GeoArch

Report 2024/22

Archaeometallurgical materials from Storey Arms

Dr Tim Young
30th December 2024

Archaeometallurgical materials from Storey Arms

Dr T.P. Young

Abstract

The submitted assemblage comprised a total of 8 pieces (118g) of vitrified, oxidised-fired hearth lining. The fragments are 12mm to 15mm in thickness, with an indurated, sandy ceramic, bearing sandstone clasts of up to 22mm, coated by approximately 5mm of dark greenish sandy glass. The larger fragments were planar to very slightly concave, but some of the smaller fragments are slightly convex.

Analysis of the slagged surface by pXRF showed very strong enrichment of iron, but low levels of copper, zinc and traces of lead were also detected.

The most likely origin for these pieces of slagged ceramic is from a metallurgical hearth, used for the working of iron. The low level of contamination by non-ferrous metals probably indicates that copper alloys were also worked, but low levels of these elements can also be acquired from the burning of coal. There was no evidence for the fuel employed in this instance.

Contents

Abstract 1

Contents 1

Methods 1

Results 1

Interpretation 1

Figure 1: pXRF spectrum from an area of glass 2

Methods

All materials were examined visually, using a low-powered binocular microscope where required.

One specimen was analysed on a semi-quantitative basis using a Bruker Tracer III-SD portable X-Ray fluorescence spectrometer (instrument belonging to the Department of Archaeology, Cardiff University). The instrument was operated with the Bruker 'yellow' filter (300µm Al + 25µm Ti), at 40kV and 9.60 µA, with a filament current of 189 µA, for 40s. The instrument was controlled by a PC running Bruker's S1PXRF with spectra stored as pdz files and csv files.

This assessment was conducted in December 2024 and was commissioned by Martin Tuck of Heneb. The materials derive from the work of Heneb on land adjacent to the public car park at Storey Arms.

Results

The submitted assemblage comprised a total of 8 pieces (118g) of vitrified oxidised fired hearth lining. The fragments are 12mm to 15mm in thickness, with an indurated, red-coloured, sandy ceramic (rounded sand grains up to 1.5mm) bearing pale/white coarse sandstone grains of up to 22mm, coated by approximately 5mm of very dark greenish sandy glass. The glass locally bears small bright blue sections, particularly adjacent to partially melted sandstone grains

The larger fragments were planar to very slightly concave, but some of the smaller fragments are slightly convex. The fragments provided no other structural information and did not include evidence or the blowhole/tuyère.

Analysis of the slagged surface by pXRF (Figure 1) showed very strong enrichment of iron, but low levels of copper and zinc; traces of lead were also detected.

