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A Lead Bulla from Apollonia-Arsūf with the Place Name Arsūf

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Abstract
This article discusses a rare lead bulla, dated to the Umayyad period, retrieved during excavations at Apollonia-Arsūf. It bears legible legends on its obverse (khātim kūrat Qaysārīyah) and reverse (madīnah Arsūf) that shed light on the administrative structure of jund Filasṭīn at the time, when kūrat Qaysārīyah still maintained its historical role as major administrative center most probably before the foundation of the district capital al-Ramlah in c. 715 CE. The article is followed by an appendix that discusses the archaeo-metallurgical characteristics of the bulla, that is to say, its microstructure, manufacturing technology and chemical composition.

EARLY ISLAMIC ARSŪF

The place name Arsūf is mentioned by several Muslim authors, from the ninth century CE onward (below). Ibn Khurraḍādhbih, who provided an accurate description of the main arteries of traffic of the mid-ninth century caliphate, mentions Arsūf between Qaysārīyah and Yafāh, on the chief road that connected Mesopotamia with Egypt. Al-Muqqaddasī mentioned Arsūf in his list of the 12 main cities of Early Islamic Palestine. He also added that, although in his time (985 CE), Arsūf was smaller than Yafāh, it was strongly fortified and densely populated.1 He further adds it was considered a ribāṭ, that is, a border town on the coastal frontier of Islam as well as a center for ransoming captives from the Byzantines. In this capacity it became part of an organized coastal warning system, which included high towers (used as observation posts and signal stations) located in the ribāṭāt, and between them and the capital al-Ramlah. On land, Arsūf was part of the country’s coastal road network, at the distance of one march from Qaysārīyah, and one march from al-Ramlah (see in this respect Marmardji 1951:7, 103, 104; El’ad 1989:297). Arsūf appears in similar lists of chief cities compiled by Ibn Rustah (early tenth century

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1 For the main Arabic sources relating to the site, see Le Strange 1890:399 (and also pp. 29, 39, 41), and Marmardji 1951:7 (and also pp. 105, 151, 162). A study on Early Islamic Arsūf (based on the written Muslim sources) was published (in Hebrew) by El’ad (1989, and esp. pp. 297–301; see also Gibb 1960; Gil 1992:220 for more concise attempts).
CE) and by Yaqūt (1225 CE), as well as on the famous map of al-Iṣṭakhrī (compiled in 925 CE; see Nebenzahl 1986:28–29 for a reproduction of a Persian version).2

Arsūf also served as a Muslim religious center where a number of scholars who studied and transmitted ḥadīth literature lived during the ninth and tenth centuries CE (El’ad 1989:298–301). The significance of the town in this period seems also to have been enhanced by a large and affluent Samaritan community. Arsūf’s Samaritan population is mentioned in the days of al-Amīn (193–198/809–813) in the Samaritan historical source of Abū al-Faṭḥ al-Sāmirī (p. 179, and remarks of the editor, Vilmar, on p. LXXX), written in 1355 CE. The Samaritan population was subjected to severe persecutions during the riots that erupted in the region in 809 CE after the death of the Abbasid Caliph Harūn al-Rashīd. The muqāwilah,3 a meeting-place in Arsūf of a sect of Samaritans called Dositheans, was burned by rebellious Muslims (Levy-Rubin 2002:69–70, 186, and also earlier discussions by Ben Zvi 1933:25; 1976:103–104; Gil 1992:292–294, 822; and Schick 1995:92–94). At any rate, Samaritans lived in Arsūf at least until its Crusader occupation in 1101 CE (Ben-Zvi 1976:103–104, with references).

The historical documentation of Early Islamic Arsūf is supported by several archaeological finds.4 Long stretches of the town wall were uncovered in the southern (Areas L, P and E) and western (Areas S and H) parts of the site, and the earliest finds unearthed in the inner adjoining rooms date to the reign of the Umayyad Caliph ‘Abd al-Malik b. Marwān (685–705 CE). The initial phase of a market street (Areas B and C) of which a section of some 65 m has been uncovered, was exposed in the eastern part of the site. Various buildings flanking both sides of the street and serving as shops and food-stalls date to the same period (Roll and Ayalon 1987; 1993). These architectural remains indicate that Early Islamic Arsūf became a fortified town, with a large part of it having already been rebuilt according to a comprehensive urban plan in the eighth century CE.

