine
    - Very few: calcite
    - Rare: epidote
    - Very rare: clinopyroxene

ZT# 48343/5 PPL View



ZT# 48343/5 XPL View



ZT48343/6

Macroscopic Description:

- This sherd is rim sherd with 2 exterior grooves. The interior and exterior are brownish-red, and the core is gray in color. The coarseness is medium with sparse medium white grit, occasional fine black and white grit, and common fine mica. The firing atmosphere is reduced as evidenced by the core color. The manufacturing method is wheel thrown. The surface treatments are burnished on the interior and exterior.

Interior View

Exterior View

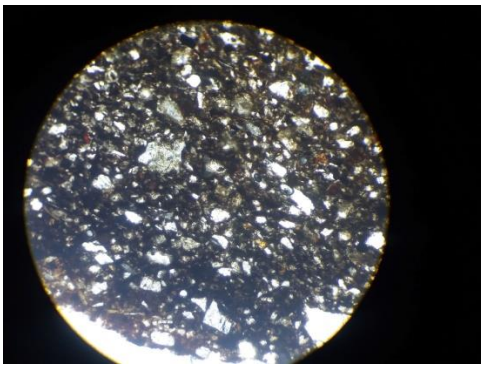
Microscopic Description:

- Microstructure: the matrix has common voids that are macrovughs and megavughs. There are micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is an inactive brownish-black (PPL) and an inactive dark brownish-black (XPL). The coarseness is medium and the inclusions are evenly distributed.
- Inclusions: the inclusions are moderately well sorted, moderate in density, small to medium in size with a few extra-large pieces of quartz, and sub-rounded in shape.

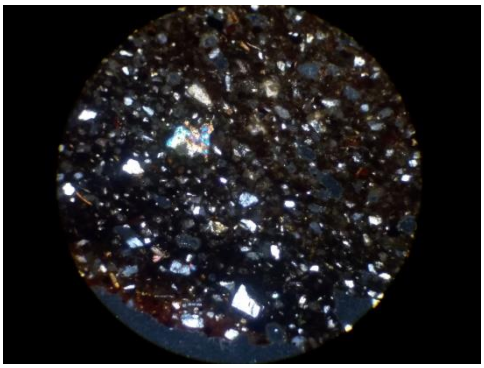
  Mineral abundance:

  - Dominant: feldspar (alkali), calcite
  - Common: quartz, garnet
  - Very few: amphibole (green), olivine, clinopyroxene
  - Rare: grog
  - Very rare: feldspar (plagioclase)

ZT#48343/6 PPL View



ZT#48343/6 XPL View



ZT34249/6

Macroscopic Description:

- This sherd is a rim sherd. The exterior is buff/light brown, and the interior and core are gray in color. The coarseness is medium with occasional fine mica and occasional medium white grit. The firing atmosphere is reduced as evidenced by the core color. The manufacturing method is wheel thrown. The surface treatment is wet-smoothed on the exterior.

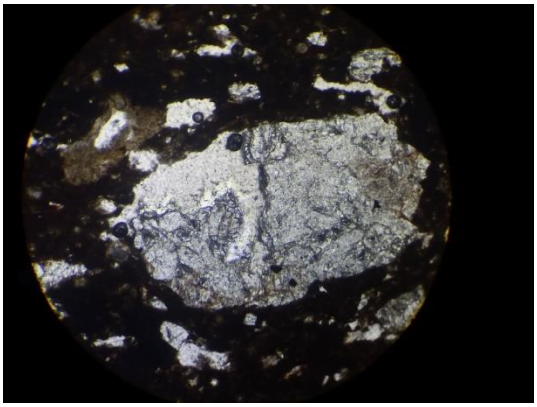
Interior & Exterior View

Microscopic Description:

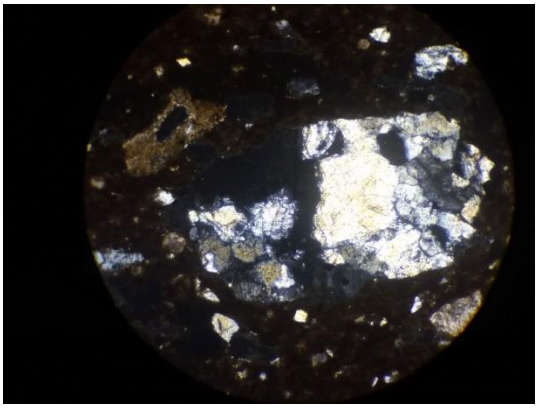
- Microstructure: the matrix has common voids that are mesoplanars and macrovughs. There are micritic calcareous infillings.
- Groundmass: the matrix color is uneven. The color ranges from an inactive brown to dark brownish-black (PPL) and an inactive reddish-brown to dark brown (XPL). The coarseness is medium and the inclusions are fairly even in distribution.

- Inclusions: the inclusions are moderately well sorted, moderate in density, mainly small in size with numerous extra-large pieces of quartz and calcite infillings, and rounded to sub-angular in shape. Mineral abundance:
    - Dominant: quartz, calcite
    - Common: feldspar (alkali)
    - Few: olivine, grog
    - Rare: biotite

ZT# 34249/6 PPL View



ZT# 34249/6 XPL View



ZT503/8

Macroscopic Description:

- This sherd is a beaker rim sherd with part of the shoulder present. The interior, exterior and core are orange-reddish-brown in color. The coarseness is medium with common fine black grit, occasional fine white grit, and common fine mica. The firing atmosphere is

oxidizing. The manufacturing method is wheel thrown. The surface treatment is burnished on the exterior.

Interior View

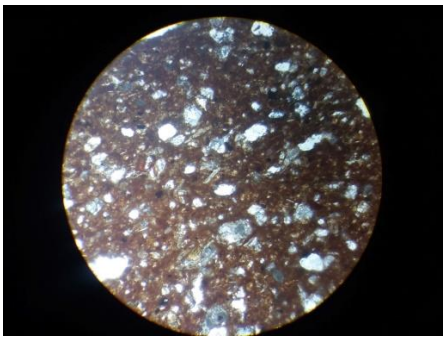
Exterior View

Microscopic Description:

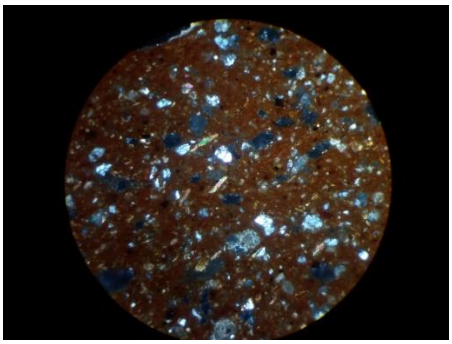
- Microstructure: the matrix has sparse voids that are mainly vesicles with a few mesovughs and microvughs. There are micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is an inactive reddish-brown (PPL) and an inactive reddish-brown (XPL). The coarseness is medium and the inclusions are fairly even in distribution.
- Inclusions: the inclusions are well sorted, common in density, small to medium in size with a few extra-large pieces of grog, and sub-rounded to sub-angular in shape. Mineral abundance:
    - Dominant: calcite

- Common: quartz, amphibole (green), feldspar (alkali), garnet
- Few: grog
- Rare: biotite

ZT# 503/8 PPL View



ZT# 503/8 XPL View



ZT288

Macroscopic Description:

- This sherd is a body sherd with a stamped spiral decoration on the exterior. The interior, exterior, and core are buff/light brown in color. The coarseness is medium with sparse fine mica, and common fine black grit. The firing atmosphere is oxidizing. The manufacturing method is wheel thrown. The surface treatment is wet-smoothed on the exterior.

