HISTORIC ENVIRONMENT SCOTLAND | ÀRAINNEACHD EACHDRAIDHEIL ALBA

The Dumbarton Cross Pendant

Uncovering the Mysteries of an Early Medieval Object

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A small cross pendant was found in 1995 during a watching brief at Dumbarton Castle.

Based on form, it was thought to be early medieval and possibly link to other evidence of an early Christian site, St Patrick's Chapel, located in the vicinity of the governor's house. As it was found out of any archaeological context, a scientific examination was required to further understand the object and to facilitate future interpretation and display.

The cross was investigated with optical microscopy, portable XRF and SEM-EDS.

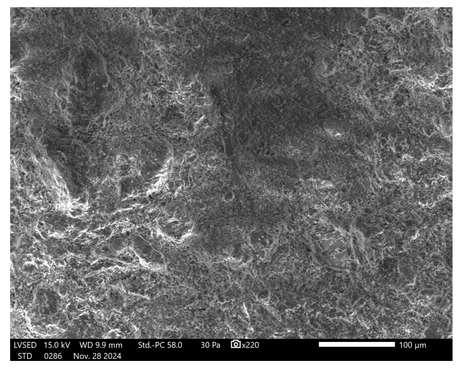
The Dumbarton cross pendant, rear face

The Dumbarton cross pendant, front face

Internal Fabric of the Cross

An exposed section on the front of the cross' arm allowed for an investigation of the internal fabric of the cross.

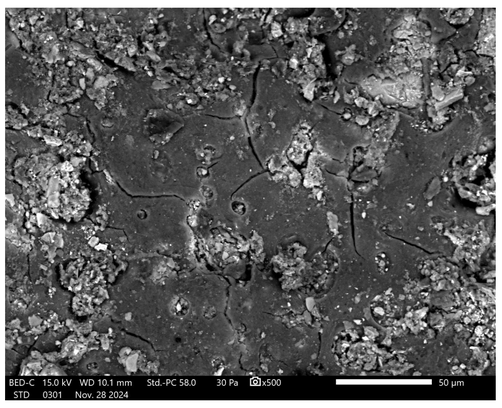
Optical microscope image of exposed section on the arm of the cross



Secondary electron image of the exposed fabric of the cross

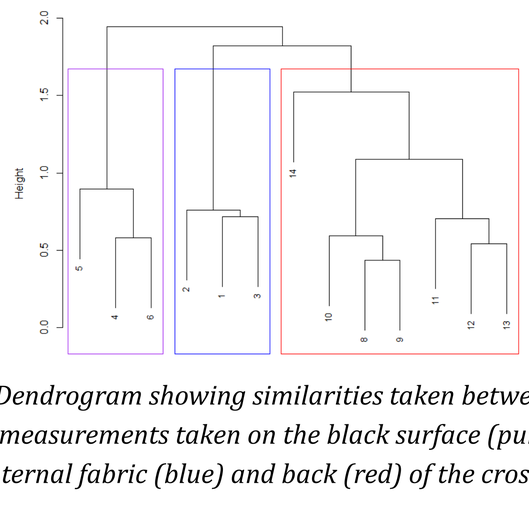
The unconsolidated nature of the internal fabric just below the surface, compared with regions of undamaged consolidated surface elsewhere on the object, suggests the cross is a poorly fired ceramic.

Front surface: Black Material



Backscatter electron image of the black surface on the front of the cross

The front of the cross has a thin black surface coating, which SEM-EDS revealed is carbon-rich. Cracks and rounded vesicles in this surface could indicate heating.



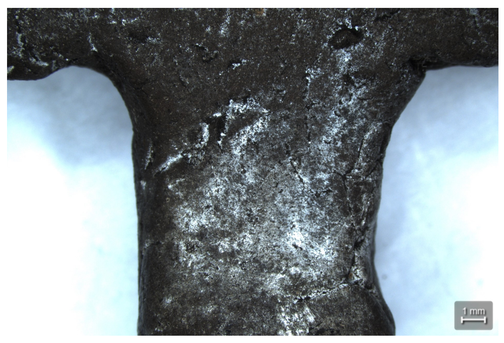
Cluster Dendrogram showing similarities taken between compositional measurements taken on the black surface (purple), exposed internal fabric (blue) and back (red) of the cross.

