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Assessment of archaeometallurgical residues from the A31, Stewart Borrow Area (AE/15/118)

Dr Tim Young
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Dr T.P. Young

Abstract

Archaeological investigations at the A31 Borrow Area produced a single piece of material that undergone high-temperature alteration. The piece formed the face of poorly-consolidated ceramic that had undergone a degree of partial melting. Such material might be termed a fuel ash slag. The piece is unlikely to be of archaeometallurgical origin, but the precise origin is unknown.
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Methods

The material described here derives from archaeological interventions at the Stewart borrow area on the A31 scheme, conducted by IAC Ltd. This project was commissioned by Maeve Tobin.

All materials were examined visually with a low-powered binocular microscope where required. As an evaluation, the materials were not subjected to any high-magnification optical inspection, not to any form of instrumental analysis. The identifications of materials in this report are therefore necessarily limited and must be regarded as provisional.

Results

Description of residues

This site yielded a single fragment of fuel-ash slag from context 99.

The fragment, 13g in weight, was dark coloured, with irregularly fissured and fragmented bloated ceramic with some generation of a flowed melt, bearing quartz grains.

Interpretation

Materials such as this piece result from partial melting of a ceramic substrate, in part under the influence of the fluxing effect of the alkali- and alkali earth- rich ash of a fuel, usually wood ash.

Most metallurgical technical ceramics are of carefully selected clay, which is often fired to either a grey (reduced) or orange (oxidised) colour, with a discrete glassy slag on the surface. This piece shows a high degree of fracturing and bloating, which are typically characteristic of poorly prepared or wet ceramics. In metallurgy, both sacrificial clay coats on crucibles and clay coatings on metals (e.g. for techniques of brazing or carburisation/decarburisation) may show bloating – but are typically preserved with a pale grey colour (e.g. Young 2012).

Fuel ash slags formed within hearths from fragmental material (e.g. from degradation of the hearth wall) may show bloated textures, but typically form isolated nubs or slightly lobate sheets if sufficient source material was present (e.g. Young 2015), but have an overall texture quite distinct from the present specimen.

This piece shows textures which most closely resemble those formed by the partial melting of an unprepared ceramic material – such as a soil. This piece may have been formed during partial melting of a hearth substrate, for instance, where the hearth has its base on the soil surface or in a shallow cut. It is probably unlikely to have been generated during a metallurgical process, although that cannot be excluded.

Further work

The residues from the site are unlikely to be of archaeometallurgical origin, although the precise process that generated the material is unknown. It is unlikely that further analysis would be able to shed light on this or to provide any other additional archaeologically useful information. Consequently, no further analysis is recommended, unless specific questions are raised from its archaeological context.

The sample should be deposited with the appropriate institution with the site archive.

References

YOUNG, T.P. 2012. Appendix 3 -. Exploiting the bog -: iron production and metalworking, pp. A3.1 – A3.60 *In:* P. Stevens & J. Channing, *Settlement and Community in the Fir Tulach Kingdom*. National Roads Authority and Westmeath County Council.

YOUNG, T.P. 2015. Fuel ash slags from Ysgol Bro Dinefwr, Llandeilo, Carmarthenshire. *GeoArch Report 2014-32.* 20pp.

Table 1: summary catalogue of macroscopic materials. All weights in g.

context	sample	sample wt.	item wt.	item no.	item notes
99	48	13	13	1	lining/FAS, a disrupted sheet of dark-coloured, partially-melted ceramic; the most melted textures have quartz grains in black glass, but much of the ceramic is just bloated; the surface is fissured and some pieces have moved and appear like clasts; fragment now broken into two pieces (with an imperfect join)

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

Office:	029 20881431
Mobile:	07802 413704
Fax:	08700 547366
E-Mail:	Tim.Young@GeoArch.co.uk
Web:	www.GeoArch.co.uk