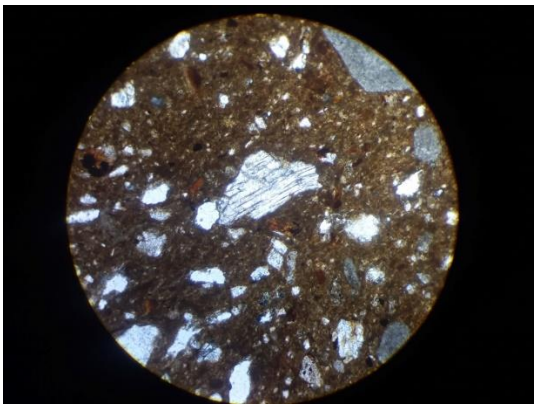
Interior View

Exterior View

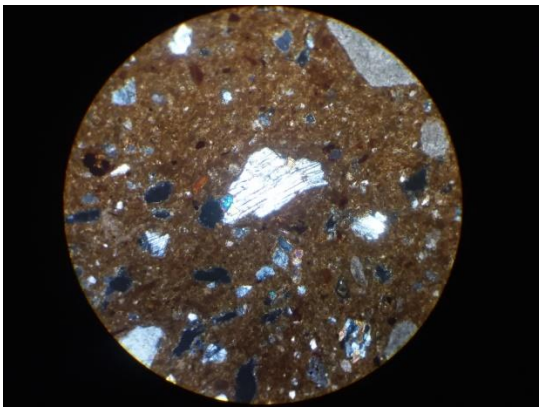
Microscopic Description:

- Microstructure: the matrix has occasional voids that are predominately megavughs with some vesicles. There are micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is an inactive light brown (PPL) and a slightly active light brown (XPL). The coarseness is medium and the inclusions are uneven in distribution.
- Inclusions: the inclusions are poorly sorted, sparse in density, medium to extra-large in size, and sub-rounded in shape. Mineral abundance:
    - Dominant: quartz
    - Common: calcite
    - Few: amphibole (brown), feldspar (alkali and plagioclase), garnet, muscovite
    - Very few: grog
    - Rare: tourmaline, clinopyroxene
    - Very rare: epidote

ZT# 288 PPL View



ZT# 288 XPL View



ZT6003/2

Macroscopic Description:

- This sherd is a bowl rim. The interior and exterior are a reddish-brown, and the core is brown in color. The coarseness is medium with occasional fine white grit, common fine mica, and occasional vegetal matter. The firing atmosphere is oxidizing. The manufacturing method is wheel thrown. The surface treatment is burnished on the interior, and burnished on the body of the exterior, not on the rim.

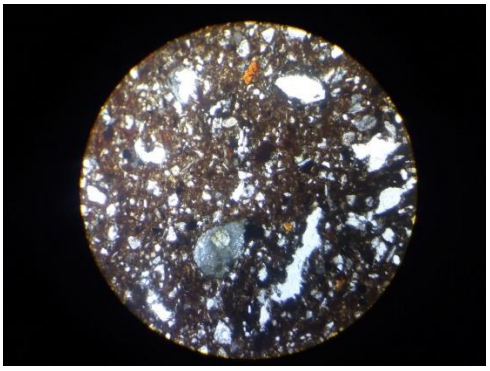
Interior View

Exterior View

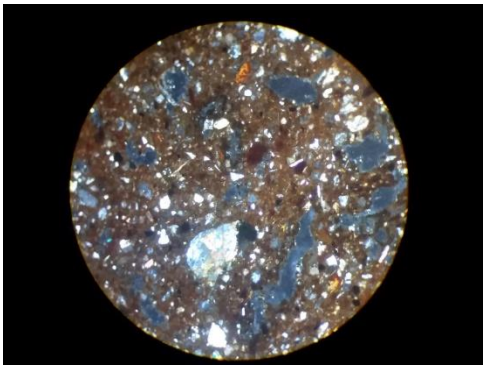
Microscopic Description:

- Microstructure: the matrix has occasional voids that are mesovughs. There are no micritic calcareous infillings.
- Groundmass: the matrix color is uneven. The color rages from an inactive reddish-brown to greenish-brown (PPL) and an inactive reddish-brown to dark brown (XPL). The coarseness is medium and the inclusions are relatively even in distribution.
- Inclusions: the inclusions are well sorted, very common in density, small to medium in size, and sub-angular in shape. Mineral abundance:
    - Dominant: quartz
    - Common: garnet, biotite, feldspar (alkali)
    - Few: feldspar (plagioclase)
    - Very few: amphibole (green), tourmaline

ZT# 6003/2 PPLView



ZT# 6003/2 XPL View



ZT6003/6

Macroscopic Description:

- This sherd is a bowl rim. The interior, exterior, and core are buff/light brown. The coarseness is medium with occasional fine white grit, sparse fine mica, and sparse fine vegetal matter. The firing atmosphere is oxidizing. The manufacturing method is wheel thrown. The surface treatments are burnished on the interior and exterior.

Interior View

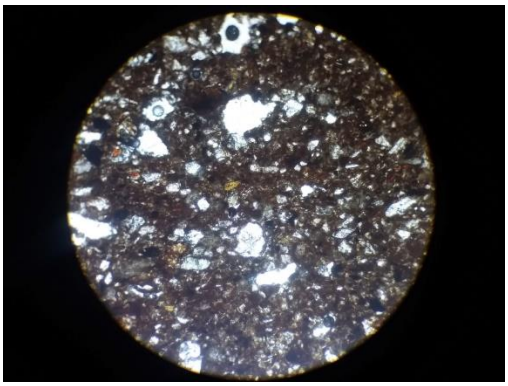
Exterior View

Microscopic Description:

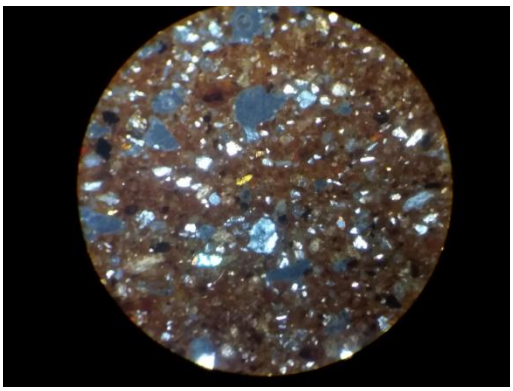
- Microstructure: the matrix has occasional voids that are predominately mesovughs with a few megavughs. There are no micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is and inactive brown (PPL) and an inactive brown (XPL). The coarseness is medium and the inclusions are evenly distributed.