THE BULLA

A lead bulla was unearthed during the 2014 excavation season at Apollonia/Arsūf (Fig. 1).

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3 In the Arabic text the word maqālah is found, it was understood as muqāwilah by Levy-Rubin and we support her understanding, cf. Dozy 1967:421 (under the root q.w.l.).

4 The Early Islamic epigraphic evidence of the site was collected and published by Sharon (1997:112–116).
The bulla measures 23 mm in diameter and is 4.0–6.3 mm thick; it weighs 12.06 g and its obverse/reverse relationship is 6 o’clock. The channel (through which a thread was inserted) is 21 mm in length and ranges between 2–3 mm in diameter, while the relationship between the channel and both the obverse and reverse is
The bulla is intact and its general shape is quite round, but otherwise it is relatively poorly preserved and so are the majority of its symbols seen on the top and bottom of its obverse and reverse. Its surface on both the obverse and reverse has many cracks. Nevertheless, the legends are still visible and fairly legible as are the majority of symbols seen on the top and bottom of both sides. For the bulla’s archaeometallurgical characteristics see Appendix (below).

Archaeological Context
The bulla came from Area T, located on the southwestern part of the walled medieval town, north of Area E and west of Area P. The area (some 14×32 m²) exhibits (among other finds) the remains of Crusader-period residential building(s) using (in part) Early Islamic architectural remains for its construction. The bulla (Reg. No. 53511) originated in L5470, a sandy debris layer (with a depth of some 30 cm) that was embedded within a concentration of collapsed stones (L5471) in one of the building’s interior spaces (south of the W5530).

As the chronological reading of the pottery from L5470 suggests a date between the end of the twelfth century and the beginning of the thirteenth century, it seems likely that the bulla is intrusive.

Legends
The bulla is transliterated and translated as follows:

Obv. khātim kūrat Qaysāriyah (Sealing [bulla] of the urban center of Qaysāriyah)
Rev. madīnah Arsūf (Town [of] Arsūf)

The legend suggests that the bulla is another version of the “kūrah and iqālīm” type of lead bullae collected by Amitai-Preiss (2007a:60–71; forthcoming). This is the first time that a bulla of this group comes from a controlled archaeological excavation, as other bullae are known only from collections. The group of lead bullae, 41 in number, contains legends that have a place-name as a kūrah — an

5 The bulla was cleaned by Miriam Lavi, Restoration and Conservation Laboratory of the Institute of Archaeology, Hebrew University. The corroded surface was cleaned by delicate mechanical means and local dissolution of some of the corrosion layer by diluted hydrochloric acid, followed by rinsing with tap water and a final drying by means of acetone.
6 Annette Zeischka-Kenzler was the area supervisor and Tamar Harpak was the registrar.
7 We are indebted to Elisabeth (Lisa) Yehuda, who is studying the town’s Crusader-period pottery, for her observations.
8 An elongated ha appears before the alīf of khātim; an elongated kaf in kūrah; and an elongated (first) ya in Qaysāriyah. Still the elongated appearance of these letters is in accordance with the style of the script of the “kūrah and iqālīm” type bullae.
9 The ya of madīnat is connected to the dal before it, rather than to the nun after it as it should be written. The sin of Arsūf is missing a stroke.
BULLA FROM APOLLONIA-ARSŪF WITH PLACE NAME ARSŪF

urban or rather an administrative center of the surrounding region/rural area and the
name of a bulla-type seal — khātim preceding the name of a city in the following
order: khātim kūrat XXX (= place name), i.e., the seal (bulla) of the kūrah of
XXX. On the reverse of each bulla an iqālim precedes a name of a town or a smaller
region under the kūrah’s area of jurisdiction; hence a hierarchy of settlements can
be extracted from these bullae (Amitai-Preiss 2007a:68).