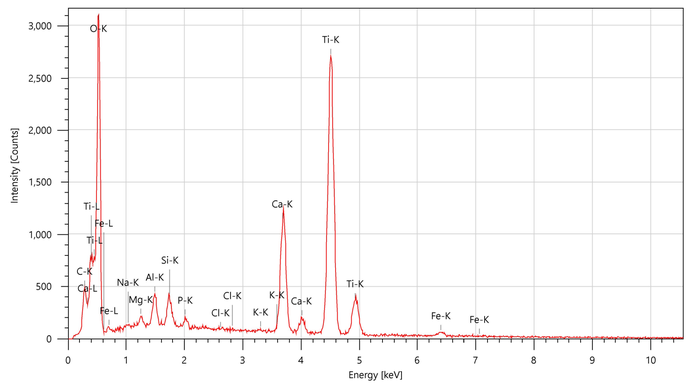
With statistical clustering analysis (see above), it is clear that the black surface is significantly compositionally different from the rest of the material of the cross. It is some form of surface treatment, possibly using charcoal.

Rear surface: White Material

White material on the rear of the cross was identified by SEM-EDS as titanium oxide, with smaller concentrations of calcium oxide and other small concentrations of geological material.

Optical microscope image of back of cross





SEM-EDS spectra of the white material on the back of the cross

This composition does not reflect any natural titanium mineral, as both the iron and calcium oxide concentrations are too low. Traces of this white material are present across the rear of the cross, but are not found on the other sides of the object.

Several possible origins have been suggested for this material:

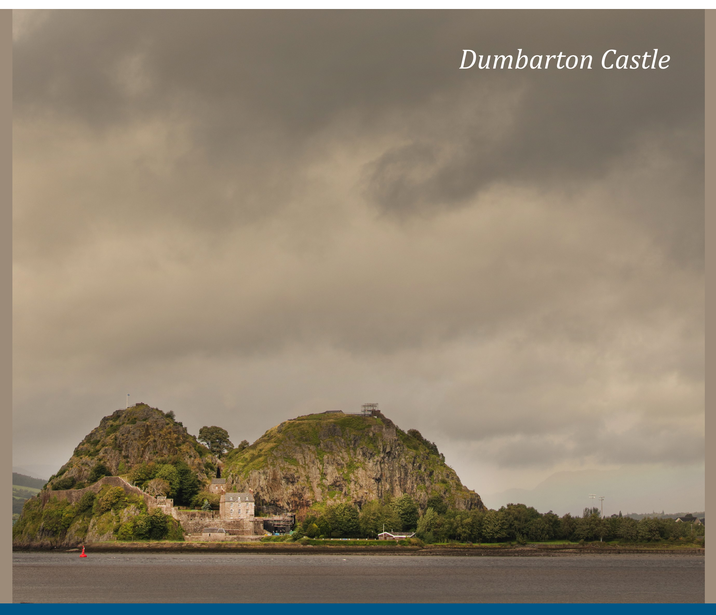
- Modern white pigment, applied either on a modern object or a historic one.
- Soil pollution from another modern source:
  - ♦ Smokescreens used when Dumbarton Castle was an anti-aircraft base in WW2.
  - ♦ Fertiliser used in the castle's gardens.

The lack of any contextual information regarding the find spot of the object makes it difficult to distinguish between these possibilities. For example, we don't know which way up the cross was oriented underground.

Scientific investigation has added significantly to the story, and the mystery, surrounding the Dumbarton Cross Pendant.

The cross was investigated by multi-disciplinary teams across Historic Environment Scotland, ahead of a new exhibition at Dumbarton Castle.

Photogrammetry of the pendant has been taken by the HES Digital Documentation and Innovation Team and the finished model can be viewed on the HES sketchfab profile. Historical research and context was provided by the Cultural Resources Team.



Dumbarton Castle