- Inclusions: the inclusions are moderately well sorted, very common in density, small to medium in size, and sub-angular to angular in shape. Mineral abundance:
    - Dominant: feldspar (alkali)
    - Common: garnet
    - Few: quartz, grog
    - Very rare: orthopyroxene, epidote

ZT# 6003/6 PPL View



ZT# 6003/6 XPL View



ZT6015/2

Macroscopic Description:

- This sherd is a bowl rim. The interior, exterior, and core are brown. The coarseness is medium with common fine mica, sparse fine vegetal matter, and sparse medium vegetal

matter. The firing atmosphere is oxidizing. The manufacturing method is wheel thrown. The surface treatment is burnished on the interior.

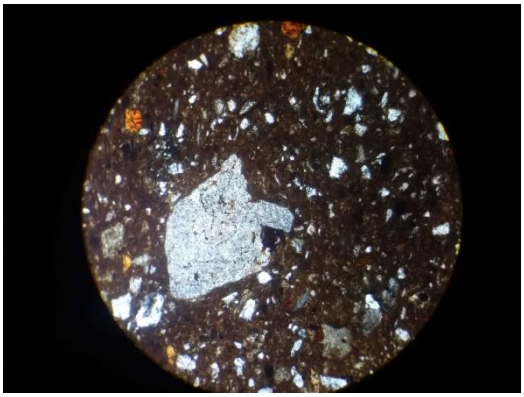
Interior View

Exterior View

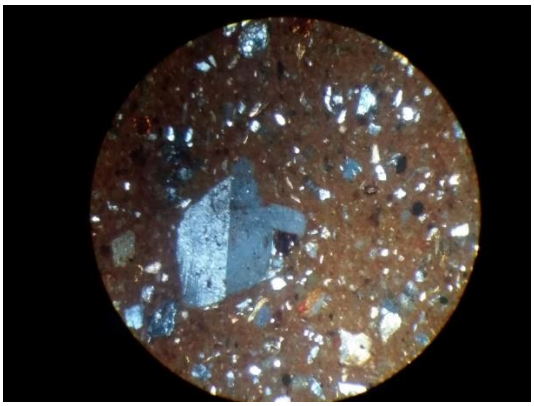
Microscopic Description:

- Microstructure: the matrix has occasional voids that mainly vesicles, with a few megavughs. There are micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is an inactive brown (PPL) and an inactive dark brown (XPL). The coarseness is medium and the inclusions are uneven in distribution.
- Inclusions: the inclusions are poorly sorted, moderate in density, small to medium in size, and sub-angular in shape. Mineral abundance:
    - Common: feldspar (alkali), quartz
    - Few: feldspar (plagioclase), garnet
    - Very few: amphibole (brown)
    - Rare: orthopyroxene, amphibole (green)
    - Very rare: clinopyroxene, calcite

ZT# 6015/2 PPL View



ZT# 6015/2 XPL View



ZT6032/2

Macroscopic Description:

- This sherd is a bowl rim with a ledge for a lid on the interior. The interior, exterior, and core are brown in color. The coarseness is medium with sparse fine white grit, common fine mica, occasional fine vegetal matter, and sparse medium vegetal matter. The firing atmosphere is oxidizing. The manufacturing method if wheel thrown. The surface treatment is slipped on the exterior.

Interior View

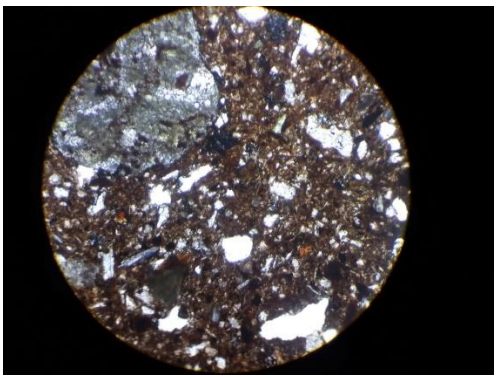
Exterior View

Microscopic Description:

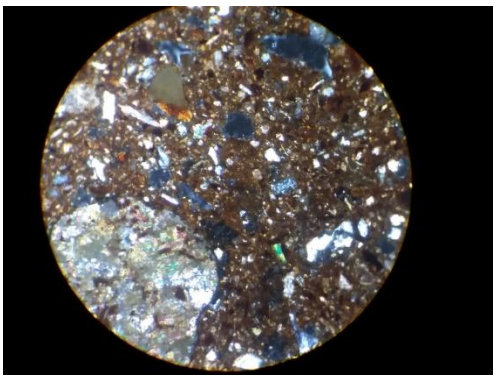
- Microstructure: the matrix has common voids that are mainly megavughs with a few mesovughs and vesicles. There are micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is an inactive brown (PPL) and a slightly active brown (XPL). The coarseness is medium and the inclusions are evenly distributed.
- Inclusions: the inclusions are moderately well sorted, abundant in density, mainly small in size with a few extra-large pieces of tourmaline, and sub-angular to angular in shape.

  Mineral abundance:
  - Dominant: quartz
  - Common: garnet, muscovite
  - Few: feldspar (alkali), calcite
  - Very few: amphibole (green)
  - Rare: clinopyroxene
  - Very rare: tourmaline

ZT# 6032/2 PPL View



ZT# 6032/2 XPL View



ZT6202/5

Macroscopic Description:

- This sherd is a bowl rim. The exterior is pinkish-brown, the interior is light reddish-brown, and the core is brownish-gray in color. The coarseness is medium with common fine black grit, occasional fine mica, and occasional fine and medium vegetal matter. The firing atmosphere is slightly reduced. The manufacturing method is wheel thrown. The surface treatment is wet-smoothed on the exterior.

Interior View

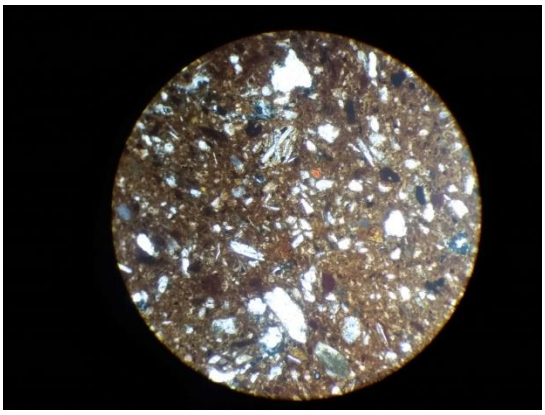
Exterior View

Microscopic Description:

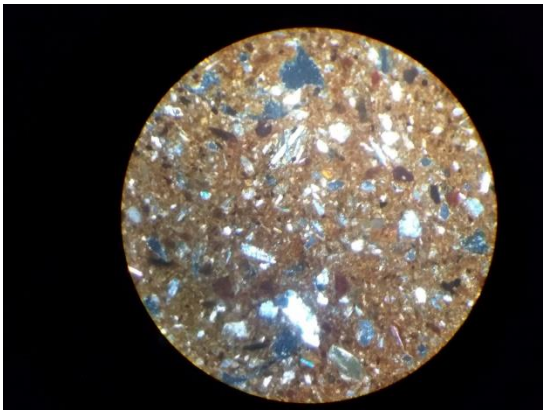
- Microstructure: the matrix has occasional voids that are mostly mega vughs, with a few megaplanars and macroplanars. There are micritic calcareous infillings.
- Groundmass: the matrix color is uneven. The color ranges from an inactive light brown to greenish-brown (PPL) and a slightly active yellowish-brown to greenish-brown (XPL). The coarseness is medium and the inclusions are evenly distributed.