This is the first time an Early Islamic bulla with the name of Arsūf has ever been
documented. Bullae with other place names found in Palestine (like Arsūf, referring
to jund Filasṭīn), include Qaysāriyah, Nābulus, al-Ludd, ‘Amwās, Īliyā’ (Jerusalem),
Bayt Jibrīn, ‘Asqalān and Ghazzah. It has been argued that bullae of the kūrah
and iqālim type may have been used as receipts for the non-Muslim religious groups
residing in rural areas surrounding the places named in their legends during the
late Umayyad or early Abbasid periods (Amitai-Preiss 2007a:66–67). One such
example is a bulla of Ṭabarīyah (Tiberias), as it mentions the Jewish community
of the kūrah of Tiberias by name, Yahūd Ṭabarīyah. This is the only known bulla
from jund al-Urdunn and the only bulla of the kūrah and iqālim type that mentions
a religious group (Amitai-Preiss 2010:20; 2015:78). Among those recorded bullae,
only one bears a similar reverse formula to that of Arsūf — a bulla of ‘Asqalān
(Amitai-Preiss 2007a:162, No. 125), where madīnah precedes ‘Asqalān there.
The bulla of Arsūf may have been used as an administrative and/or fiscal sealing,
affixed to a document of some sort. Still, given the chronological context it most
likely served the site’s non-Muslim inhabitants (possibly Samaritans), as either
an administrative seal affixed to a receipt for taxes paid to the Muslim authorities
or as an individual sealing worn around the neck (or hand) as evidence that the
wearer had paid the requisite taxes. We cannot, however, support this idea on the
basis of its reading or of its archaeological context.

10 All but ‘Amwās are cited in Amitai-Preiss 2007a:62–64; for ‘Amwās see Amitai-
Preiss 2007b:19 No. 11. Another seal of ‘Asqalān is also published there (Amitai-
Preiss 2007b:19, No. 10).

11 Robinson (2005) summarized Arabic and Syriac sources for early Islam, especially
for seventh- and eighth-century Syria and Iraq, for the use of neck sealings in the
administration of the poll tax. Although he argued that neck sealing originally
related to other stigmatizing practices, and was principally symbolic and punitive,
this practice was later focused upon non-Muslims. Bullae may thus have functioned
similarly among ethnic (non-Muslim) minorities. The fact that most of the kūrah
and iqālim type bullae mention villages (placed at the bottom of a social organization
hierarchy) in their legends lends support to this conclusion. Moreover, those legible
bullae normally mention villages of ethnic minorities: worth noting are Kafīr Yahūd
(near al-Ludd [probably Jews]; Amitai-Preiss 2007a:153, No.99), Samīr (near al-
Ludd; Amitai-Preiss 2007a:154, No.102 [probably Samaritans, cf. Taxel 2013:163]),
Kafīr Līdā (near al-Ludd [probably Christians, known from Talmudic times as a
village of Gentiles called Kafar Lūdim]; Amitai-Preiss 2007a:154, No.101; Taxel
According to Ibn Khurradādhbih (820–913 CE) the term madīnah refers to the capital of a jund (a district): Ṭabarīya madīnat al-Urdunn ... al-Ramlah madīnat Filasṭīn (p. 78) and later in his text both are referred to as qaṣabah which means a capital of a county (Ibn Khurradādhbih, p. 117). As we have no historical accounts from the Early Islamic period on Arsūf prior to the ninth century CE, our knowledge on the administrative status of the site is based on later sources. Hence in al-Muqaddasī (c. 985 CE), Arsūf is mentioned in his lists of mudun (plural of madīnah) as smaller than Yafāh, strongly fortified and densely populated, with a nice minbar in its mosque that had been brought from al-Ramlah. In another place al-Muqaddasī mentioned Arsūf as the last ribāṭ in the list of the ribāṭāt of jund Filasṭīn (above). Al-Muhallabī wrote (between 975–996 CE) that Arsūf is a madīnah (city/town) on the sea shore that has a market and a wall surrounding it (p. 63).

