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Faience beads from Early Bronze Age contexts at Tell es-Safi/Gath, Israel

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ABSTRACT

A total of thirty-eight beads, including one pendant securely dated to the Early Bronze Age III, were recently unearthed at Tell es-Safi/Gath, Israel. The beads were subjected to analysis by FTIR spectrometry in order to identify the mineralogy and materials used for their making. Among the various materials identified, such as carnelian, steatite and shells, twenty-five were made of faience. The microstructure and chemical composition of two faience beads were analyzed by electron microscopy and are the focus of this short report. Results show that cementation glazing was most likely used for one, whereas efflorescence glazing was most probably used in the production of the other. These preliminary results shed light on the variability that existed in manufacturing procedures and choice of raw materials for the production of early vitreous materials during this period.

1. Introduction

Faience is a composite material made of sintered quartz body and a glaze.[1] It is often termed 'Egyptian faience' in order to differentiate it from a specific type of tin-glazed pottery, from Faenza, Italy (also known as majolica) known from the late medieval times, which gave faience its name. However, the addition of the term 'Egyptian' may be confusing with regard to the origin of such materials in archeological contexts, and therefore will not be used in this paper.

Faience was first produced in Egypt and in the Near East, from as early as the 4th millennium BCE (Nicholson and Shaw 2000; Tite et al. 2007; Moorey 1999). Although beads in general and faience beads, in particular, are commonly found in Bronze and Iron Age archeological contexts in the southern Levant, their study rarely goes beyond description of shape and color and has been somewhat lacking in scientific analytical characterization (e.g. Blockman and Sass 2013; Getzov 2006; Mazar and Rotem, 2012, Panitz-Cohen and Mazar 2006; Seger et al. 1990; Scheftelowitz 2002). Most of the technological studies conducted on faience objects were carried out on Late Bronze Age Egyptian (New Kingdom) or Middle Bronze Age Minoan artifacts (see for e.g. Tite et al., 1983, 2007, 2009). However, there is some limited, but important analytical data, from the earlier periods of faience production (Protodynastic and Old Kingdom) as well (e.g. Kaczmarczyk and Hedges, 1983; Moorey 1999). Ilan et al. (1993) published analytical results of one glass bead dated to the EB III (or early MB I) and Bar-Yosef Mayer et al. (2004) described a large assemblage of steatite beads from Peqi'in, a Chalcolithic cave, Israel. Recently, an Iron Age assemblage of beads from Ashkelon, Israel, was also studied (Toffolo et al. 2013).

Recently, thirty eight beads securely dated to the Early Bronze Age III (EB III, ca. 2900–2600 BCE[2]) were unearthed at Tell es-Safi/Gath (Fig. 1). The site is located between the southern coastal plain of Israel and the Judean foothills. It is identified as the Canaanite and later Philistine city of Gath (Maeir, 2012). Among the many periods of occupation at the site, an extensive EB III urban settlement (ca. 24 ha. in size) was exposed. Excavations in Area E (Fig. 1b) exposed a large residential neighborhood. Two strata were identified, E6 and E5, dated to the early and late EB III, respectively, and based on both relative and absolute chronology (Shai et al., 2014).

The beads studied in this research were found on the floors and amidst the collapse of various rooms and buildings of the domestic neighborhood. It is important to note that, as beads are very small artifacts that could easily slip down to earlier occupation levels, only those that originated from clear, well-defined and sealed EB III contexts were chosen for the study. In some contexts, several beads were found together, such as six tiny beads associated with a cylinder seal that originated from a room of Stratum E5a (Locus 104,803, see Table 1).

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[1] For more on the terminology and definition of faience, see Nicholson and Shaw (2000: 177) and Moorey (1999: 166).

[2] This is based on recent 14C dating of the Early Bronze Age suggested by Regev et al., 2012. For the traditional, lower chronology of the EB III see, Mazar, 1990.

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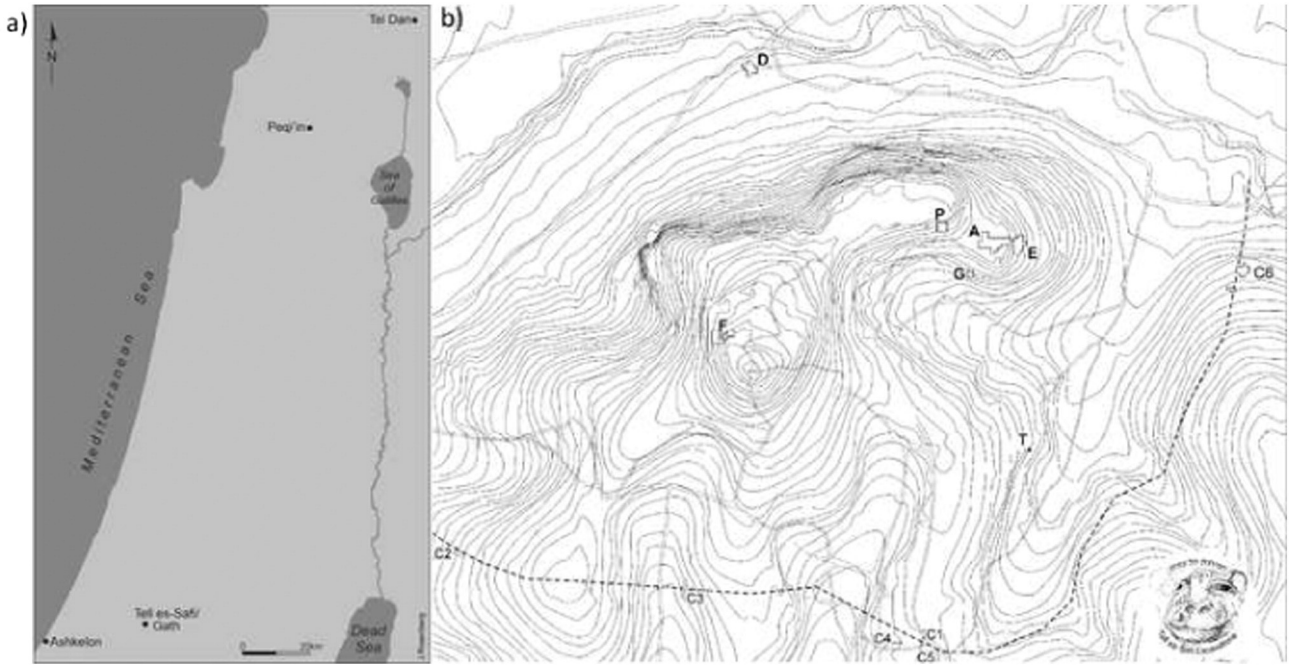