- Inclusions: the inclusions are well sorted, abundant in density, mainly small in size with a few extra-large pieces of quartz, and sub-angular in shape. Mineral abundance:
    - Dominant: quartz
    - Common: feldspar (alkali), muscovite, garnet
    - Few: calcite
    - Very few: orthopyroxene
    - Rare: feldspar (plagioclase)
    - Very rare: tourmaline

ZT# 6202/5 PPL View



ZT# 6202/5 XPL View



ZT6202/7

Macroscopic Description:

- This sherd is a bowl rim. The interior and exterior are brown, and the core is gray in color. The coarseness is medium with common fine black grit, occasional fine white grit,

common fine mica, and occasional fine vegetal matter. The firing atmosphere is reduced as evidenced by the core color. The manufacturing method is wheel thrown. The surface treatment is wet-smoothed on the exterior.

Interior View

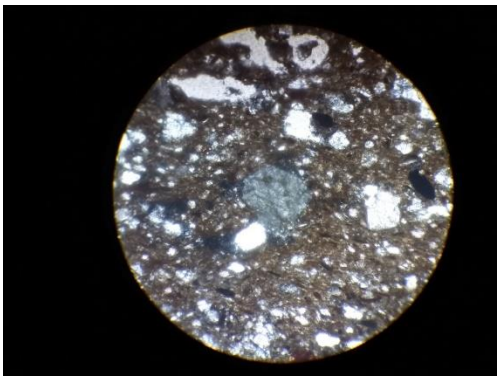
Exterior View

Microscopic Description:

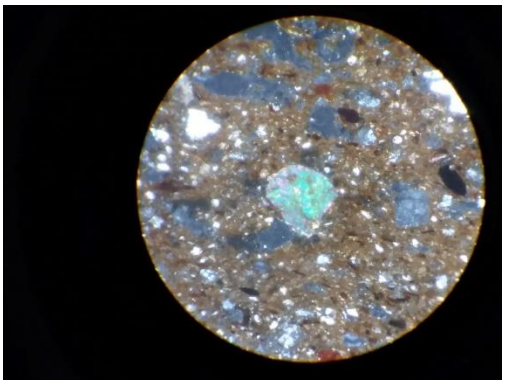
- Microstructure: the matrix has common voids that are mostly megavughs with a few macrovughs. There are micritic calcareous infillings.
- Groundmass: the matrix color is uneven. The color ranges from and inactive brown to greenish-brown to brownish-black (PPL) and an inactive brown to black (XPL). The coarseness is medium and the inclusions are evenly distributed.
- Inclusions: the inclusions are poorly sorted, common in density, found in every size from small to extra-large, and sub-rounded. Mineral abundance:
    - Dominant: quartz
    - Common: feldspar (plagioclase), muscovite, garnet
    - Few: feldspar (alkali), clinopyroxene

- Very few: calcite
- Rare: epidote
- Very rare: sulfate

ZT# 6202/7 PPL View



ZT# 6202/7 XPL View



ZT8180/2

Macroscopic Description:

- This sherd is a bowl rim. The interior, exterior, and core are brown in color. The coarseness is fine with occasional fine black and white grit, and sparse medium mica. The firing atmosphere is oxidizing. The manufacturing method is wheel thrown. The surface treatment is heavy burnishing on the interior and exterior.

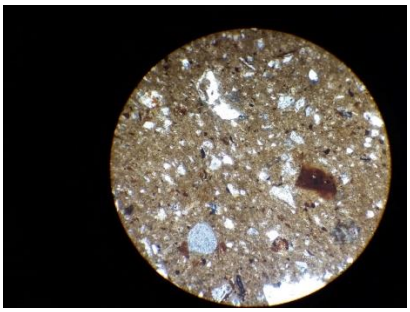
Interior View

Exterior View

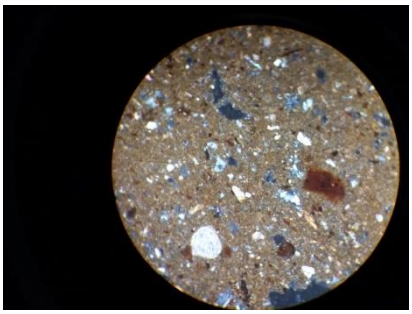
Microscopic Description:

- Microstructure: that matrix rarely has voids and they are primarily vesicles with a very few megavughs. There are micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is an inactive light brown (PPL) and a slightly active yellowish-brown (XPL). The coarseness is fine and the inclusions are fairly even in distribution.
- Inclusions: the inclusions are moderately well sorted, sparse in density, small in size, ad rounded to angular in shape. Mineral abundance:
    - Dominant: quartz
    - Common: garnet
    - Few: feldspar (alkali), muscovite
    - Very few: orthopyroxene
    - Rare: calcite, epidote

ZT# 8180/2 PPL View



ZT# 8180/2 XPL View



ZT519/1

Macroscopic Description:

- This sherd is a bowl rim. The exterior is reddish-gray, the interior and core are buff/light brown. The coarseness is medium with occasional fine black grit, and common fine mica. The firing atmosphere is oxidizing. The manufacturing method is wheel thrown. The surface treatment is burnished on the interior and exterior.

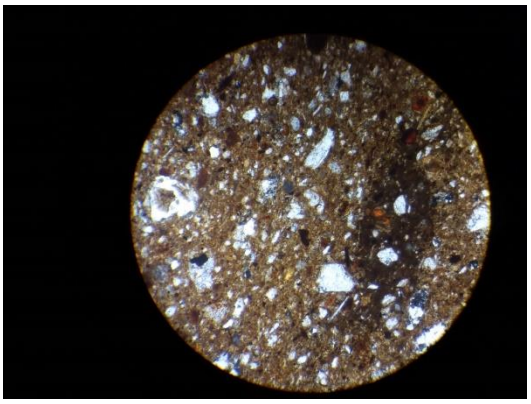
Interior View

Exterior View

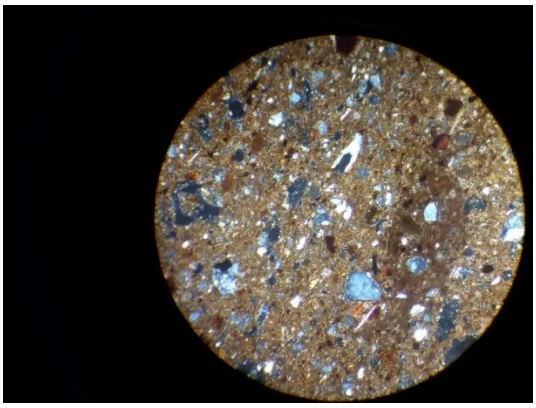
Microscopic Description:

- Microstructure: the matrix has occasional voids that are mesovughs and macrovughs. There are micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is an inactive yellowish-brown (PPL) and a slightly active yellowish-brown (XPL). The coarseness is medium and the inclusions are evenly distributed.
- Inclusions: the inclusions are moderately well sorted, common in density, small to medium in size, and sub-rounded to angular in shape. Mineral abundance:
    - Dominant: feldspar (alkali)
    - Common: muscovite, garnet, quartz
    - Few: feldspar (plagioclase), orthopyroxene
    - Very few: tourmaline, calcite

ZT# 519/1 PPL View



ZT# 519/1 XPL View



ZT5718/2

Macroscopic Description:

- This sherd is bowl rim. The interior, exterior, and core are light reddish-brown in color. The coarseness is fine with occasional fine black grit, and sparse fine mica. The firing atmosphere is oxidizing. The manufacturing method is wheel thrown. The surface treatment is burnished for the interior and exterior.

Interior View

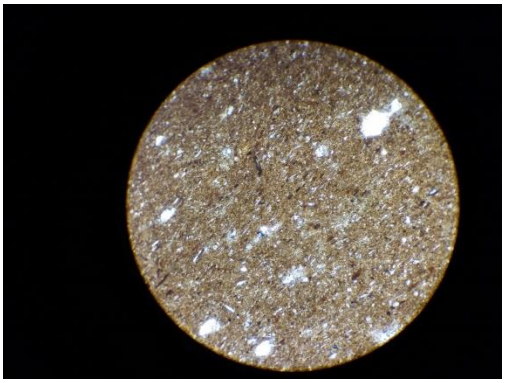
Exterior View

Microscopic Description:

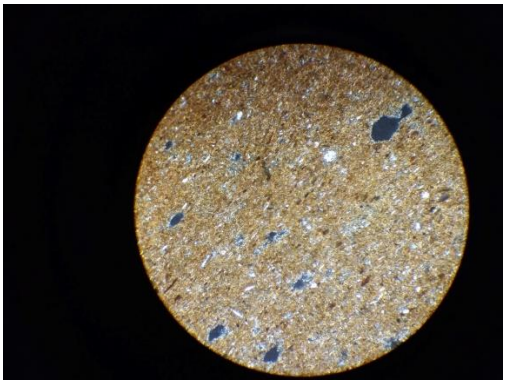
- Microstructure: the matrix has sparse voids with a few mesovughs and a nearly continuous planar void along the top edge of the sherd. There are micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is an inactive light brown (PPL) and an active light brown (XPL). The coarseness is very fine and the inclusions are evenly distributed.

- Inclusions: the inclusions are well sorted, rare in density, small in size, and angular in shape. Mineral abundance:
    - Dominant: clinopyroxene, orthopyroxene
    - Common: calcite, muscovite, epidote
    - Very few: feldspar (alkali)

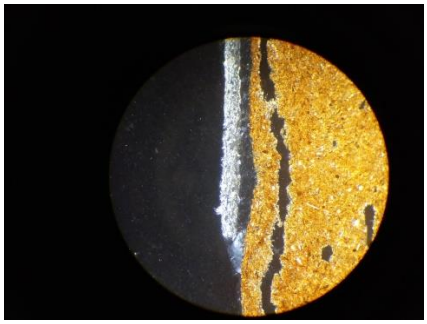
ZT# 5718/2 PPL View



ZT# 5718/2 XPL Main View



ZT# 5718/2 XPL View Continuous Void



ZT5815/1

Macroscopic Description:

- This sherd is a bowl rim with red paint on the interior. The interior, exterior, and core are light brown in color. The coarseness is medium with common fine mica, and common fine black grit. The firing atmosphere is oxidizing. The manufacturing method is wheel thrown. The surface treatment is burnished on the interior and exterior.

Interior View

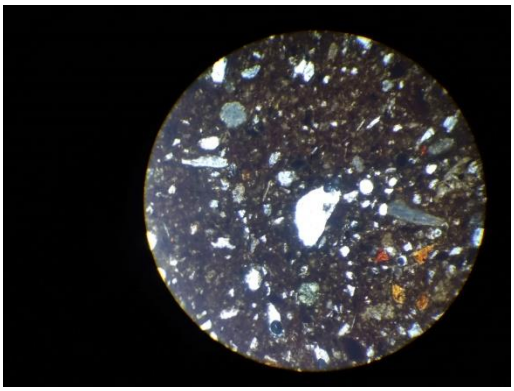
Exterior View

Microscopic Descriptions:

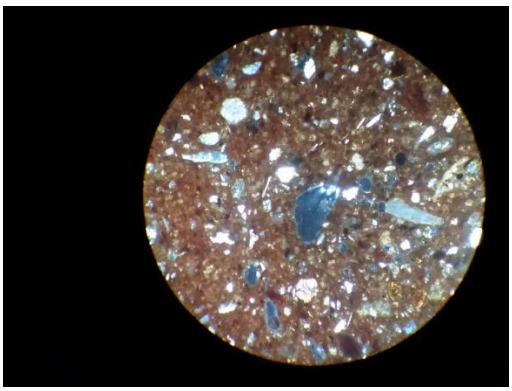
- Microstructure: the matrix has sparse voids that are mesovughs. There are no micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is an inactive brown (PPL) and an inactive brown (XPL). The coarseness is medium and the inclusions are evenly distributed.
- Inclusions: the inclusions are poorly sorted, common in density, small in size, and sub-rounded in shape. Mineral abundance:

- Dominant: quartz
- Common: feldspar (alkali), garnet
- Few: biotite
- Rare: feldspar (plagioclase), orthopyroxene, clinopyroxene
- Very rare: epidote, tourmaline

ZT# 5815/1 PPL View



ZT# 5815/1 XPL View



ZT173/1

Macroscopic Description:

- This sherd is a bowl rim that is chaff tempered. The interior, exterior, and core are light reddish-brown in color. The coarseness is medium with common fine white grit, sparse medium white grit, occasional fine mica, and common fine vegetal matter. The firing

atmosphere is oxidizing. The manufacturing method is wheel thrown. There are no surface treatments.