Our bulla from Arsūf, as well as the bulla from ʿAsqalān (above) clearly portray different, probably earlier, administrative realia from those described by Ibn Khurradādhbih. Both bullae are evidence that madīnah is a city or a town rather than a capital. Hence the term on the bulla may also supply a terminus ante quem for its date, no later than the ninth century CE. The site’s legal status as a madīnah, i.e., a town rather than a major administrative center, under the administration of the kūrah of Qaysāriyah, recalls that of the Byzantine period, when Apollonia (then called Sozousa) was most probably under the direct administration of the capital of Palaestina Prima, Caesarea (Abel 1938:171–174). Hence, it seems reasonable to suggest an earlier date for the bulla, in the early stages of Umayyad rule, possibly during (or after) the reign of Muʿāwiyah I as either governor of Syria (640–661 CE) or caliph (661–680 CE), or otherwise shortly after that. Not only had he (according to some sources; Gil 1992:59) conquered Qaysāriyah — in his capacity as governor of Syria prior to his caliphate — but he had probably maintained the Byzantine-
period administrative structure (Gil 1992:110–111), which likely remained in effect until the reforms of ‘Abd al-Malik b. Marwān (a few years prior to 696–697 CE) and the foundation of al-Ramlah in the early eighth century by Sulaymān b. ‘Abd al-Malik (see, in this respect, Gil 1992:104–106; Petersen 2005:95–102). This foundation led to a new administrative situation which left Arsūf (as one of jund Filastīn’s ribāṭāt) most probably subject to the newly established capital al-Ramlah, if not in the days of Sulaymān b. ‘Abd al-Malik then shortly afterward.

Our bulla offers the first, contemporary, archaeological evidence — not attested in historical and geographical Muslim sources, which were written no less than 150 years after the Umayyad occupation of Palestine — confirming what was hitherto an assumption, namely, that Qaysārīyah served as a kūrah (on the Early Islamic site, see Holum 2011; Whitcomb 2011) — a major urban administrative center (a city), under which the madīnah of Arsūf — a secondary urban administrative center (a town) functioned. This settlement hierarchy probably belonged to the period before the foundation of al-Ramlah, most likely in the middle or late seventh or the very beginning of the eighth century, in the middle period of the Umayyad rule over Palestine.

APPENDIX: ARCHAEOOMETALLURGICAL CHARACTERISTICS OF THE BULLA

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Experimental Methods and Testing
Non-destructive testing (NDT) examination of the bulla was performed, included the following methods:

1. Visual Testing (VT) and stereo microscopy observation (up to ×50 magnification).
2. Measurements of weight, diameter and thickness.

A possible census between 668 and 670 (Foss 2010:85) could have led to this administrative reorganization in which Qaysārīyah became a kūrah as seen on the bulla. This may be strengthened by the Nessana Arabic papyri dated to 674–677 CE, where Ghazzah is termed a kūrah (Kraemer 1958:68, No. 21), while Elousa is an iqlīm (and Nessana is a village of lesser importance in the regional settlement hierarchy), quite different from the previous administrative situation reflected in the Nessana Greek papyri dated to the Byzantine period, in which Elousa formed the major city (the capital of Palaestina Tertia) and Nessana was second to it in the hierarchy of Negeb settlements (Foss 2010:84).
3. Environmental scanning electron microscope (ESEM-FEI Quanta 200FEG) in high vacuum and an Everhart-Thonley secondary electron (SE) detector was used in order to observe the two sides of the bulla’s surfaces (obverse and reverse). The composition of both sides of the bulla was analyzed by dispersive x-ray spectroscopy (EDS) using a Si(Li) liquid-cooled Oxford X-ray detector. Such an analysis connects between the microstructure of a local area and its chemical composition (Wang et al. 2015).

Results
After its cleaning (see n. 5), the bulla is silvery and glossy dark grey in color according to its external oxide cover, with a few areas with brownish tinge. Stereo microscope observation of the bulla revealed many cracks and rough topography of the bulla’s surface (Fig. 2).

![Fig. 2. Stereo microscope images of the bulla; (a) obverse and (b) reverse of the bulla](image)

SEM observation of side A of the bulla (Fig. 3, dash line square) revealed rough surface and a cast defect at the lower right part of its surface. Chemical analysis of the bulla’s obverse revealed a composition of 54.6 weight percentage (wt%) Pb, 24.8 wt% Sn and 20.6 wt% O (Table 1). Another EDS chemical analysis of the bulla at another point of the same area also revealed it was made of Pb, with additional presence of Sn and O (Fig. 4).
Fig. 3. SEM-EDS examination of the obverse: (a) the examined area of the bulla (dash line square); (1) SEM observation revealing the roughness of the bulla’s surface as well a cast defect at the lower right part of the image.