Fig. 1. A map of Israel with Tell es-Safi/Gath located (a) and a topographic map with the location of Area E, on the south-eastern slope of the upper tell (b).

Table 1
A list of the beads with their registration details color and material/mineralogy as identified using Infrared spectrometry.

Registration no.	Locus	Material/mineral	Color
1048022-3	104803	?/altered quartz	Brown/red
1343035	134307	?/altered quartz	Brown
1448011	144801	?/altered quartz	Brown
16E83C035	16E83C05	?/altered quartz	Brown
1048019	104803	Carnelian	Red/orange
1141082	114107	Carnelian	Red/orange
1044014	104403	Faience/altered quartz	Light blue/green
1048031/2	104803	Faience/altered quartz	White
1048022-2	104803	Faience/altered quartz	Light blue
1048022-1	104803	Faience/altered quartz	Light blue
1048031/1	104804	Faience/altered quartz	Brown
1141098	114107	Faience/altered quartz	Light blue
1142016	114203	Faience/altered quartz	White
1146032	114602	Faience/altered quartz	Light blue
1343107	134312	Faience/altered quartz	Light blue/green
1348078/1	134813	Faience/altered quartz	Light blue
1445071	144507	Faience/altered quartz	Light blue/gray
16E83C072/6	16E83C07	Faience/altered quartz	Brown
16E83C072/5	16E83C07	Faience/altered quartz	Gray
16E83C072/4	16E83C07	Faience/altered quartz	Brown
16E83C072/3	16E83C07	Faience/altered quartz	Brown
16E83C072/2	16E83C07	Faience/altered quartz	Brown
16E83C072/1	16E83C07	Faience/altered quartz	Gray
16E84C035	16E84C04	Faience/altered quartz	Bright green
944100	94409	Faience/altered quartz	Light blue/green
944102	94410	Faience/altered quartz	Light blue
E15AQ066	E15AQ07	Faience/altered quartz	White
E15AR077	E15AR02	Faience/altered quartz	Light blue
E15AU117	E15AU04	Faience/altered quartz	Light blue
E15AW003	E15AW01	Faience/altered quartz	Brick red
1348078/2	134813	Lime stone/calcite	White
1141099	114107	Shell/aragonite	White
17E83C059	17E83C05	Shell/aragonite	White
1141096	114107	Steatite	Brown
16E83B066	16E83B05	Steatite	Brown/red
E15AQ162	E15AQ12	Steatite	White
E15AU077	E15AU04	Steatite	Brown/red
E15AU120	E15AU04	Steatite	White

The beads and the cylinder seal may have been strung on a single necklace since they were found together in a ceramic container. Fifteen other beads, most of which were recovered by dry sifting of sediments, originated from an alley way between two buildings dated to Stratum E5a (for a more detailed description of Area E strata and phases see Shai et al., 2014). It should be noted, however, that beads (faience and other materials) were also recovered from the overlying stratum that has been dated to the Late Bronze Age. This latter assemblage is now under study and a comparison between both assemblages is one of our future aims.

Among the beads of shells, semi-precious stones (carnelian) and other stones recovered during the excavations of the EB III at Tell es-Safi/Gath, more than half (25, 65%) were identified as faience (Table 1). In this paper we will present preliminary mineralogical characterization of the entire assemblage using FTIR and the results of microstructure analysis obtained for two faience beads (Fig. 2). These two were specifically chosen to serve as a glimpse into the variability of techniques and materials used for bead production during this period. To the best of our knowledge, this is the earliest assemblage of faience beads so far subjected to analytical study from the southern Levant.

2. Characterization results

2.1. Typology

The beads, mostly exhibiting simple shapes with no decorative elements, were classified according to Beck's typology (1928). Fig. 3 illustrates some of the faience shapes identified in the assemblage. Classification analysis showed that two main types (*Type-I.A.1.b*, rounded thin disk, Fig. 3:1 and *Type-I.B.1.b*, circular short barrel, Fig. 3:7) dominated (ca. 60%) among the faience beads.

2.2. Fourier Transform Infra-red (FTIR) analysis

The thirty eight beads comprising the assemblage were characterized initially with using Fourier Transform Infrared spectrometry (FTIR). This enabled us to identify the mineralogy and materials used in bead production. The advantage of this method lies in its ability to

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