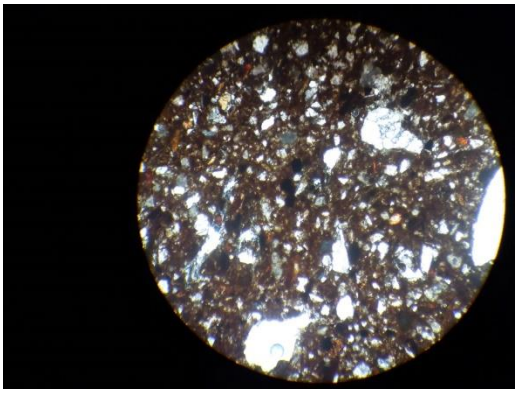
Interior View

Exterior View

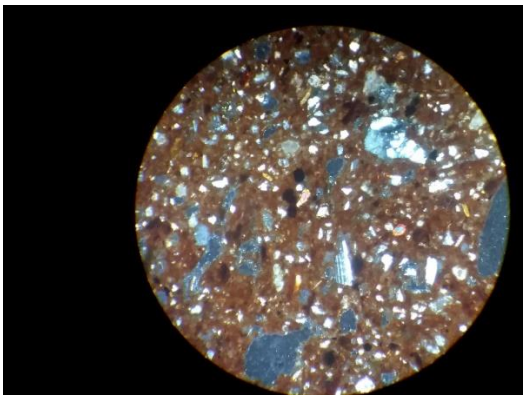
Microscopic Description:

- Microstructure: the matrix has common voids that are evenly divided by vesicles, macrovughs, and megavughs. There are no micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is an inactive brown (PPL) and an inactive brown (XPL). The coarseness is medium and the inclusions are evenly distributed.
- Inclusions: the inclusions are well sorted, common in density, small in size, and sub-rounded in shape. Mineral abundance:
    - Dominant: quartz
    - Common: feldspar (alkali), garnet
    - Few: feldspar (plagioclase), grog, clinopyroxene
    - Rare: olivine

ZT# 173/1 PPL View



ZT# 173/1 XPL View



ZT2205/3

Macroscopic Description:

- This sherd is a bowl rim. The interior, exterior and core are reddish-brown in color. The coarseness is medium with common fine black grit, sparse fine white grit, common fine mica, and sparse vegetal matter. The firing atmosphere is oxidizing. The manufacturing method is wheel thrown. There are no surface treatments.

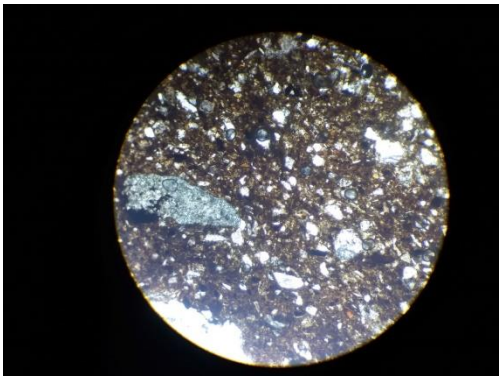
Interior View

Exterior View

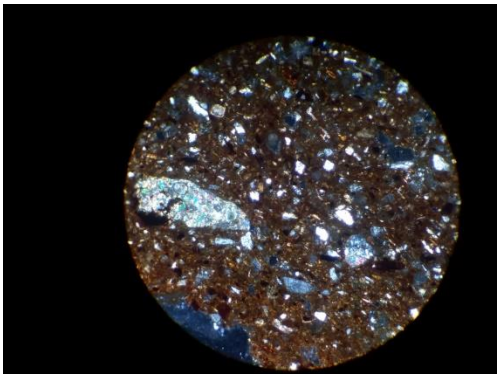
Microscopic Description:

- Microstructure: the matrix has occasional voids that are mostly mesovughs with a few megavughs. There are micritic calcareous infillings.
- Ground structure: the matrix color is even. The color is an inactive brown (PPL) and an inactive brown (XPL). The coarseness is medium and the inclusions are evenly distributed.
- Inclusions: the inclusions are well sorted, very common in density, small sub-rounded and extra-large angular (quartz) in size and shape. Mineral abundance:
    - Dominant: quartz
    - Common: feldspar (alkali), muscovite, garnet
    - Few: clinopyroxene
    - Rare: calcite, epidote, amphibole (green)

ZT# 2205/3 PPL View



ZT# 2205/3 XPL View



ZT5738/1

Macroscopic Description:

- This sherd is a rim sherd with a gray encrustation on the interior and rim. The interior, exterior, and core are light reddish-brown in color. The coarseness is medium with common fine black and white grit, and occasional fine vegetal matter. The firing atmosphere is oxidizing. The manufacturing method is wheel thrown. The surface treatment is slipped on the exterior.

Interior View

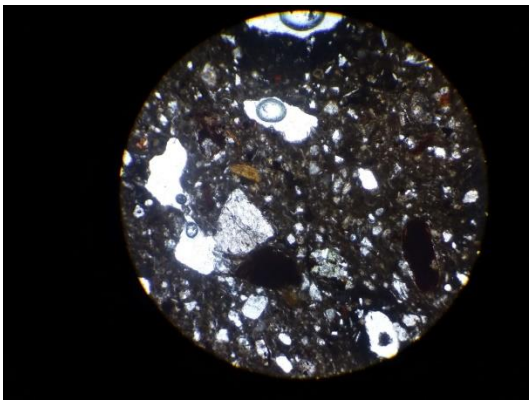
Exterior View

Microscopic Description:

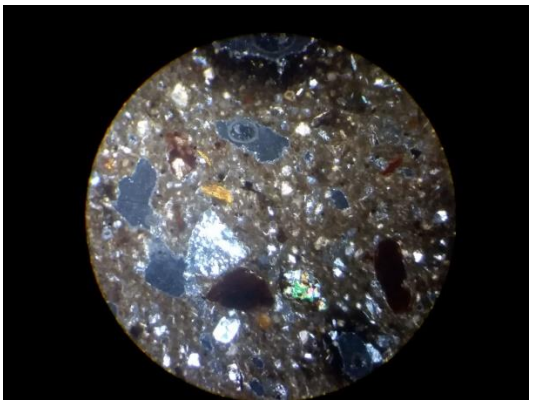
- Microstructure: the matrix has occasional voids that are megavughs and macroplanars. There are micritic calcareous infillings.
- Groundmass: the matrix color is even. The matrix color is an inactive greenish-gray (PPL) and an inactive dark greenish gray (XPL). The slip color is brown in both PPL and XPL. The coarseness is medium and the inclusions are evenly distributed.
- Inclusions: the inclusions are moderately well sorted, sparse in density, small to medium in size, and sub-angular in shape. Mineral abundance:

- Dominant: quartz
- Common: feldspar (alkali), garnet
- Few: amphibole (green)
- Very few: clinopyroxene
- Rare: olivine, calcite

ZT# 5738/1 PPL View



ZT# 5738/1 XPL View



ZT6003/5

Macroscopic Description:

- This sherd is a bowl rim. The interior, exterior, and core are brown in color. The coarseness is medium with occasional fine black grit, sparse fine mica, sparse fine vegetal matter, and sparse medium vegetal matter. The firing atmosphere is oxidizing. The manufacturing method is wheel thrown. The surface treatment is burnished on the interior and exterior.