Table 1. SEM-EDS results of the lead bulla of Arsūf, using ESEM-FEI Quanta 200FEG from FEI

<table>
<thead>
<tr>
<th>Measured Area</th>
<th>Composition (wt %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obverse (side A), bulla’s surface (Fig. 3)</td>
<td>Pb 54.6</td>
</tr>
<tr>
<td></td>
<td>Sn 24.8</td>
</tr>
<tr>
<td></td>
<td>O 20.6</td>
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<td></td>
<td>Ca –</td>
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<td>Si –</td>
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<td>P –</td>
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<td>Fe –</td>
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<td></td>
<td>Al –</td>
</tr>
<tr>
<td></td>
<td>Cl –</td>
</tr>
<tr>
<td>Reverse (side B), bulla’s surface, cracked area (Fig. 5)</td>
<td>Pb 44.3</td>
</tr>
<tr>
<td></td>
<td>Sn 7.9</td>
</tr>
<tr>
<td></td>
<td>O 33.1</td>
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<td>Ca 5.2</td>
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<td></td>
<td>Si 3.4</td>
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<td>P 3.7</td>
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<td></td>
<td>Fe –</td>
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<tr>
<td></td>
<td>Al 0.9</td>
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<tr>
<td></td>
<td>Cl 1.0</td>
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<tr>
<td>Reverse (side B), bulla’s surface, circumference line (Fig. 6)</td>
<td>Pb 62.3</td>
</tr>
<tr>
<td></td>
<td>Sn 11.7</td>
</tr>
<tr>
<td></td>
<td>O 23.1</td>
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<td></td>
<td>Ca 1.3</td>
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<td></td>
<td>Si –</td>
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<tr>
<td></td>
<td>P 0.7</td>
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<td></td>
<td>Fe 0.9</td>
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<tr>
<td></td>
<td>Al –</td>
</tr>
<tr>
<td></td>
<td>Cl –</td>
</tr>
<tr>
<td>Reverse (side B), bulla’s surface, circumference line, area of small crystals (Fig. 6)</td>
<td>Pb 54.3</td>
</tr>
<tr>
<td></td>
<td>Sn 5.7</td>
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<tr>
<td></td>
<td>O 32.0</td>
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<td></td>
<td>Ca 4.6</td>
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<td>Si 1.1</td>
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<td>P 2.3</td>
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<td>Fe –</td>
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<td></td>
<td>Al –</td>
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<tr>
<td></td>
<td>Cl –</td>
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</tbody>
</table>
Fig. 4. EDS chemical analysis of the obverse (dash line square), revealing the presence of elements Pb, Sn and O.

SEM observation of the reverse of the bulla (Figs. 5 and 6) revealed rough topography of the surface, with the existence of a brittle surface of fissures network, as expected from as-cast metal. Chemical analysis of the bulla’s surface at the cracked area revealed a composition of 44.3 wt% Pb, 7.9 wt% Sn, 33.1 wt% O, as well as presence of Ca, Si, P, Fe, Al and Cl (Table 1). Another EDS chemical analysis measurement near the same area revealed it is made of lead, with the presence of the elements O, Sn, Ca and Fe (Fig. 7).

Fig. 5. SEM-EDS examination of the reverse; (b) the examined cracked area (dash line square); (1) SEM observation of the cracked area showing the roughness of the bulla’s surface, as expected from as-cast material.
Fig. 6. SEM-EDS examination of the reverse; (b) the examined area of the surrounded circumference line of the bulla (dash line square); (2) SEM observation of the surrounded circumference area showing the roughness of the bulla’s surface, as expected from as-cast material.

Fig. 7. EDS chemical analysis of the reverse (dash line square), revealing the presence of elements Pb, Sn, O, Ca and Fe.