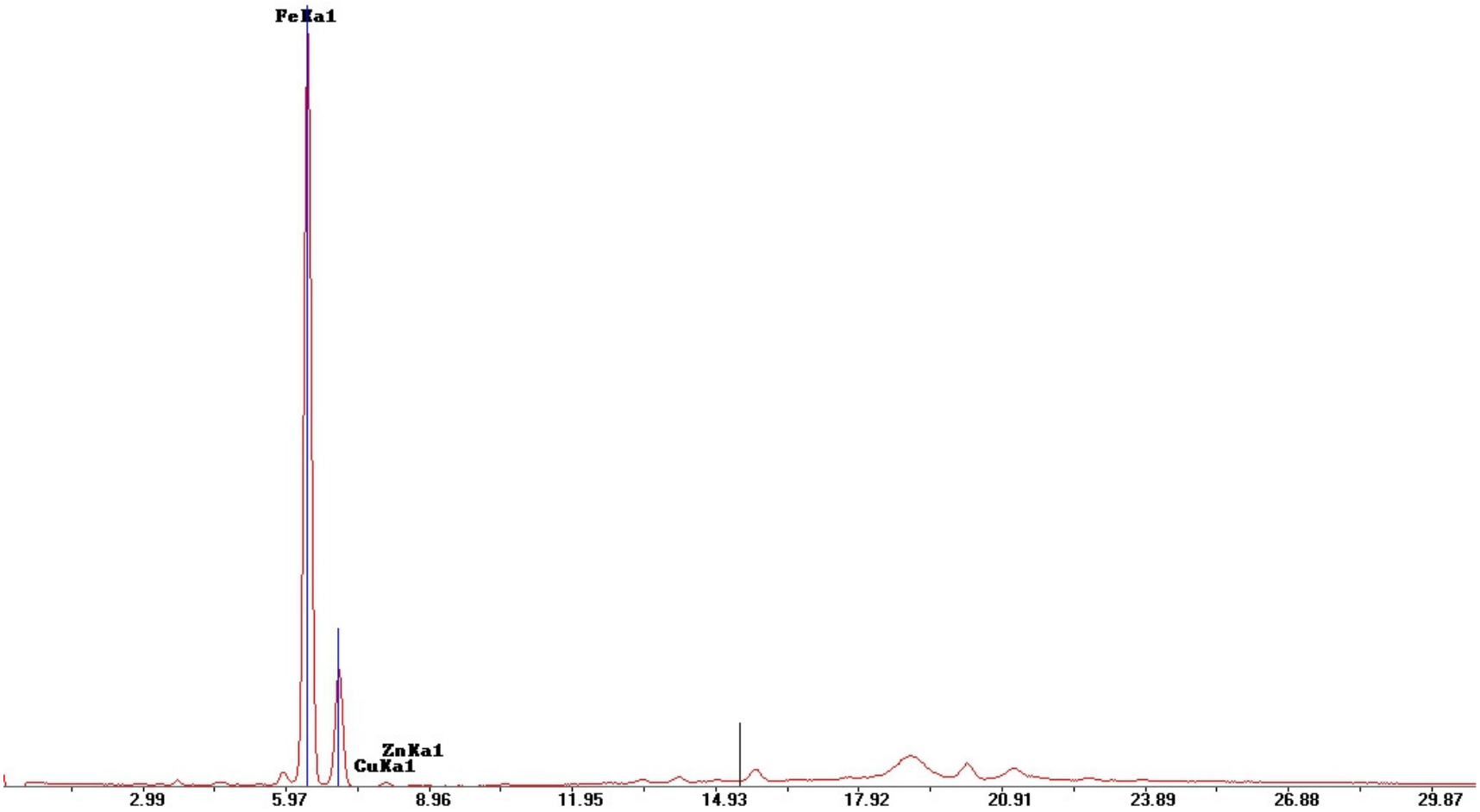
Interpretation

The assemblage is probably indicative of the lining of an early or informal smithing hearth. The lining of the hearth in a coarse gravelly and sandy ceramic suggests the use of materials of material gleaned at, or close to, the site. The presence of bright blue zones within the dark glaze would be unusual in a coke/coal fuelled hearth but does not demonstrate the use of charcoal with certainty.

The dominant contamination of the slagged lining was by iron – indicating the primary use of the hearth. The level of copper and zinc present was borderline for suggesting that the hearth had worked copper alloy too, although this appears likely. These elements can alternatively become incorporated into hearth materials from the use of coal, but there was no evidence for the fuel employed in this instance.

The material does not provided evidence for age, except that the sandy material for the lining, rather than a fire clay, may suggest that the hearth was not modern.

Figure 1: pXRF spectrum from an area of the glaze on a cermaic specimen from Storey Arms. The key peaks discussed in the text are labelled. Peaks for copper and zinc are low, but above background.



GeoArch

geoarchaeological, archaeometallurgical & geophysical investigations

Unit 6,
Western Industrial Estate,
Caerphilly,
CF83 1BQ

Office: 029 20881431
Mobile: 07802 413704

E-Mail: Tim.Young@GeoArch.co.uk
Web: www.GeoArch.co.uk