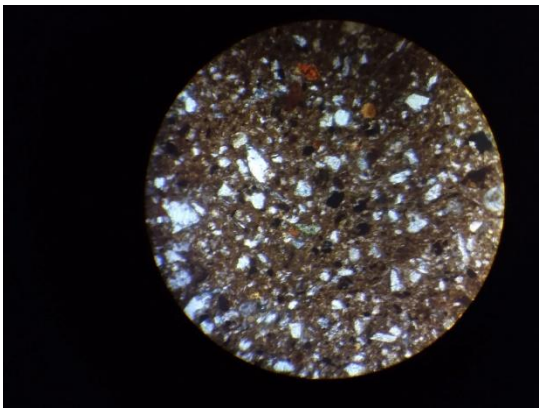
Interior View

Exterior View

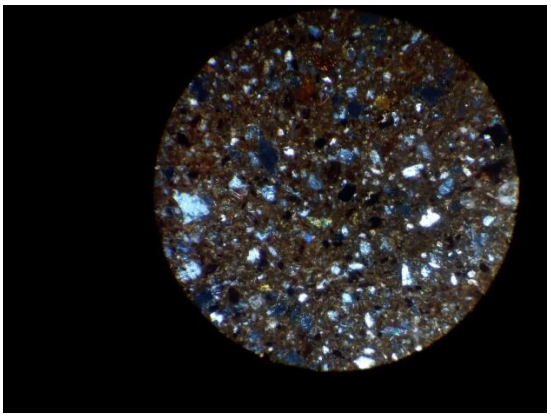
Microscopic Description:

- Microstructure: the matrix has sparse voids that are mostly mesovughs with a few macrovughs. There are no micritic calcareous infillings.
- Groundmass: the matrix color is even. The color is an inactive light brown (PPL) and a slightly active orange-brown (XPL). The coarseness is medium and the inclusions are evenly distributed.
- Inclusions: the inclusions are well sorted, common in density, small to medium in size, and sub-rounded to angular in shape. Mineral abundance:
    - Dominant: quartz
    - Common: feldspar (alkali), garnet
    - Few: muscovite, clinopyroxene, orthopyroxene
    - Rare: tourmaline

ZT# 6003/5 PPL View



ZT# 6003/5 XPL View



5. Results

The results from the macroscopic and microscopic analysis reveal the samples to be homogenous with only three of the sherds standing out as separate from the 30 samples analyzed. Sherds ZT134 and ZT5718/2 are both very fine in macroscopic and microscopic coarseness. The clay matrix for both of these thin sections is unlike the rest of the thin sections examined. The matrix was very dense, and minerals were extremely small and fragmented. These thin sections had the least amount of different minerals present at 5 total mineral types: ZT134 contained quartz, feldspar (alkali), garnet, biotite, and brown amphibole. ZT5718/2 was a standout for not having any quartz, but containing feldspar (alkali), clinopyroxene, orthopyroxene, muscovite, and epidote. Sherd ZT1590/4 was designated as coarse mainly due to the abundant amount of voids present, but otherwise should be considered as consistent with the rest of the sherds.

To aid in analysis, a microscopic mineral graph was constructed with information from all of the samples to see the overall pattern of mineral inclusion for each thin section (Fig. 3), as well as a macroscopic features graph (Fig. 4) that could be sorted to see trends in the main fabric.

Based on the microscopic analysis, the main fabric is generally medium in coarseness with the dominant minerals being quartz, garnet, and feldspar, which were found in 29 out of 30 (96%) of the thin sections. A majority of the samples, 17 out of 30, had calcite deposits that were predominately located inside void space, or combined with other minerals. The least represented mineral was sulfate, which was present in only 3 of the sections (10%).

A few of the thin sections (8 in total) have a slightly active to active matrix color: ZT6003/5, ZT5718/2, ZT519/1, ZT8180/2, ZT6202/5, ZT6032/2, ZT288, ZT1581/6, where the matrix shows birefringent properties. The fabric color is various shades of brown among all the samples, with 8 of the sherds being fired in a reduced atmosphere, and 22 in an oxidizing atmosphere. All of the samples were manufactured using the fast wheel manufacturing method. For surface treatments 6 out of 30 sherds (20%) had no surface treatment on the interior or exterior, 8 out of 30 (26%) were wet-smoothed on the exterior with one of these also wet-smoothed on the interior. Only one sherd was obviously slipped, ZT6202/5. The most common surface treatment feature in the samples from Ziyaret Tepe was the presence of burnishing on the exterior of the sherds on 14 out of 30 samples (46%), of which 11 (36%) of those are also burnished on the interior. This feature is not common among contemporary pottery from the Assyrian heartland.

6. Conclusion

The pottery designated as Plain Simple Ware from Ziyaret Tepe is comparable to contemporary pottery that is designated as Common Ware or Simple Ware from other Assyrian sites. The macroscopic descriptions are consistent in color, both in matrix color and the two-

toned effect produced by a reduced atmosphere, coarseness and the presence of grog, and manufacturing method. The pottery at Ziyaret Tepe is unique, as stated above, by the presence of burnishing. This feature would be worth exploring in other sites if possible, to see whether the feature is indicative of the local population, or of the deportees that were certainly in residence at Ziyaret Tepe. The microscopic descriptions are consistent with the geomorphology of the area, suggesting a local source for raw material for pottery production. The next step will be to conduct a macroscopic and petrographic analysis on the pottery designated as “Palace Ware” to see if these artifacts were also produced locally, and if they are comparable to contemporary pottery from other Assyrian sites.

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Figure 3 - Microscopic Minerals

The number 1 indicates the presence of a particular mineral, 0 indicates the absence of a particular mineral

Figure 3	ZT134	ZT2104/1	ZT589/1	ZT1590/4	ZT1581/6	ZT1602/2	ZT202/2	ZT48343/1	ZT48343/2	ZT48343/3	ZT48343/4	ZT48343/5	ZT48343/6	ZT34249/6	ZT503/8
Quartz	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Feldspar - Alkali	1	1	0	0	1	1	0	1	1	0	1	1	1	1	1
Feldspar - Plagioclast	0	0	1	0	1	0	1	1	1	1	0	0	1	0	0
Clinopyroxene	0	0	0	1	1	0	1	0	0	0	1	1	1	0	0
Orthopyroxene	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Amphibole	1	0	0	0	1	0	0	1	1	1	1	0	1	0	1
Tourmaline	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Olivine	0	0	1	1	0	0	0	0	0	1	1	1	1	1	0
Garnet	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Epidote	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
Calcite	0	1	1	0	0	0	1	1	0	0	0	1	1	1	1
Sulfate	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Biotite	1	0	1	1	0	1	0	1	0	1	1	1	0	1	1
Muscovite	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0
Grog	0	1	1	0	0	1	1	0	1	1	0	0	1	1	1
total# of minerals	5	7	8	6	8	7	7	8	6	7	7	8	9	7	7

Figure 3 - Microscopic Minerals

The number 1 indicates the presence of a particular mineral, 0 indicates the absence of a particular mineral