SEM observation of the reverse, at the surrounding circumference line revealed a rough surface and small crystals of lead oxide. Chemical analysis of the circumference line, at the area that contains small crystals revealed a composition of 62.3 wt% Pb, 11.7 wt% Sn, 23.1 wt% O, as well as presence of Ca, P and Fe (Table 1). Another EDS chemical analysis of the bulla near the same area revealed it was made of Pb, with the presence of other elements, including O, Sn, Si, Ca and P.
Discussion

In order to learn more about the bulla’s composition and microstructure and to understand the manufacturing technology of the lead bulla from Apollonia-Arsûf, NTD tests were performed, including VT and SEM with EDS examination (Wang et al. 2015). The results of the SEM observation revealed that both sides of the bulla have very rough surfaces and some cast defects. According to that it was concluded that the bulla was most likely manufactured by casting. Lead was used for that purpose since it is widespread, easy to smelt, and not expensive metal that has a low melting point of 327 °C combined with excellent castability (Kahanov and Ashkenazi 2011; Scott 1996).

The EDS results confirmed the bulla was made of lead, with the presence of lead-oxide on the bulla’s surface, as well as between 5.7–24.8 wt% Sn and the presence of other elements, such as Ca, Si, P, Fe, Al and Cl. Lead that contains a small amount of tin (~5 wt% Sn) has microstructure that includes a small quantity of second phase precipitations. In such a case the metal strength as well as hardness will increase moderately. However preferential corrosion attack may occur at the second phase zones (Mao, Larson and Rao 1969). The large concentration of tin (up to 24.8 wt% Sn) on both sides of the bulla’s surfaces indicates that the bulla was made of recycled material, as solder alloy composed of lead and tin was used in antiquity to join lead parts together (Ashkenazi et al. 2013; Kahanov et al. 2015; Scott 1991).

No lead isotope analysis was performed on the bulla, however lead isotope signature is expected to be a product of a mixed signatures of the different recycled metals involved. Since lead is usually extracted from ores such as galena (PbS) and pyromorphite [Pb₅(PO₄)₃Cl], the presence of elements such as P and S may indicate the ore origin (Forbes 1964 [Vol. VIII, Ch. 6]; Kahanov and Ashkenazi 2011; Tylecote 1983).

Although the use of lead-tin alloy reduces the melting point of the lead and as a result improves the castability of the object, the use of lead-tin alloy is presumably according to economic constraints, and most likely contained remains of Pb–Sn solder material (Ashkenazi et al. 2013; Kahanov et al. 2015).

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14 All this information is found in Tal 2014:66–67.


ABBREVIATIONS

AJC Y. Meshorer Ancient Jewish Coinage. Dix Hills, NY 1982
AJN American Journal of Numismatics
BMC e.g., BMC Arab.: G.F. Hill. Catalogue of the Greek Coins of Arabia, Mesopotamia, and Persia. London 1922
BMCO e.g., BMCO 1: S. Lane-Poole. The Coins of the Eastern Khalefehs in the British Museum. Catalogue of the Oriental Coins in the British Museum 1. London 1875
CH Coin Hoards
CIL Corpus Inscriptionum Latinarum
CNP e.g., L. Kadman. The Coins of Akko Ptolemais (Corpus Nummorum Palæstinensium IV). Jerusalem 1961
CRE e.g., H. Mattingly. The Coins of the Roman Empire in the British Museum I. Augustus to Vitellius. London 1923
IEJ Israel Exploration Journal
IG Inscriptiones Graecae
INJ Israel Numismatic Journal
INR Israel Numismatic Research
LA Studium Biblicum Franciscanum Liber Annuus
MN American Numismatic Society Museum Notes
NC Numismatic Chronicle
NCirc. Numismatic Circular
NNM Numismatic Notes and Monographs
RIC e.g., C.H.V. Sutherland. The Roman Imperial Coinage I. From 31 BC to AD 69. London 1984
RN Revue Numismatique
RPC e.g., A. Burnett, M. Amandry and I. Carradice. From Vespasian to Domitian (AD 69–96). Roman Provincial Coinage 2. London 1999
SICA e.g., S. Album and T. Goodwin. Sylloge of Islamic Coins in the Ashmolean 1: The Pre-Reform Coinage of the Early Islamic Period. Oxford 2002
SNAT e.g., L. Ilisch. Sylloge Numorum Arabicorum Tübingen–Palästina IVa Bilād aš-Šām I. Tübingen 1993
SNG Sylloge Numorum Graecorum (with suffix as necessary, e.g. SNGCop.)
SNR Schweizerische Numismatische Rundschau
TINC Transactions of the International Numismatic Congress
ZfN Zeitschrift für Numismatik