ZT288	ZT6003/2	ZT6003/6	ZT6015/2	ZT6032/2	ZT6202/5	ZT6202/7	ZT8180/2	ZT519/1	ZT5718/2	ZT5815/1	ZT173/1	ZT2205/3	ZT5738/1	ZT6003/5	Totals
1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	29
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	26
1	1	0	1	0	1	1	0	1	0	1	1	0	0	0	15
1	0	0	1	1	0	1	0	0	1	1	1	1	1	1	15
0	0	1	1	0	1	0	1	1	1	1	0	0	0	1	8
1	1	0	1	1	0	0	0	0	0	0	0	1	1	0	15
1	1	0	0	1	1	0	0	1	0	1	0	0	0	1	8
0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	9
1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	29
1	0	1	0	0	0	1	1	0	1	1	0	1	0	0	9
1	0	0	1	1	1	1	1	1	0	0	0	1	1	0	17
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3
0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	14
1	0	0	0	0	1	1	1	1	1	0	0	1	0	1	11
1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	12
11	7	6	8	8	8	9	7	8	5	9	7	8	7	7	

Figure 4 - Macroscopic Descriptions

Figure 4	Color - Int.	Color - Ext.	Color - Core	Coarseness	Black Grit	White Grit	Mica
ZT1590/4	Brown	Brown	Gray	Coarse		Common - fine	Common - fine
ZT134	Buff/Light Brown	Buff/Light Brown	Buff/Light Brown	Fine	Sparse - fine	Sparse - fine	Occasional - fine
ZT5718/2	Light Reddish-brown	Light Reddish-brown	Light Reddish-brown	Fine	Occasional - fine		Sparse - fine
ZT1581/6	Pinkish-brown	Light Brown	Light Gray	Medium	Common - fine	Occasional - fine	Common - fine
ZT6003/2	Reddish-brown	Reddish-brown	Brown	Medium		Occasional - fine	Common - fine
ZT6003/6	Pinkish-brown	Pinkish-brown	Pinkish-brown	Medium		Occasional - fine	Sparse - fine
ZT8180/2	Brown	Brown	Brown	Medium	Occasional - fine	Occasional - fine	Sparse - medium
ZT519/1	Buff/Light Brown	Reddish - gray	Buff/Light Brown	Medium	Occasional - fine		Common - fine
ZT5815/1	Buff/Light Brown	Buff/Light Brown	Buff/Light Brown	Medium	Common - fine		Common - fine
ZT6003/5	Brown	Brown	Brown	Medium	Occasional - fine		Sparse - fine
ZT1602/2	Buff/Light Brown	Buff/Light Brown	Black-Gray	Medium	Occasional - fine	Sparse - fine	Sparse - fine
ZT48343/6	Brownish-Red	Brownish-Red	Gray	Medium	Occasional - fine	Occasional - fine, Sparse - medium	Common - fine
ZT48343/5	Gray-Brown	Brown	Brownish-Gray	Medium		Common - fine	Common - fine
ZT503/8	Orange-reddish-brown	Orange-reddish-brown	Orange-reddish-brown	Medium	Common - fine	Occasional - fine	Common - fine
ZT5738/1	Light Reddish-brown	Light Reddish-brown	Light Reddish-brown	Medium	Common - fine	Common - fine	
ZT6015/2	Brown	Brown	Brown	Medium			Common - fine
ZT202/2	Buff/Light Brown	Buff/Light Brown	Pinkish-Gray	Medium		Occasional - fine	Occasional - fine
ZT48343/1	Buff/Light Brown	Buff/Light Brown	Buff/Light Brown	Medium	Occasional - fine	Occasional - fine & medium	Occasional - fine
ZT48343/2	Buff/Light Brown	Buff/Light Brown	Buff/Light Brown	Medium	Occasional - fine	Sparse - medium	Occasional - fine
ZT173/1	Light Reddish-brown	Light Reddish-brown	Light Reddish-brown	Medium		Common - fine, Sparse - medium	Occasional - fine
ZT2205/3	Reddish-brown	Reddish-brown	Reddish-brown	Medium	Common - fine	Sparse - fine	Common - fine
ZT6202/5	Pinkish-brown	Reddish-brown	Brownish-Gray	Medium	Common - fine		Occasional - fine
ZT48343/3	Buff/Light Brown	Buff/Light Brown	Buff/Light Brown	Medium		Common - fine & medium	Common - fine
ZT48343/4	Brown	Brown	Brown	Medium	Common - fine	Common - fine	Common - fine
ZT288	Buff/Light Brown	Buff/Light Brown	Buff/Light Brown	Medium	Common - fine		Sparse - fine
ZT6032/2	Brown	Brown	Brown	Medium		Sparse - fine	Common - fine
ZT589/1	Brown	Brown	Gray	Medium	Common - fine	Common - fine	Occasional - fine
ZT34249/6	Buff/Light Brown	Gray	Gray	Medium		Occasional - medium	Occasional - fine
ZT6202/7	Brown	Brown	Gray	Medium	Common - fine	Occasional - fine	Common - fine
ZT2104/1	Gray-Brown	Gray	Gray	Medium	Occasional - fine	Common - fine	

Figure 4 - Macroscopic Descriptions

Vegetal	Firing	Mfg Meth.	Surface Treatment - Int.	Surface Treatment - Ext.
	Reduced	Wheel	None	None
	Oxidizing	Wheel	Burnished	Burnished
	Oxidizing	Wheel	Burnished	Burnished
	Oxidizing	Wheel	Burnished	Burnished
Occasional - fine	Oxidizing	Wheel	Burnished	Burnished
Sparse - fine	Oxidizing	Wheel	Burnished	Burnished
	Oxidizing	Wheel	Burnished	Burnished
	Oxidizing	Wheel	Burnished	Burnished
	Oxidizing	Wheel	Burnished	Burnished
Sparse - fine, Sparse - medium	Oxidizing	Wheel	Burnished	Burnished
Sparse - fine	Reduced	Wheel	Burnished	Burnished
	Reduced	Wheel	Burnished	Burnished
	Oxidizing	Wheel	None	Burnished
	Oxidizing	Wheel	None	Burnished
Occasional - fine	Oxidizing	Wheel	None	Burnished
Sparse - fine	Oxidizing	Wheel	Burnished	None
	Oxidizing	Wheel	None	None
	Oxidizing	Wheel	None	None
	Oxidizing	Wheel	None	None
Common - fine	Oxidizing	Wheel	None	None
Sparse - fine	Oxidizing	Wheel	None	None
Occasional - fine	Reduced	Wheel	None	Slipped
Occasional - fine	Oxidizing	Wheel	None	Wet-smoothed
	Oxidizing	Wheel	None	Wet-smoothed
	Oxidizing	Wheel	None	Wet-smoothed
Occasional - fine	Oxidizing	Wheel	None	Wet-smoothed
Occasional - fine	Reduced	Wheel	None	Wet-smoothed
	Reduced	Wheel	None	Wet-smoothed
Occasional - fine	Reduced	Wheel	None	Wet-smoothed
	Reduced	Wheel	Wet-smoothed	Wet-smoothed